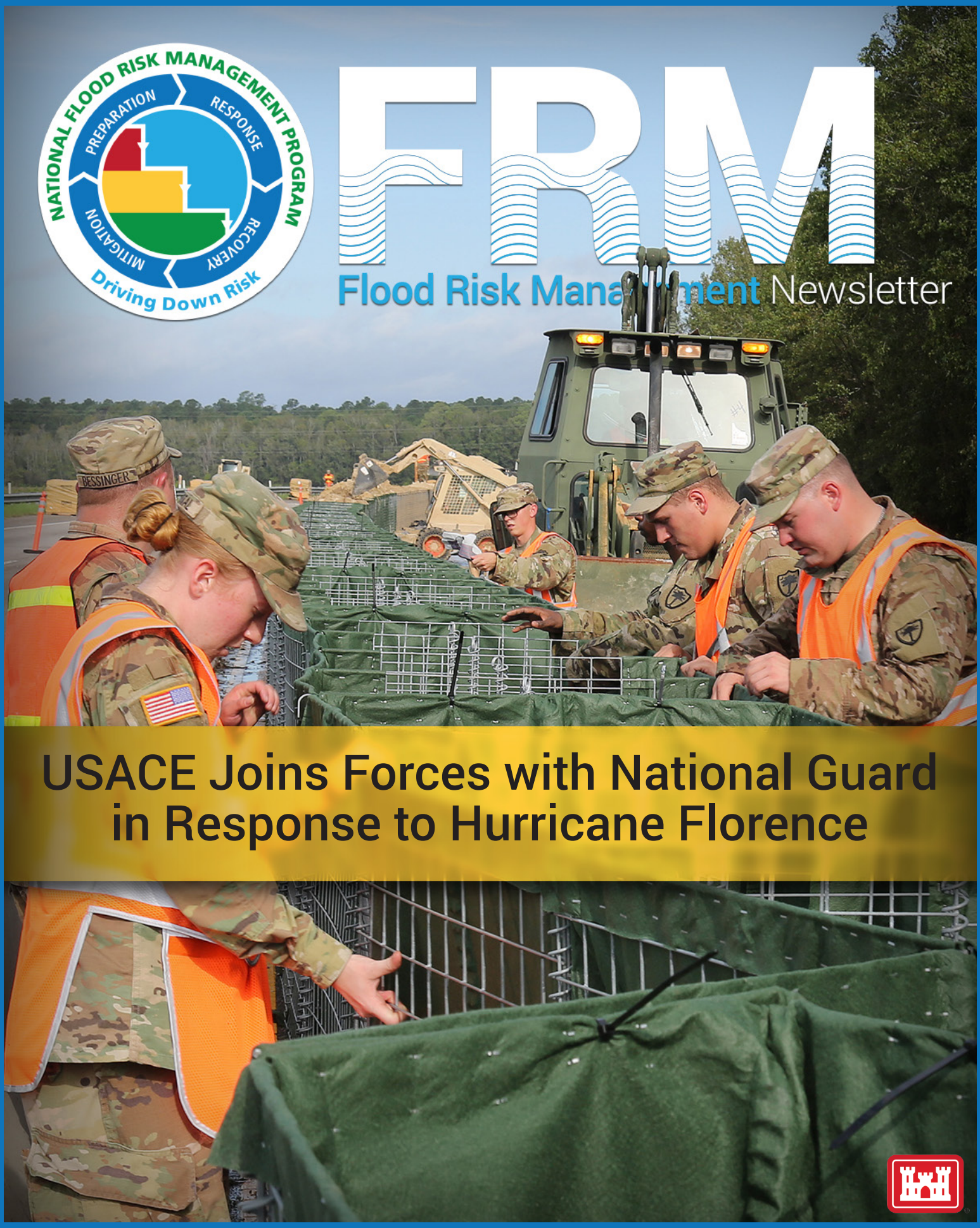

USACE Joins Forces with National Guard in Response to Hurricane Florence

January 2019 • vol 12 no 1

Flood Risk Management Newsletter

US Army Corps of Engineers

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CONTENTS
January 2019

P.1 Farewell and Best Wishes to Jeff Jensen

P.3 California's Green Infrastructure Inventory Encourages Further Evaluation

P.5 Army Corps of Engineers Joins Forces with National Guard in Response to Hurricane Florence

P.7 Workshops Focus on Comprehensive Solutions to Challenging Interior Flooding in Nation's Capital

P.9 Mini-Argus Nearshore Video Imaging: An Adaptive Management Capability for Flood Risk Management

P.11 Districts Connect and Learn Through Levee Safety Risk Communication Tabletop Exercises

P.14 New Federal Flood Risk Management Program Website Launches

P.15 Other Important Information

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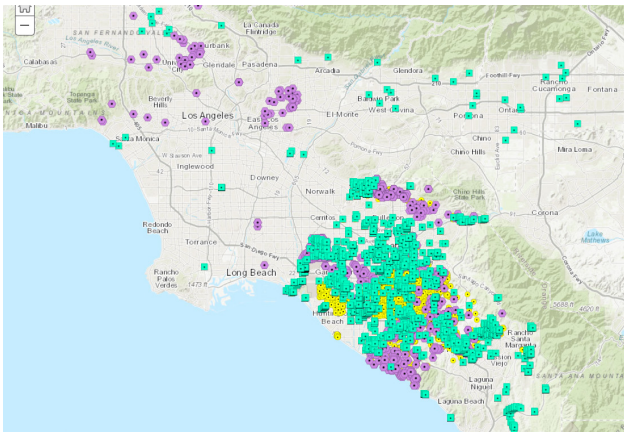
In This Issue



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P.3

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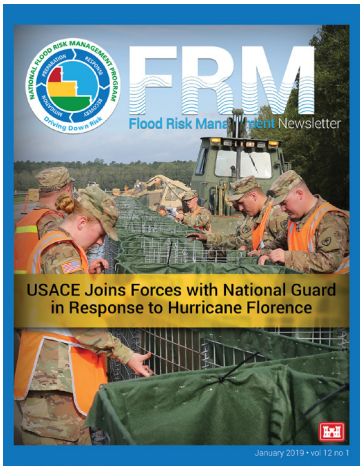
P.11



On the Cover

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U.S. Army Corps of Engineers logistics and technical advisors joined forces with South Carolina National Guard engineering battalions as part of Hurricane Florence response and recovery operations in Horry County, S.C.

P.5

Farewell and Best Wishes to Jeff Jensen

By Mark Roupas, Deputy Chief, Office of Homeland Security

A hearty welcome to 2019 and thank you for taking the time to read this edition of the FRM Newsletter. I want to take a moment to recognize, both personally and professionally, and thank Mr. Jeff Jensen, Deputy Director of the National Flood Risk Management Program (NFRMP), on his retirement. Jeff has been a part of the NFRMP since the early days of the program and is a plankholder of the development of its initial program guidance. As Deputy Director, he was responsible for the planning, direction, and coordination of flood risk management and other related emergency activities as well as for the development of national policy for FRM, and served a critical role in guiding and supporting the NFRMP team that includes USACE and its partners.

Early in the development of the NFRMP, Jeff was instrumental in conducting the initial outreach and coordination with Districts and Divisions that led to the framing, socializing, and establishing of the program and its structure across the agency. He was a tireless advocate for the establishment of regularly occurring forums for face-to-face interaction and engagement with key federal, state, and other partners in flood risk management (including the Silver Jackets Program) – an ongoing initiative that continues today and, in my personal opinion, one of the reasons we have been successful. In his role as Deputy Director, Jeff has also been a champion for many other initiatives, including the promotion and funding of interagency collaborative studies completed by the Silver Jackets teams and the establishment and development of a National Flood Risk Characterization Tool (NFRCT). This tool allows for the exploration of national-level flood risk assessment for policy decision-making.

In addition to serving as the Deputy Director of the NFRMP, Jeff served with distinction as the USACE Flood Risk Management Business Line Manager. The FRM business line is a multi-billion dollar effort and is the second largest business line within the entire Civil Works portfolio. In this role, Jeff has been instrumental to every aspect of flood risk management within the authority of the agency. Jeff managed the funding of every program that supports the USACE flood risk management mission, both through regular appropriations and supplemental appropriations when they relate to flood risk management and also as they impacted several other civil works appropriations. For those old enough to remember, there was an old advertisement for an investment company with the tag line, "When E.F Hutton speaks, people listen." In my attendance to the budget development, defense, and execution briefings to senior leaders, the same can be said of Jeff; when he spoke, people listened, for his rational and well explained statements on the FRM business line. Jeff excelled in this role and served as a passionate champion for the NFRMP, for which we are most grateful.

Jeff began his civilian career in the USACE Emergency Management Branch after retiring from the US Army in January 2003. When I first met Jeff, he was serving as USACE's first

liaison to the Department of Defense's newly created Assistant Secretary of Defense for Homeland Defense and America's Security Affairs position. This office and position was established in 2003 in response to the terrorism events of September 11, 2001 to serve as a compliment to the creation of the Department of Homeland Security. When I took over this role from him in the Pentagon, Jeff came back to the headquarters to serve as the Public Law 94-99 Program Manager, leading the development of key changes to the Corps' Rehabilitation Inspection Program through a revision to Engineer Regulation (ER) 500-1-1 (Jeff, we are still working to update this document). The knowledge and expertise gained from this experience proved tremendously beneficial as well, as Jeff served as a phenomenal source of information regarding the relationships and opportunities between flood risk management and emergency management, and establishing our current understanding of the Emergency Management Community of Practice.

I would be remiss if I didn't mention his military career which included assignments as Commander of a Combat

Continued on page 2.

Engineer Company, Deputy Director of Engineering & Housing for the Presidio of San Francisco, Deputy District Engineer, San Francisco District, Military Construction Program Manager for the U.S. Intelligence & Security Command, and Deputy Chief, U.S. Army Corps of Engineers Emergency Operations Center (UOC). Jeff also served as an operations officer in the UOC while a Major in the US Army.

Jeff, I want to extend my deepest appreciation, and that of the entire NFRMP team, to you for all your efforts and work for the NFRMP over the past 10+ years and for your exemplary work to the entire Civil Work's program as a model for how a Business Line Manager should operate. I think I speak for the entire NFRMP team when I thank you for the humor you've injected over the years, particularly through the many farm analogies and stories you've shared. The llamas and bee exploits will be missed, as will the free produce. Thank you Jeff and best wishes in your next steps!

California's Green Infrastructure Inventory Encourages Further Evaluation

By David Silvertooth, USACE Los Angeles District

Green infrastructure provides a more sustainable alternative for managing stormwater in urban environments in comparison to conventional, single-purpose piped drainage and water treatment systems (or grey infrastructure). Green infrastructure elements, such as bioretention basins, bioswales, and permeable pavement, can deliver multiple environmental, social, and economic benefits by reducing impervious cover, capturing and conveying localized flood waters, promoting infiltration, replenishing depleting groundwater supplies, improving runoff quality, reducing flood risk, and improving drought resiliency. Green infrastructure initiatives are being pursued at the local, state, and federal levels, as well as through NGOs and research institutions. Projects that rely on green infrastructure principles have been implemented throughout Southern California, especially in the highly urbanized Los Angeles metropolitan area. While the adoption of green infrastructure is on the rise, there is a need to better understand the existing inventory of regional and local projects to identify best practices and the most favorable opportunities for greening the water resources infrastructure portfolio.

This need led to the Silver Jackets Flood Plain Management Services (FPMS) Interagency Nonstructural Green Infrastructure project, which investigated the portfolio of existing green infrastructure features (e.g. best management practices (BMPs), low impact development (LID), etc.) in Southern California through the development of a GIS database. The goal of the effort was to ensure existing project information was shared so future design efforts can be optimized for efficiency and effectiveness. The project was led by the California Silver Jackets Team in a coordinated effort with USACE Engineering Research & Development Center, the U.S. Environmental Protection Agency, the California Department of Water Resources, Counties of Los Angeles and Orange, City of Los Angeles, California State University Northridge, Cal Poly Pomona, and the Southern California Coastal Water Research Project (SCCWRP).

The term "green infrastructure" can have multiple definitions and scope so the team began by defining the term "green infrastructure" to determine the appropriate data to collect. The team defined green infrastructure as an approach to stormwater management that emphasizes the use of natural drainage features and/or multibenefit elements used to capture, infiltrate, reuse, and/or clean urban runoff and precipitation, thus reducing flooding and water pollution and helping address drought resiliency.

This definition served as a guide for this project only and was intentionally broad to include as many innovative projects as possible, while excluding large-scale flood risk management projects like dams or reservoirs. The use of "natural features" was not intended to imply that a green infrastructure project must be 100 percent natural, and it was also emphasized that the designation was not intended to serve as a regulatory definition.

Using the definition as a basis, the team then drafted a series of questions to clarify objectives of the data collection process, i.e., what the team wanted to get out of the data. These questions were put in hierarchal order to prioritize data collection and led to a comprehensive list of proposed data targets for the compilation effort. This list was then formatted in a spreadsheet that could eventually serve as an attribute table for a GIS map or database.

An evaluation of existing databases by the Silver Jackets FPMS Interagency Nonstructural Green Infrastructure team found that data on green infrastructure projects currently exist on several web sites. None of these systems, however, serve to compile these data across all agencies, the sites are not well-integrated, and the data can be difficult to access. Furthermore, there is currently no means or incentive for these organizations to share or disseminate their data. For this reason, there is a need for the development of an LID BMP central repository for collected data on LID BMP project locations, monitoring data, and metadata. A LID BMP database has the potential to have many functional elements, but an important first step is to have an accessible, central repository for long-term data storage.

A variety of GIS tools and platforms were considered, but it was determined that an online GIS web viewer would be the most accessible and intuitive tool. Compiling data in a simple spreadsheet and using this type of tool also provided flexibility in the future use of the dataset.

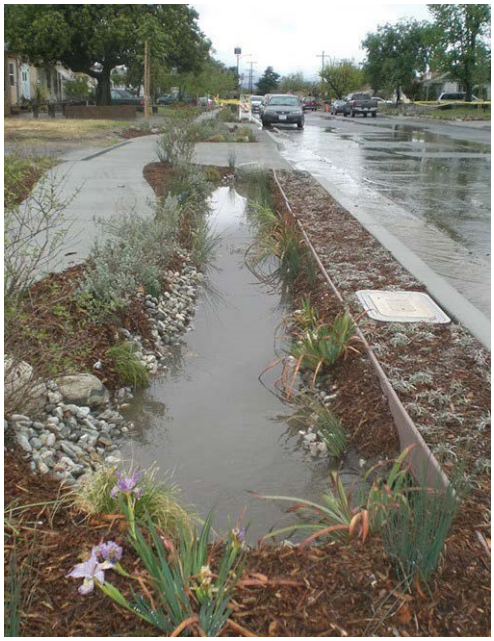
The current GIS tool includes more than 6,000 project features from the Counties of Orange and Los Angeles, including the City of Los Angeles and other municipalities in Southern California. The team is currently evaluating the appropriate, permanent host site and an administrator for the dataset. Designating the host site and administrator will ensure future green infrastructure projects are included in the dataset and the maintained

Continued on page 4.

Federal, state, and local agencies, working together, compiled data features from more than 6,000 green infrastructure projects in Southern California into the GIS database.

data would be valuable in selecting future investigations. Data uses for assessment of prospective investigations could include evaluating performance effectiveness of existing projects, compiling lessons learned, identifying inefficiencies, and proposing potential modifications to optimize performance objectives. Investigation findings could also lead to more effective design approaches that help resource managers attain city, state, regional, and federal goals.

This project was a vital first step in bringing federal, state, and local agencies together to begin partnering on a greener future for the region through data sharing and encouraging multiple entities to use the database in order to provide the critical data needed to evaluate the performance of LID BMPs.



Army Corps of Engineers Joins Forces with National Guard in Response to Hurricane Florence

By Edward N. Johnson , USACE Tulsa District

Members of the South Carolina Army National Guard fill wire mesh flood barriers provided by the U.S. Army Corps of Engineers with sand along U.S. Highway 501 in Horry County, S.C., to help mitigate the risk of flooding and keep the route open for emergency responders and food deliveries, Sept. 17, 2018. Army National Guard engineering units are working here with U.S. Army Corps of Engineers logistics and technical experts in support of FEMA, state and local partners during post-storm recovery operations. (U.S. Army photo by Edward N. Johnson)

U.S. Army Corps of Engineers logistics and technical advisors joined forces with South Carolina National Guard engineering battalions as part of Hurricane Florence response and recovery operations in Horry County, S.C.

"I just want to say what an honor it is for the Corps of Engineers to support our FEMA, local, and state partners in this post-storm period," said the USACE South Atlantic Division Commander, Brig. Gen. Diana M. Holland. "One of the ways we helped here is with flood mitigation efforts along U.S. Highway 501."

Philip Bethea, a construction engineer with the South Carolina Department of Transportation underscored the importance of keeping the 501 corridor open as long as possible.

"Our goal was to keep at least one lane open in each direction of the highway to ensure local residents had access to medical services, food and supplies," said Bethea. "Fortunately, the Army Corps and National Guard helped make that happen."

Lt. Col. William A. Matheny, commander, 122 Engineering Battalion, was the South Carolina National Guard's senior engineer on the ground and at the center of efforts to mitigate the risk of flooding in the area.

"This actually wasn't the first time I'd had the privilege of serving with Brig. Gen. Holland," said Matheny. "She was my commander during a 2013 deployment to Afghanistan and we really appreciated the resources she and her personnel were able to provide in support of our operations on the ground in Horry County."

With that in mind, USACE personnel worked around the clock to support the effort.

According to Tommy Fennel, USACE's on-site liaison officer assigned to the Horry County Emergency Operations Center, there were USACE personnel from across the country integrated into state and local efforts to provide logistics and technical advice regarding Hurricane Florence flood response efforts.

"We supplied more than 22,000 linear feet of wire mesh barrier material and 125,000 sandbags to this site alone," said Fennel. "These mission critical supplies were deployed at the direction of the South Carolina Department of Transportation to help protect areas impacted by flooding."

Continued on page 6.

Cpt. Joseph Varin (right), commander, 125th Engineer Multi-Role Bridge Company, South Carolina National Guard, discusses bridging operations with U.S. Army Corps of Engineers, South Atlantic Division Commander, Brig. Gen. Diana M. Holland, as part of ongoing efforts to mitigate the risk of flooding brought about by Hurricane Florence along the U.S. Highway 501 corridor in Horry County, S.C., Sept. 18, 2018. Army National Guard engineering units are working together with U.S. Army Corps of Engineers logistics and technical experts in support of FEMA, state and local partners during post-storm recovery operations. (U.S. Army photo by Edward N. Johnson)

Emergency Operations Planner Andrew Fleming, Louisville District, U.S. Army Corps of Engineers, operates a hydraulic sandbag filler in Horry County, S.C., in support of Hurricane Florence flood risk management efforts underway across the region here, Sept. 16, 2018. The sandbagging system can generally fill up to 500 sandbags per hour and greatly enhances USACE's ability to provide sandbags during natural disasters. Since arriving in S.C., Fleming's has worked with the local Army National Guard units to fill more than 5,500 sandbags since his arrival following the storm. When disasters occur, USACE teams and other resources are mobilized from across the country to assist FEMA, state and county efforts regarding flood response. (U.S. Army photo by Edward N. Johnson)

U.S. Army Corps of Engineers, Charleston District Commander, Lt. Col. Jeffrey Palazzini (left), coordinates flood mitigations efforts underway along U.S. Highway 501 in Horry County, S.C., following impact of Hurricane Florence with South Carolina Army National Guard Lt. Col. William A. Matheny, commander, 122 Engineering Battalion, Sept. 16, 2018. Army National Guard engineering units are working here with U.S. Army Corps of Engineers logistics and technical experts in support of FEMA, state and local partners during post-storm recovery operations. (U.S. Army photo by Edward N. Johnson)

Workshops Focus on Comprehensive Solutions to Challenging Interior Flooding in Nation's Capital

By Sarah Lazo , USACE, Baltimore District

Participants attend a Silver Jackets Workshop.

The Federal Triangle and its surrounding area is the center of tourism in the District of Columbia. The area includes the National Mall and is home to some of our nation's most iconic and significant buildings, including the Smithsonian Institution, Internal Revenue Service Headquarters, U.S. Commerce and Justice departments, and National Archives. This means there is a lot at risk when it comes to flooding.

The District of Columbia is situated in an area that makes it prone to flooding. It can be flooded via three ways: Potomac River freshwater flooding from the upper watershed, Potomac River tidal/storm surge flooding and interior flooding.

The District of Columbia Levee System, which was constructed by the U.S. Army Corps of Engineers (USACE) and is maintained by the National Park Service (NPS), reduces risks from major flooding along the Potomac River; however, the threat of interior flooding remains. Interior flooding is caused by heavy localized rainfall that descends directly over the District in a short period of time and overwhelms stormwater systems.

The Federal Triangle area experienced a major interior flood in summer 2006 that resulted in disruption of and millions of dollars in damages to buildings, utilities and the Metro system. Double digit rainfall totals affected parts of the region over the course of five days. At Reagan National Airport, nearly 8 inches of rain fell in a 24-hour period, surpassing the previous rainfall record by more than one inch.

Since this time, a few studies have been conducted and various agencies have worked to flood proof their individual buildings; however, a comprehensive solution does not yet exist. This lingering hazard led the District of Columbia Silver Jackets team to host two workshops in summer 2018 specifically focused on interior flood risk in the Federal Triangle, bringing together more

Continued on page 8.

than 75 facility managers, planners, architects, engineers, environmental specialists and emergency managers from federal and district agencies, international embassies, non-profit organizations and academia.

Agencies represented included USACE, NPS, District Department of Energy and Environment (DOEE), National Capital Planning Commission, Architect of the Capitol, General Services Administration, National Archives and Records Administration, National Gallery of Art, U.S. Commissions of Fine Arts, and the Smithsonian Institution.

"We cannot wait for another event like the 2006 flooding before we take further actions," said DOEE DC Floodplain Manager and DC Silver Jackets Co-leader Phetmano Phannavong. "These workshops provided a forum for stakeholders to openly discuss potential solutions to the flooding risks we face together. As flood risk management leaders in the District of Columbia, the DC Silver Jackets team is always seeking solutions to reduce flood risks in collaborative and creative ways."

The intent of the first workshop held at the University of DC June 6 was to provide attendees with an overview of the flood history and risk in the Federal Triangle; discuss steps individual agencies are currently taking to flood proof their properties via a panel discussion; present types of interior flood risk management measures; and engage through an interactive breakout session on key opportunities and challenges related to interior flooding in the area.

"We were provided with everything a new or even a seasoned facilities manager needs to learn about the history of flooding in the Federal Triangle area, and, more importantly, dialogue with leading experts on how to best mitigate flood risk to our own facilities in the future," said National Gallery of Art, Facilities Management Chief Dave Samec. "During the panel discussions, we learned about the flood proofing techniques that other facilities are currently employing, as well as other larger-scale holistic options, and this was followed up with frank conversations during the breakout session regarding the pros and cons, costs and other considerations for each."

> "Because of the information gathered from these workshops, we are now armed with a wealth of perspectives and ideas to provide stakeholder leadership with the goal of achieving consensus on a path forward for reducing interior flood risk in this critical area."

The second workshop, also held at the University of DC, Sept. 5 focused on potential relevant interior flood risk management solutions for this area based on input gathered from the first workshop. Types of projects discussed included underground storage and/or conveyance out of the Federal Triangle, underground storage with parking, upstream detention techniques, restoration of natural drainage, and flood proofing of buildings. Breakout sessions focused on the identification of potential advantages and challenges associated with each type of project; potential funding opportunities and partnerships; and short-term interim interior flood risk management actions.

"With participants from various agencies with different backgrounds and responsibilities, including an international perspective with representation from the Danish, Dutch and Seoul governments, the afternoon breakout sessions were lively," said USACE, Baltimore District, Silver Jackets Coordinator Stacey Underwood. "The flooding problem and potential solutions are challenging, especially with the number of invested stakeholders in the area, and everyone was able to come to the table and share their views and learn from one another."

"The workshops make clear that cultural institutions, federal and district agencies and utilities must collaborate in the near term to develop shared solutions and seek funding to protect our assets and make them more resilient," said Smithsonian Institution, Associate Director for Planning Ann Trowbridge.
The project team is planning to meet with executive leaders of the area's primary agencies to discuss the flooding issue and next steps.

"Because of the information gathered from these workshops, we are now armed with a wealth of perspectives and ideas to provide stakeholder leadership with the goal of achieving consensus on a path forward for reducing interior flood risk in this critical area." said Underwood.

To view presentations and documents from these workshops, visit the DC Silver Jackets web page: https://silverjackets.nfrmp.us/State-Teams/Washington-DC.

Mini-Argus Nearshore Video Imaging: An Adaptive Management Capability for Flood Risk Management

By Dr. Brittany Bruder, Dr. Katherine Brodie, Mr. Nicholas Spore, and Mr. Alexander Renaud,
Engineer Research & Development Center, Coastal & Hydraulics Laboratory, Field Research Facility District

USACE utilizes sand placement, via dune restoration or berm construction, to combat coastal erosion, extreme runup, and overtopping for Flood Risk Management (FRM) on federal beach projects. Project health and performance is typically assessed via low frequency morphologic surveys (2-3 between placements). Low frequency surveys do not provide a complete description of project health as they cannot quantify beach response to individual erosive events nor isolate long-term seasonal trends. To understand project performance and any site-specific natural processes, USACE districts need an improved ability to monitor the state of these projects at higher spatial and temporal resolution and lower costs relative to existing methods. Existing in-situ monitoring methods can be cost and safety prohibitive as they are either time-consuming or may put individuals in dangerous situations. This is particularly true during storm events, the most disruptive and dynamic conditions, where project monitoring is needed most.

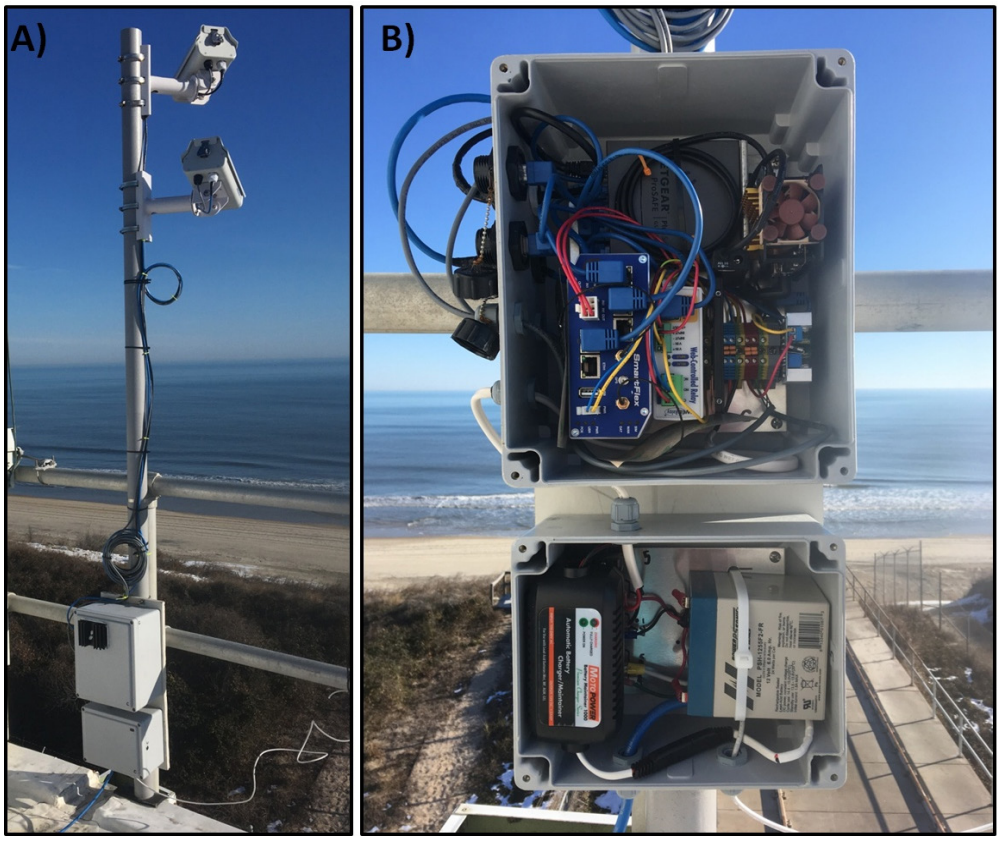


Figure 1: First generation mini-Argus design. A) External components. B) Internal components.

Coastal imaging is a promising tool to supplement traditional survey data; imagery of the coast can be exploited qualitatively and quantitatively to provide information on coastal processes, beach & dune topography, nearshore water depths, sandbar positions, wave runup elevations, as well as the condition of coastal infrastructure or navigability of harbor or inlet entrances. The Argus coastal imaging system has been developed at ERDC-CHL's Field Research Facility (FRF) with Oregon State University (OSU) for over 30 years. However, Argus systems require the installation of tower infrastructure and therefore somewhat high initial financial and temporal capital. Towers cannot be erected quickly prior to storm events, nor is it cost efficient to build a tower for small, short term projects. Recent development of the mini-Argus station provides opportunities to set up a nearshore monitoring station near federal beach projects quickly and inexpensively.

Research at CHL's FRF in collaboration with OSU and the U.S. Geological Society through the Coastal Imaging Research Network has led to the development of the Mini-Argus. A single mini-Argus station consists of a small computer processor, running software that controls two gigabit ethernet (GiGe) cameras (Figure 1). Mini-Argus utilizes the same software as full Argus stations. The software, designed by OSU is unique and advantageous because it computes full frame image statistical products in near real time. In addition, it also can save videos of desired pixels rather than full frames to significantly reduce file sizes. The system is autonomous, time synchronized, and remotely accessed/controlled through a mobile internet router, i.e. successful operation during storms requires no on-site personnel. The self-contained system operates on solar or traditional AC power. The system fits easily in a mid-size SUV allowing for rapid deployment and installation on top of tall structures (1 day).

In August 2018, ERDC-CHL installed three mini-Argus systems for a district pilot deployment with USACE Jacksonville District (SAJ). The site, New Smyrna Beach, FL, has historically

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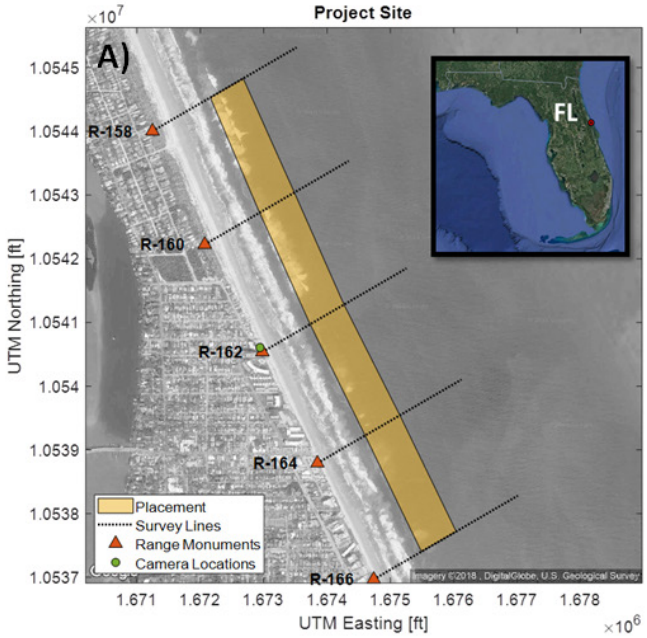

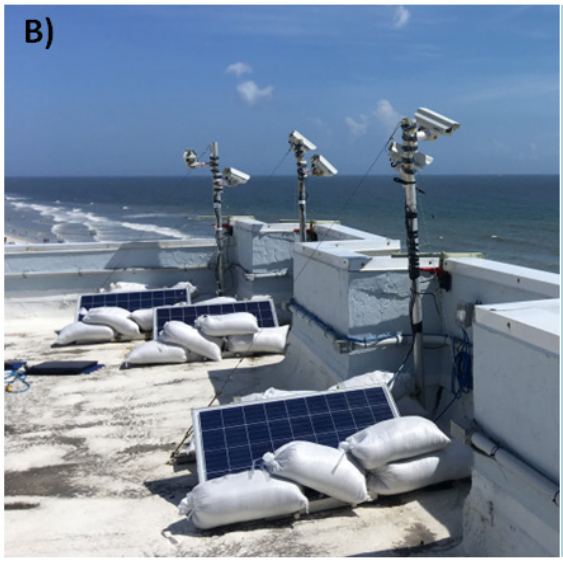

Figure 2: Pilot deployment A) Site: Nearshore Berm Placement at New Smyrna Beach, FL. B) System install at New Smyrna Beach with storm-proof mini-Argus design.

suffered severe seasonal beach erosion due to storms and was scheduled to be renourished in the form of a nearshore berm (500,000 cy; Figure 2). The systems were successfully installed on top of an eight-story beachfront condominium and were operational within two days. To this date, systems have successfully provided hourly geo-rectified imagery that could be utilized to calculate average shoreline/sandbar/berm position as well as bathymetry evolution over time (Figure 3). The systems captured the initial sand placement and evolution, including during and after significant wave events such as Hurricanes Florence and Michael. With the success of this initial District pilot effort, ERDC researchers learned valuable lessons that will enable the final research and development to transform mini-Argus from a nascent technology into a District-operational product over the coming year(s). Future work includes the development of a data-portal for near-real time public access to imagery, incorporation of stereo-imaging analysis for high frequency (daily) topographic beach profiles, and streamlining data analysis.

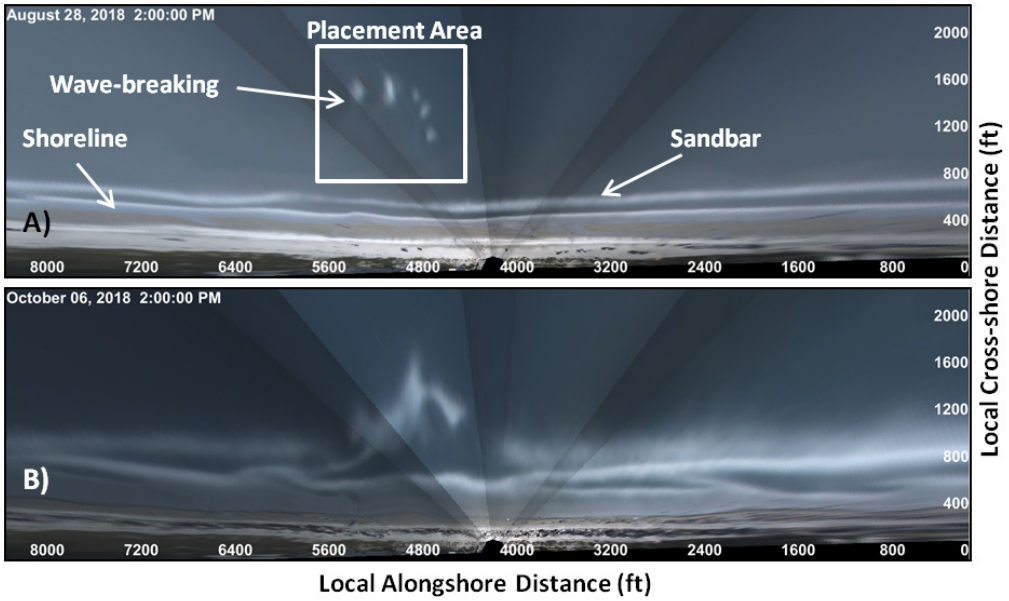

Figure 3: Example georectified time-averaged imagery at New Smyrna Beach, FL pilot deployment. White areas indicate wave breaking, a proxy for sand bar/placement location. A) Initial placement. B) Immediately prior to Hurricane Michael.

Rapid remote sensing data collected from Mini-Argus stations is a new adaptive management capability that has potential to substantially alter the Corps' ability to collect coastal geospatial products for project monitoring and emergency preparation/response for FRM. Continuous monitoring will be particularly valuable at high-value or vulnerable project sites, where real-time feedback on project response to seasonal and short term wave/storm events is critical. In combination with other UAS-based monitoring approaches, USACE is poised to expand our understanding of project performance and enhance our extreme event planning and impact analysis along our coasts. With low operational costs, in both finance and time, close-range remote sensing technologies allow the Corps to respond and monitor more events in a more timely fashion. This allows for longer and more accurate pre/post–storm assessments, observations during storms, and thus improved data for post-storm assessments and reconstruction. USACE districts will have high value coastal monitoring data that can be integrated into engineering decisions for improved FRM knowledge base and practices.

Districts Connect and Learn Through Levee Safety Risk Communication Tabletop Exercises

By Mary Weidel, IWR

Los Angeles River Tabletop Exercise, June 21, 2018.

In the pursuit of helping sponsors and communities address and communicate residual flood risk in a leveed area, four tabletop exercises were recently organized and conducted. These tabletop exercises were funded by the Levee Safety Program through a request for interagency implementation of Levee Safety Program communication and sponsor engagement strategies. The program funded projects that considered how interagency implementation support would further communication goals and lead to action geared toward risk reduction within leveed areas.

The four tabletop exercises focused on the Los Angeles River levee system in Los Angeles, California, the Salina, Kansas levee system, the Huntington, West Virginia levee system and the Manhattan, Kansas levee system.

Los Angeles River Tabletop

The Los Angeles District in partnership with Los Angeles County, sponsored a flood risk tabletop exercise simulating a flood event caused by levee overtopping along the Los Angeles River. It was conducted on June 21, 2018, with over 45 participants from all levels of government. The participants broke into five groups to discuss how they would respond to the simulated catastrophic flood posed during the exercise. They also focused on how to communicate the flooding dangers and evacuation of the communities as the event escalated. During the tabletop exercise, the flood conditions intensified through six phases and the groups processed each addressing what immediate actions should be taken, what coordination is needed, should an evacuation be considered, and what flood fighting activities should be implemented.

The Los Angeles River flood risk tabletop exercise had three objectives: operational coordination, planning for a potential flooding event in the future and identifying roles and responsibilities of local, state and federal agencies based on existing plans during a flood response. Steven Frasher, public information officer with LA County Department of Public Works and a participant in the exercise, described it as a very valuable exercise and an opportunity to meet operational contacts at other agencies before the critical need arises.

"The exercise demonstrated the importance of agencies sharing their expertise to maximize effectiveness in

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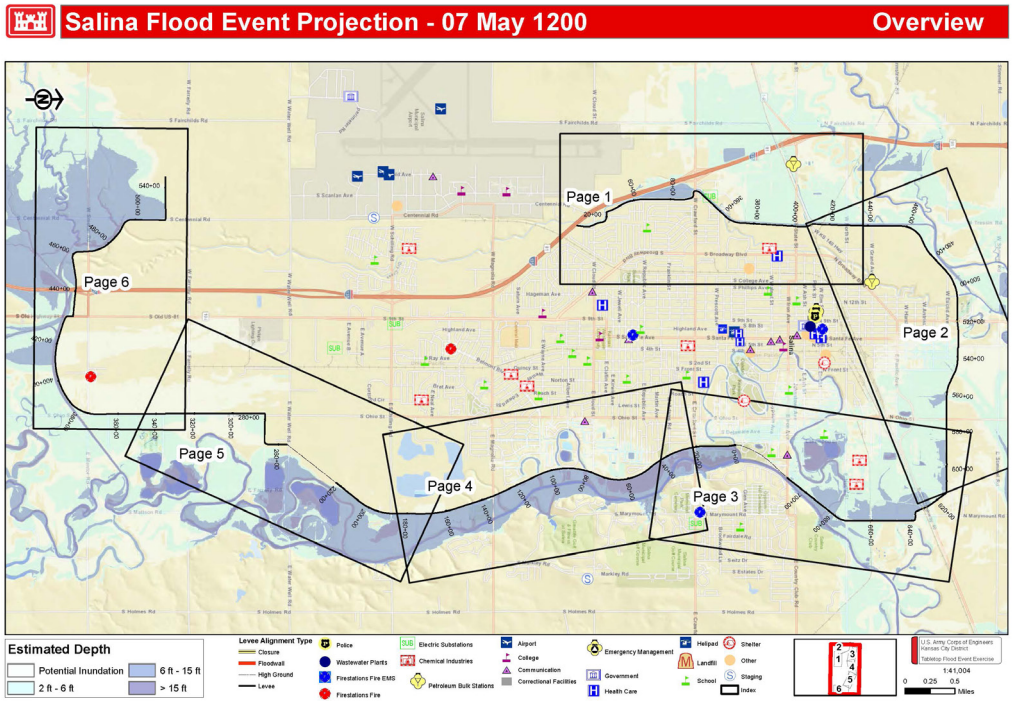


Salina Flood Event Projection for Tabletop Exercise

a critical incident," Frasher said. "From a communications standpoint, the fast-developing scenario emphasized the importance of advance awareness education through community outreach and media relationships, so residents have forewarning of what to expect and how to respond, before a critical incident escalates."

Salina, Kansas Tabletop

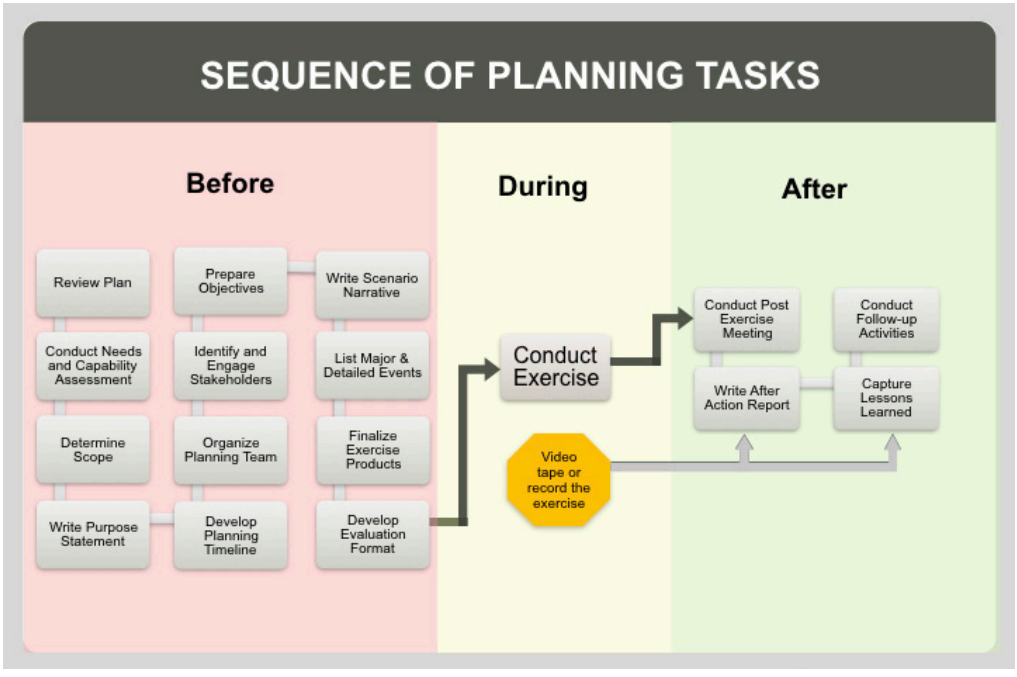
The Salina, Kansas, Levee Safety Interagency project conducted an eight hour long tabletop exercise that aimed to help identify needed enhancements to managing flood risks. On March 8, 2018, the Kansas City District, in cooperation with the Kansas Hazard Mitigation Team, Kansas Department of Agriculture Division of Water Resources, Kansas Department of Emergency Management, Saline County Emergency Management, and City of Salina, KS, conducted the tabletop exercise. Approximately 90 people from local, state, federal governments, as well as nongovernmental organizations (Red Cross, Salvation Army, hospitals, etc.) participated. One unique aspect to the Salina exercise was the involvement of college students majoring in emergency management to help take notes of group discussions and the hot wash.

The objectives included promoting awareness of Salina area flood risk, simulating emergency response activities and interactions, and identifying potential areas for improvement. The exercise also tied in the risk associated with Kanapolis Dam overtopping and potential downstream impacts.

The benefits of the tabletop exercise that were noted by participants included the opportunity for networking and learning how other agencies and departments could assist. The participants also learned they weren't fully prepared for a disaster like the city flooding. This exercise enabled participants to identify evacuation routes and enhance the city's emergency action plan, in addition to exploring mitigation alternatives for critical infrastructure and residential buildings.

Huntington, West Virginia Tabletop

The Huntington, West Virginia tabletop project focused on improving flood risk awareness and emergency planning efforts associated with levee breaching and overtopping in a very densely populated area. The levee tabletop exercise brought together 57 participants for a simulated flood experience using inundation mapping from the USACE Modeling, Mapping and Consequences (MMC) Production Center. The maps



Huntington, WV Tabletop Sequence of Planning Tasks

Continued on page 13.

helped show what roads would be closed and plan for evacuation routes which directly impact life safety, especially near a critical facility (hospital).

Stakeholders left the exercise with a better knowledge of their own roles/ responsibilities, emergency actions to take, and the proper chain to contact before, during, and after a flood event. It also helped everyone understand resource constraints that could occur during a major flood event and initiated collaborative efforts among the participants to address resource issues that came up. Notably, the levee system is in two counties which requires integrated efforts and planning for having one joint command office for flood events.

The exercise was under four hours long and facilitated by an experienced Emergency Management Institute instructor which was key to its success. The tabletop exercise even had an adjacent community member with a similar levee system come in as an observer to bring back to their community lessons learned from the Huntington tabletop. Another benefit from the tabletop exercise was the initiation of exercising installation of gate closures over busy sections of city roadways by the Huntington Stormwater Utility in conjunction with other stakeholders.

Manhattan, Kansas Tabletop

On November 8, 2018, the Kansas City District, in cooperation with the Kansas Hazard Mitigation Team, Kansas Department of Agriculture Division of Water Resources, Kansas Department of Emergency Management, City of Manhattan, Riley County and Pottawatomie County, conducted a tabletop exercise that helped identify needed enhancements to managing flood risks. Significant preparations and planning occurred among a core interagency planning team. The tabletop exercise was facilitated by the Saline

Participants at the Manhattan, KS Tabletop Exercise

County emergency manager (not an exercise impacted county) and was originally planned to occur two months prior but was postponed due to a flood event.

The event used a Levee Safety Production Center two-dimensional hydraulic analyses for participants to visualize locations where water is overtopping levees and the impacted areas, making participants especially aware of the timing of how the leveed area could flood. The two dimensional model established the overtopping location at the confluence of the two rivers. This visualization aided in understanding how evacuation routes would be constrained by flooding. The exercise considered actions that could enhance the city's emergency action plan, as well as the communication processes. The exercise served to better prepare the community in developing public messages and specific response actions, as well as completing an action item in their floodplain management plan.

A FEMA resource often used in developing a tabletop exercises, the Homeland Security Exercise and Evaluation Program (HSEEP), can be found here: https://preptoolkit.fema.gov/web/hseep-resources.

It contains information and templates for the phases of executing an exercise including design and development, conduct, evaluation, improvement planning, in addition to an overall program management template.

New Federal Flood Risk Management Program Website Launches

By Doug Bellomo, IWR

In December 2018, the USACE National Flood Risk Management Program, in coordination with a variety of other Federal Agencies, soft launched the beta "Federal Flood Risk Management Programs" Website (https://ffrmp.nfrmp.us/). This website provides summaries of 120 Federal programs across 11 federal agencies that relate in some way to flood risk management. Users can search for the programs most relevant to their needs using filters such as potential program APPLICANT, flood risk management cycle PHASE, and TYPE of assistance being sought. Search results provide summaries of Federal programs and links to additional information about each program. With release of this beta version the development team is both sharing information about the programs and looking for feedback. Please check out the site, share it with others, and provide constructive feedback so we can make the next version even better!

Other Important Information

Events

This listing is for information only and is not a complete list of FRM-related meetings. These meetings are not endorsed by the Corps of Engineers unless specifically stated. If we have failed to list a conference/meeting/symposium that would be of interest to the Flood Risk Management community, please forward the conference details to us.

6-10 January 2019 – **99th American Meteorological Society Annual Meeting** – Phoenix, AZ - https://annual.ametsoc.org/2019/

23-27 March 2019 – **2019 AWRA Spring Specialty Conference** – Omaha, NE - http://awra.org/

22-25 April 2019 – **National Hurricane Conference** – New Orleans, LA - http://hurricanemeeting.com/

19-24 May 2019 – **ASFPM Annual Conference** – Cleveland, OH - http://www.floods.org/index.asp?menuID=223&firstlevelmenuID=181&siteID=1

3-7 November 2018 – **2019 AWRA Annual Water Resources Conference** – Salt Lake City, UT – https://www.awra.org/

Be sure to check out floods.org for the dates of state conferences and training opportunities: http://www.floods.org/n-calendar/calendar.asp?date=3/12/2016

FRM Statements of Need: Submitting "Statement of Need" is the first step in the process of a concept becoming a requirement for research and development. If USACE District personnel have problems or situations they feel should be addressed by research, the Flood Risk Management Gateway, http://operations.usace.army.mil/flood.cfm, is the place to submit these research Statements of Need (SoNs).

Past issues of this newsletter, various links, news items, and presentations, are all available on the Flood Risk Management Gateway, https://operations.erdc.dren.mil Check it out!

This newsletter is a product for and by the Flood Risk Management Community. The views and opinions expressed in this unofficial publication are not necessarily those of the U.S. Army Corps of Engineers or the Department of the Army.

If you would like to submit an article or an idea for an article for the next edition of the newsletter, or if you have any comments or questions about articles in this edition, please email ***Stephanie.N.Bray@usace.army.mil.***

FRM Flood Risk Management Newsletter

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