



Flood Risk Management Newsletter US Army Corps of Engineers July 2019 • vol 12 no 3

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On the Cover

Corps' Automatic Sandbagger is Game Changer in Flood Fights

USACE is raising the bar for disaster response and touting its latest asset—automatic sandbagging machines, which can fill up to 1,000 sandbags per hour, drastically increasing efficiency when it's needed the most.

Recognizing Excellence in Flood Risk Management

By Mark Roupas, Deputy Chief, Office of Homeland Security



Happy Summer and thank you for your continued interest in the FRM Newsletter. One of the best parts of being in a leadership role is the opportunity to recognize excellence. Every year, I have the honor of recognizing excellence from across the USACE and interagency flood risk management community through three primary awards: 1) Flood Risk Manager of the Year; 2) Silver Jackets Coordinator of the Year; and 3) State Silver Jackets Team of the Year. These three National Flood Risk Management Program (NFRMP) awards recognize outstanding individuals and teams who exemplify the goals and objectives of the program.

Typically, we recognize the recipients of these awards at our regularly scheduled meetings; however, our last meeting was held in May of 2018, leaving us with an extended gap prior to our next scheduled meeting. Given that, I'd like to take a brief pause from all the disastrous news caused this year's flooding to recognize and congratulate our 2018 awardees.

The Flood Risk Manager of the Year Award seeks to recognize outstanding individual efforts and contributions to flood risk management. The Flood Risk Manager of the Year is a member of USACE who has made outstanding contributions in advancing the goals and objectives of the Flood Risk Management Program.

"I'd like to take a brief pause from all the bad news that floods have caused this year to recognize and congratulate the recipients of the 2018 National Flood Risk Management Program (NFRMP) awards."

My congratulations to the 2018 Flood Risk Manager of the Year, Mr. Marco Ciarla from the Baltimore District. Mr. Ciarla has served as a project manager for a number Floodplain Management Services (FPMS) special studies as well as other Silver Jackets efforts. He has worked with others inside and outside USACE to improve his own skillsets and to bring the full suite of services of USACE and our partner agencies to bear on flood risk management challenges. In doing so, he has worked with the National Nonstructural Committee, which has allowed him to bring new expertise back to the District. He has also devoted significant effort to public outreach efforts associated with many of the projects on which he has worked. Mr. Ciarla has been recognized inside and outside USACE for his technical expertise and his ability to bring together multiple partners to address flood risk challenges. Mr. Ciarla has demonstrated commitment to supporting local communities, as well as state and other interagency partners.

The Silver Jackets Coordinator of the Year Award seeks to recognize outstanding individual USACE efforts and contributions to a Silver Jackets team. The Silver Jackets Coordinator of the Year is a member of USACE who has made outstanding contributions in advancing the goals and objectives of the Silver Jackets Program.

I would like to recognize the 2018 Silver Jackets Coordinator of the Year, Mr. Brian Balukonis from New England District. Mr. Balukonis is the lead Silver Jackets Coordinator for five states as well as a support Coordinator for one additional state. In this role, Mr. Balukonis has assisted the state teams in planning and carrying out more than a dozen interagency efforts which will help reduce and manage flood risk in the states. Though coordinating many teams, Mr. Balukonis' energy, dedication, and persistence have ensured that all are high-performing teams actively working to reduce flood risk. In addition to all the great work for which he was nominated for this award, Mr. Balukonis deployed to Puerto Rico after Hurricane Maria as an Infrastructure Systems Recovery Support Function Coordinator. In his time on the island, Mr. Balukonis was able to work with the territorial government and other federal agencies to gain commitment to establish a Silver Jackets team, which recently joined the ranks of active teams.

The Silver Jackets State Team of the Year Award recognizes an outstanding team that exemplifies the goal of effective flood risk management within the context of shared responsibility and that has demonstrated significant accomplishments in flood risk management throughout the preceding year. The award seeks to recognize outstanding team efforts and contributions to optimize the use of Federal resources and leverage state investment, prevent duplication among Federal agencies, and produce results that save lives and/or reduce future damages, including through nonstructural projects and communication of risk. This award is unique because the winner is chosen through a peer voting process, during which only other state teams have the opportunity to vote on the team most deserving of the award.

The 2018 State Silver Jackets Team of the Year, chosen by their peers, is Montana. The team is recognized for their efforts to collaboratively leverage advanced technical tools in order to provide local communities with more accurate and easily communicable flood risk information. Demonstrated strength in engaging with the public through outreach and communication efforts also helped the Montana team stand out to their peers. Examples of the interagency efforts undertaken by the team include a "High Water Mark Signage" campaign to help raise awareness of historical flooding and development of a cellphone app, created in partnership with USACE Cold Regions Research and Engineering Laboratory, National Weather Service, and U.S. Geological Survey, to allow the public to monitor and report ice jam conditions that could lead to flooding.

Please join me in recognizing Mr. Ciarla, Mr. Balukonis, and the Montana Silver Jackets team. My sincere thanks and congratulations to the 2018 award recipients. Individuals and teams such as these are the reason that the National Flood Risk Management Program is a demonstrated success. I hope you enjoy the rest of this edition of the FRM Newsletter!



Marco Ciarla, 2018 Flood Risk Manager of the Year, at a February 2019 Silver Jackets charrette discussing flood risk management along the Watts Branch in Washington, D.C. Photo by John Sokolowski, USACE Baltimore District.



2018 Silver Jackets Coordinator of the Year, Brian Balukonis, with Chief of Engineers and Commanding General, LTG Todd Semonite.

Corps' Automatic Sandbagger is Game Changer in Flood Fights By Katie Newton, USACE Louisville District

The U.S. Army Corps of Engineers is raising the bar for disaster response and touting its latest asset—automatic sandbagging machines, which can fill up to 1,000 sandbags per hour, drastically increasing efficiency when it's needed the most.

"The automatic sandbagging machine has proven valuable in multiple flood fights over the last year and is now considered the new standard," said USACE Louisville District Emergency Manager George Minges, whose office is becoming a center of expertise on the new tool.

The Louisville District deployed a team of six people in support of the flood fighting efforts along the Arkansas River in late May where the machine was used to fill more than 56,200 sandbags over the course of two weeks.

The concept was the brain-child of the Kansas City District Emergency Management Office as they saw the need for faster, more efficient sandbag-filling operations, years ago and worked with Express Scale Parts and Manufacturing out of Lenexa, Kansas to use their existing portable bagging technology to build a trailer-mounted sandbag machine.

USACE now has an inventory of 13 machines across the country that can be deployed quickly in an emergency upon request according to Minges.

"The state emergency operations center or any Corps of Engineers district can request them through the National Flood Fight Materials Center in Rock Island, Illinois," said Minges.

The Louisville District's machine has already expended more than



U.S. Army Corps of Engineers Louisville District employees George Minges, Todd Davis and Bob Burick fill sandbags during a flood fight in Smithland, Kentucky, in February 2019 using the district's automatic sandbagging machine, which is capable of filling up to 1,000 sandbags per hour.

100,000 sandbags after its latest mission in Arkansas. It was the first off the production line and deployed immediately in September 2018 to support flood fighting efforts in South Carolina after Hurricane Florence.

"By happenstance Hurricane Florence was targeting the East Coast when the National Flood Fight Material Center got a request for our assistance," said Minges.

In only a few short days it was used to fill 25,000 sandbags to protect areas like Conway, Georgetown and Pawley's Island in South Carolina.

"This machine allows us to better support our partner agencies because we are able to respond faster and more efficiently," said Minges. "We can fill more sandbags with fewer people. It greatly increases our emergency response posture." The sandbag machine is completely self-contained only requiring sand, sandbags, fuel and two operators making it extremely cost-effective and efficient. The entire bag-filling process takes less than 5 seconds.

"Using four to six guys you can get the same amount of bags filled an hour as it would take 20 guys filling them with shovels," said Minges. "It's not nearly as labor intensive so you don't fatigue the workers as bad."

The automatic sandbagging machine was a game changer in the February 2019 flooding in Smithland, Kentucky. There, along the sprawling riverbank, were crews of up to 100 people pitching in to fill sandbags in hopes of holding back the mighty Ohio River. When the Corps arrived with the new sandbagging machine in tow it was a welcomed sight. "It's a wonderful tool – it's like a rolling billboard when we show up to flood fights," said Minges. "They know the Corps is there."

In February 2019 the machine proved invaluable in the flood fighting efforts in Smithland and farther South in Jamestown, KY in support of the Nashville District where it was used to fill 25,000 of bags. In both events the machine filled sandbags to provide extra support for the construction of temporary Hesco gabion basket and Typar geocell structures.

"When you couple them together the time it takes to build something just goes down exponentially," said Minges. "There is always going to be a need for sandbags to wrap corners and things like that on the barriers and this makes it all so much faster."

Because of the Louisville District's flood fighting expertise they have been named as the proponent to train other districts across the region. Minges and Andrew Fleming, emergency management specialist, who are relied on across the region for their expertise, have conducted operator trainings for the Rock Island, Detroit and Baltimore Districts in addition to numerous trainings for state and local responders throughout Indiana and Kentucky. During the Arkansas flood fight the team delivered just-in-time classroom training on flood fighting tactics and techniques for Little Rock District personnel.

Louisville District Emergency Management staff assisted in the completion of a field guide, which will be printed by the USACE Readiness and Support Center in Mobile, Alabama to be pushed across USACE on how to operate the machines.

"We are happy to share our expertise to better the enterprise as a whole and raise the bar for USACE flood fighting responses," said Minges. IM

By the Numbers

In less than one year of service:

- 100,000 sandbags expended
- Fills 500-1000 sandbags per hour
- **10** trained operators in the Louisville District
- Requested for **5** different flood fights events
- Used for **9** training events for USACE/local responders



Rob Nicoson, Louisville District stands by a stockpile of sandbags that were filled for the City of Little Rock, Arkansas during the flood fight in June 2019.

History Has a Way of Repeating: Silver Jackets Initiative Seeks to Freshen Memories ^{By Eileen Williamson,} USACE Northwestern Division

Unusually heavy snowfall and extraordinarily cold temperatures extended into early March. Then, temperatures climbed and heavy rain sent melting snow in northern Nebraska, South Dakota and parts of North Dakota pouring water into the Missouri River.

The water melted the snow and the rivers rose very fast, pushing all that water under still frozen creeks and streams. As the river levels rose, the layers of ice on top broke apart, stacked up and moved with destructive force through towns located near the river.

This story isn't from 2019, it tells the story of the Great Missouri River Flood of 1881.

In March of 1881, the riverfront at Yankton, South Dakota was filled with large chunks of ice left behind by the destructive flooding that sent up to six feet of water through Pierre, South Dakota.

In Omaha, Nebraska and Council Bluffs, Iowa, the flooding remained at high levels for several weeks with losses in the millions of dollars.

Throughout the Missouri River basin there is a long history of flood events caused by heavy snow, ice jams breaking up, cloudburst thunderstorms, and sustained rain events.

There's a popular saying, "If it can rain, it can flood," meaning, it can flood anywhere. If you're near water, especially rivers, creeks and streams, there's a greater risk of flooding. They will all flood eventually. There are no exceptions.

"Just because an area hasn't flooded in the past or in your lifetime, doesn't mean it won't. Memory can be short and it's easy to forget the last flood, and this



GLENDIVE, MT

When ice breaks up on the Yellowstone River, there is a risk of ice jam flooding to the City of Glendive.

On this day, as the river rose rapidly, 30 horses were caught on islands by the flood. All drowned except for one. The horse, belonging to Martin Evans, climbed onto a cake of ice and floated for 2 days traveling over 35 miles on the river.

When the block of ice settled onto the flooded flats at Glendive, he was finally rescued and had miraculously escaped injury.

Reports claim the animal stood during the entire journey bracing its legs each time the ice was jarred by striking other ice blocks.





lack of memory prevents communities from properly managing their risk," said Tony Krause, flood risk manager for the U.S. Army Corps of Engineers Omaha District.

Krause has been working with local floodplain managers, state, and federal

agencies to spotlight past flood events through historical marker signs, sponsored by the Silver Jackets program. Each sign offers a historical glimpse of a community by telling the story of a real flood event in that location and the *Continued on page 6.*

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impacts the flooding had on the people and community.

Using unique stories about the community engages the "isolation effect" (or Von Restorff Effect), meaning people remember things that are unique or stand out. A unique event with selfrelevance helps to deliver messages with lasting impact.

Historically, storms would "sneak up" on a community and several inches of rain in a day would flood homes in low lying areas. Weather forecasts, radar and climate records allow communities and homeowners to better identify the potential for flooding. Having a story of past flooding primed in memories enables communities to accept and act on this information.

"We often have residents tell us 'it never floods here' or 'I don't ever remember when they water got that high' when we start working with a community to analyze its flood risk. These signs are a small way to avoid this form of confirmation bias," said Krause.

The signs also offer a memory trigger and opportunity for one generation, who may have experienced the flooding themselves or knew stories from their parents or grandparents to share stories with younger generations.

Sharing stories from these signs on social media sites has triggered similar discussions and often offers even more details to the events captured in the photos.

"We encourage those who spot one of our signs to learn about the flood history in the area and learn how to prepare their families for natural hazards," said Krause.

To date, the Silver Jackets initiative in the Omaha District has placed more than 125 signs in Montana, Nebraska, and Iowa. This year, the project is preparing signs for the State of South Dakota.



MISSISSIPPI RIVER, DAVENPORT February 21, 1966

On this day, an ice jam at a narrow turn in the Mississippi River 8 miles downstream from Davenport created a dam which sent river levels to a crest of 18.5 feet, more than 3 feet above flood stage.

No one could tell what the flood was going to do or how high the water would get because it wasn't upstream runoff, but rather backup from downstream.

The jam could not be blasted loose. The US Army Corps of Engineers provided sandbags and the Iowa National guard was called in to provide assistance sandbagging along River Drive. This photo from the Des Moines Register shows where crop-dusting planes played tic-tac-toe while laying coal dust in an effort to melt the ice.



To learn more visit: floodrisk.iowa.gov

"The signs offer a memory trigger and opportunity for one generation, who may have experienced the flooding themselves or knew stories from their parents or grandparents to share stories with younger generations."

Update on the USACE National Nonstructural Committee

By Lea Adams, USACE Institute for Water Resources

2018 was a year of change for the USACE National Nonstructural Committee (NNC). Longtime NNC Chair, Randall Behm of Omaha District, retired in March 2018. Shortly thereafter, USACE Headquarters solicited NNC member applications. Six members were selected to serve 3-year terms. The six members are:

Chair: Lea Adams, PE, Chief, Water Resource Systems Division, Hydrologic Engineering Center

Executive Secretary: Danielle Tommaso, CFM, Planner, New York District

Member: Jodie Foster, PhD, Planner, Fort Worth District

Member: Andy MacInnes, Water Resource Certified Planner, New Orleans District

Member: Brian Maestri, RTS, Economist, New Orleans District

Member: Chris Rasmussen, CFM, Hydraulic Engineer, New York District

The Committee members met with the NNC's Advisory Panel for the first time in October 2018 to establish short- and long-term goals. The NNC Advisory Panel consists of representatives from USACE Office of Water Project Review, the Planning Community of Practice, the Flood Risk Management Planning Center of Expertise, and the Coastal Storm Risk Management Center of Expertise. The Advisory Panel provides guidance to the NNC on policy questions and other support as needed.

The NNC has been working on a number of activities in FY19 that are intended to build nonstructural expertise and increase the visibility of nonstructural approaches both internally and externally to USACE.



The first initiative was to establish the Nonstructural Working Group (NWG), consisting of staff with an interest in and/or experience with any aspect of nonstructural. An email list and sharepoint site were created to facilitate sharing of information within the USACE nonstructural community, and the NWG hosts webinars every 1 to 2 months on topics of interest to the field. Webinar subjects covered to date include: nonstructural Planning Bulletins 2016-01 and 2019-02, buyout guidance, relocation assistance, managing structure inventories and nonstructural cost estimation. The webinar slides and audio are available on the NWG sharepoint site: (https://team.usace.army.mil/sites/ IWR/PDT/nonstrucworkgrp/default. <u>aspx</u>).

Two other FY19 NNC activities aimed at increased sharing of nonstructural knowledge across USACE are: 1) development of a series of Best Practice Guides and 2) identification of a pool of nonstructural practitioners who have the interest and skills to support projects and reviews. A draft Best Practice Guide template has been completed and the goal is to create six new Guides by the end of the FY. In addition, a draft practitioner survey has been completed and will be routed to the NWG and other CoPs for staff to self-identify their interest and skill in nonstructural. This database of practitioners will make it easier for the NNC to connect district staff with nonstructural support needs to those who can help.

The NNC is also working to promote the visibility of nonstructural methods, both within USACE and with our project partners. NNC members will deliver multiple workshops and training presentations over the course of FY19, including workshops at conferences and presentations at training classes and national meetings. These efforts are timely, given the increasing interest in nonstructural approaches from our partners.

Looking forward, USACE nonstructural activities are ramping up. Two large nonstructural-focused projects are moving towards implementation: Fire Island to Montauk Point in New York District and Southwest Coastal Louisiana in New Orleans District. Both studies involve several thousand structures, and are a great opportunity for USACE to embrace implementation of nonstructural techniques on a scale never done before by our agency. These are exciting and challenging times, and the NNC embraces our mission of providing support to USACE staff as they navigate these and other projects. Feel free to reach out to any member of the NNC for support if you have a need.

For more information about the NNC, please see:

- 1. Public-facing NNC webpage: https://www.usace.army.mil/ Missions/Civil-Works/Project-Planning/nfpc/
- 2. USACE-only NWG sharepoint site: <u>https://team.usace.</u> <u>army.mil/sites/IWR/PDT/</u> <u>nonstrucworkgrp/default.aspx</u>

FRM-PCX Delivers Real-Time Assistance

By Jerry Fuentes, USACE Sacramento District, Monique Savage, USACE St. Paul District, and Nick Applegate, USACE South Pacific Division Original cartoons by Jerry Fuentes, USACE Sacramento District

Over the past few months, the Flood **Risk Management Planning Center** of Expertise (FRM-PCX) began an initiative to deliver short trainings on specific topics that are relevant to the challenges currently faced by Project Delivery Teams (PDTs) conducting FRM studies. These trainings build on the broader scoped webinar, "Risk Informed Decision Making Webinar in FRM" that was delivered in August 2018. This article discusses key takeaways from the first two webinars. The first webinar focused on particular challenges with the identification of FRM Problems, Opportunities, Objectives, Constraints (POOC's) and the Future Without Project Conditions (FWOP). The second webinar introduced an assortment of tools and best practices available to help determine the right level of detail and properly using the Risk Register.

of property and people to those consequences and not just focus on the symptoms of the problem. While many people still think of opportunities as the reverse of the problem statement, it was pointed out that opportunities should be outside the problem where we can gain positive action through congruent actions. The key takeaway regarding Corps study objectives is to ensure that they are specific and measurable. If you can't measure it, maybe it shouldn't be an objective! We also shared that planning constraints should be few and far between and don't get them confused with your planning considerations, which can inform but not restrict your planning. about potentially different FWOP scenarios, but attempt to identify ONE "most likely" FWOP to formulate alternatives and identify the TSP, then do sensitivity tests on key FWOP assumptions. Another big takeaway is to look for flexibility in the analytical tools to be able to gather information quickly and efficiently to inform the planning iterations. The figure at the end of this article is a reference tool developed to help guide PDT's through FWOP during initial iterations.



Level of detail and scoping remains one of the biggest challenges to PDTs. It is important PDTs keep in mind that a "feasibility" study determines if a plan is reasonable, or capable of being done, not a design product with specifications. A PDT should assess what's needed to make a good planning decision, but no more. PDT's can't afford, in time or money, to chase data or conduct analysis that is not needed to make that planning decision. Risks arising from uncertainties that can affect the planning decision are considered instrumental risks. The level of detail needed for a study is tied to those instrumental risks. For example if the team is uncertain about existing levee material and levee performance, there is a high risk the FWOP can be misidentified and the

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The first webinar's focus on the POOC's and FWOP grew out of issues exhibited during the latest round of Alternatives Milestone Meeting (AMM's) for the Supplemental Studies. The beginning of the presentation emphasized that problems are in the eyes of the beholder and to consider other views in problem identification. In FRM, it's important to understand the linkage between the flood hazard, the adverse consequences, and the exposure and vulnerability



The FWOP is a much more dynamic condition under risk-informed decisionmaking than previously thought. Every planning iteration needs to have a FWOP! As the PDT works through iterations, the FWOP will evolve from defining it, to refining it, to validating it as more data is gathered. And don't forget that climate and sea level change and their effects should be considered in accordance with policy. Think critically wrong plan could be selected, making it instrumental to gather more levee data. The risk register can help identify those instrumental risks and assist in their management. The key take away is - USE IT! At a minimum, the team members should regularly discuss instrumental risk and how it's being managed. Best practice is to update the Risk Register at every PDT meeting as most team activities should be related to mitigating instrumental risk and uncertainty. The Risk Register allows the team to follow a methodical approach for identifying the uncertainties associated with less/old/incomplete information

and accepting the associates risk in a planning study. Every iteration should address the decisions being made that may result in an instrumental risk and the subsequent management of those risks. And remember...the Risk Register is not intended to be your team's worry list! Keep it focused on only the instrumental risks you are managing. The online version of the Risk Register, found on the IWR-APT website (https://iwrapt.planusace.us/), has made it much easier to use and share.

The full version of these and all future webinars are available at the PCoP

Training page (https://planning. erdc.dren.mil/toolbox/resources. cfm?Id=0&COption=Planning%20 Webinars). Upcoming training modules will focus on tools and best practices for incorporating Climate Change and Sea Level Change into FRM studies. The FRM-PCX is always looking for new ideas for future training topics that can assist teams in efficient and successful study execution. Please contact Nick Applegate (Nicholas.J.Applegate@usace. army.mil) or Eric Thaut (Eric.W.Thaut@ usace.army.mil) with your ideas or questions!

ITERATIONS OF THE FWOP (DATA GATHERING EXAMPLES IN FRM)



USACE Activities at Coastal Sediment 2019 (27-31 May 2019) By Emily Russ and Julie Rosati, USACE Engineer Research & Development Center, Coastal & Hydraulics Laboratory

Nearly 300 coastal scientists and engineers from around the world met at the Coastal Sediments 2019 Conference, "Advancing Science & Engineering for Resilient Coastal Systems," in St. Pete Beach, Florida May 27-31, 2019. The Coastal Sediments Conference has been held every 4 years since 1977 and is an opportunity for coastal researchers and practitioners to share cutting-edge research in coastal engineering, geology, and oceanography.

The Conference kicked off on Monday, May 27, with 4 full-day short courses, 2 of which were led by ERDC-CHL researchers: GenCade – Rusty Permenter, Yan Ding, Sung-Chan Kim, and Richard Styles (with Hans Hanson from the University of Lund, Sweden); and Coastal Imaging Data Processing -Kate Brodie (with Meg Palmsten from Naval Research Laboratory). The short courses were designed to give conference participants a hands-on introduction to coastal data analysis tools. GenCade is a 1-D long-shore transport and evolution model that predicts shoreline change, incorporating inlets and coastal structures in the model, for planning and engineering design purposes. The Coastal Imaging Data Processing short course introduced attendees to coastal imaging technologies (single camera station and unmanned aerial vehicles [UAVs]) and data analysis packages available in the open source Coastal Imaging Research Network (CIRN) UAV toolbox.

On Tuesday, May 28, Dr. Britt Raubenheimer, Woods Hole Oceanographic Institute (WHOI), gave the first keynote on "The Nearshore Water-Land System During Major Storms", followed by a second keynote by former USACE Assistant Director for Civil Works Research



Drs. Kate Brodie (USACE-ERDC-CHL) and Britt Raubenheimer (WHOI) leading a DUring Nearshore Event eXperiment (DUNEX) discussion forum. Photo Credit: Mary Cialone

and Development, Joan Pope, on "Past, Present, and Future Considerations in Coastal Engineering." Four concurrent sessions followed with 40 technical themes over the next 3 days. Several ERDC-CHL researchers presented papers and/or chaired technical sessions on a range of coastal research topics, highlighting basic and applied research projects in various coastal environments (e.g. marshes, beaches, barrier islands, dunes, inlets, and deltas) using a variety of measurement, modeling, and analysis techniques.

Kate Brodie, Mary Cialone, Britt Raubenheimer (WHOI), and Hilary Stockdon (USGS) organized a discussion forum about the multi-agency field experiment called "DUring Nearshore Event eXperiment" (DUNEX) on Wednesday, May 29, to provide DUNEX updates and give researchers interested in participating in the DUNEX Pilot (Fall 2019) or the full experiment (Fall 2020) an opportunity to network, discuss research plans, and facilitate collaborations.

The Conference ended with 2 technical tours on Friday, May 31 to see coastal structures and geomorphic features in Pinellas and Manatee Counties, and included visits to USACE-maintained inlets (e.g. Johns Pass, Blind Pass) and a USACE-led nourishment project at Sand Key Federal Beach.

Coastal Dynamics, the sister conference to Coastal Sediments, will be held in 2021 in Delft, Netherlands, and the next Coastal Sediments conference will be held in 2023.

USACE Uses Inundation Maps to Communicate Flood Risks from Hurricane Florence

By Emily Russ and Julie Rosati, USACE Engineer Research & Development Center, Coastal & Hydraulics Laboratory

From September 11 through September 24, 2018 the United States Army Corps of Engineers produced dailyupdated forecast flood inundation maps and trafficability maps as part of its comprehensive Hurricane Florence emergency response mission. These maps covered seven river basins spanning the states of South Carolina, North Carolina and Virginia. The USACE Flood Inundation Mapping Cadre supported

South Atlantic Division by running hydraulic models from the Corps Water Management System (CWMS) and by developing the interactive map products. The products were deployed in the **USACE** Common Operating Picture (UCOP) and shared with local, state and federal agencies and with the public.

Multiple online sources are available for additional information:

- Story map with detailed discussion of how the products were produced.
- Interactive webmaps of predicted peak inundation and trafficability, including a timeline of how the maps changed during the event with examples for the Cape Fear River Basin.
- Article in Army Engineer Magazine, Teamwork and Technology a Game Changer for USACE.



Predicted Maximum Flood Extents for All Basins Modeled by the USACE FIM Cadre

Trafficability Assessments for U.S. HWY 13 East of Fayetteville, NC -



USACE Concrete Chute Spillway Review Update

By Steven Townsley, USACE Risk Management Center

During FY18 and FY19, the USACE Risk Management Center (RMC) assembled a team of spillway subject matter experts to evaluate reinforcedconcrete spillway chutes at USACE dams. This evaluation was performed in response to the vulnerabilities exposed during the Oroville Dam spillway incident in February 2017. Primary contributors (vulnerabilities) leading to significant damage at the Oroville gated spillway (\$1 Billion on-going repair) were identified as:

- Erodibility of the foundation beneath the chute;
- Adequacy of the anchor system to rock foundation;
- Adequacy of the underdrain system;
- Robustness of the slab structural design; and
- Presence of watertight joints between slabs and footings with dowels or shear keys to control offsets into the flow.

The USACE spillway review objectives included: 1) identifying projects that have similar design vulnerabilities (according to current design best practices) and 2) evaluating the potential economic risk associated with spillway operation in their current condition. For projects with identified vulnerabilities and the potential for high economic risk during operation, a host of interim risk reduction measures can be developed and likely implemented in an efficient and cost effective manner. For some projects, a major rehabilitation may be required, particularly those with the highest economic risk and operational concern. In addition, the RMC team intends to provide a detailed spillway inspection process to aid in identifying these vulnerabilities during District inspections to facilitate a proactive maintenance plan for these projects.

"For projects with identified vulnerabilities and the potential for high economic risk during operation, a host of interim risk reduction measures can be developed and likely implemented in an efficient and cost effective manner."

The study team performed a database review of all 714 USACE dams and identified 118 spillways at 115 high hazard dams having reinforced concrete chutes. The team screened the 118 spillways down to only those that have a moderate to high potential for foundation erodibility and have a relatively thin (<2 feet thick) reinforced concrete slab section. A total of 29 spillways met these two primary criteria. Following the screening, a more detailed review was performed for these 29 spillways to evaluate the underdrain systems, foundation anchor systems and slab/footing water-tightness. Each spillway was then rated from the highest to lowest susceptibility of damage based on the vulnerabilities identified above, resulting in 13 spillways with a high rating, 13 spillways with a moderate rating and 3 with a low rating. The results of this study were documented in a final report titled Concrete Chute Spillway Review RMC-TR-2019-06 dated March 2019. This final report, along with a copy of the review database, assessment sheets and summary presentation can be found on the CEDALS Project Wise for all of USACE at pw://coe-wpcpwp01dcp.eis. ds.usace.army.mil:RMC01/Documents/ P%7bd8ff0821-412d-4bff-a857-1e1f31bcd56d%7d/.

Following the completion of the final report, the RMC spillway team was notified by SPL that Prado Dam spillway appeared to meet the primary screening criteria, so the team reviewed the Prado spillway data again and determined that it did meet the primary criteria, having erodible foundation rather than non-erodible foundation as the design drawings had indicated. Prado spillway was added to the highly susceptible queue and a site visit was performed in June 2019 by the RMC spillway team. The team visited Prado and Sepulveda spillways to validate the study results and ratings, and consider the path forward for each project. The preliminary results of the site visit indicate that Prado spillway is in need of significant repair/ rehabilitation, while the Sepulveda spillway is in relatively good condition with only minimal repairs recommended. SPL and the RMC will work together to determine the recommended path forward along with potential funding sources to implement the suggested repairs for both projects. Additional site visits are planned in the next 6 months to further validate the study results and determine a path forward for USACE spillway inspections in the future. 🔤

The Concrete Chute Spillway Review Final Report, along with a copy of the review database, assessment sheets and summary presentation can be found on the CEDALS Project Wise for all of USACE at <u>pw:/// coe-wpcpwp01dcp.eis.ds.usace.</u> army.mil:RMC01/Documents/ P%7bd8ff0821-412d-4bff-a857-1e1f31bcd56d%7d/.

Flood Risk Management Research Area Review Group (FRM-RARG) Meeting, April 3-4, 2019

By Emily Russ and Julie Rosati, USACE Engineer Research & Development Center, Coastal & Hydraulics Laboratory

Each year, new research is prioritized to address emerging needs within the Flood Risk Management (FRM) business line at the FRM Research Area Review Group (RARG) meeting. This year, the Engineer Research and Development Center's Coastal and Hydraulics Laboratory hosted both the Navigation and Flood Risk Management RARGs, April 2-4 in sequential meetings with one concurrent session. RARG attendees included Division and District practitioners, investigators from the Engineering Research & Development Center (ERDC) and the Institute for Water Resources' Hydraulic Engineering Center (IWR-HEC), and Headquarters (HQ) leadership from the Flood Risk Management and Navigation Civil Works Business Lines.

A joint Navigation-FRM session was held on April 3, and featured discussion of ongoing cross-cutting research including a joint District-research presentation on advancements in natural and nature based feature (NNBF) research and development projects. A session followed on innovative ways to capture and communicate value of R&D investments, such as cost and time saving through implementation of improved products; projects that benefit from improvements in durability, reduced Operation and Maintenance requirements, and intangible impacts external to the Corps (e.g. adoption of methods by others). Suggested performance metrics to highlight R&D value included uncertainty reduction, improvements to the national economy, and accomplishments of funded research over the past 5 years. Potential outreach opportunities included updating the Civil Works Booklet, public communication map products (i.e. flood inundation and trafficability), and



improved lateral communication across districts, divisions, and labs.

To better demonstrate recent FRM research accomplishments to District, Division, and Headquarters attendees, select researchers presented on advancements of their work units within the Flood & Coastal Systems and Coastal Ocean & Data System Research Programs, including work on unmanned aircraft systems, mini-Argus, low-cost wave buoys, quantifying post-wildfire effects and HEC-RAS. A poster session gave researchers additional opportunities to interact with District, Division, and Headquarters attendees.

The other main focus of the FRM RARG was to discuss the Statements of Need (SoNs) for research related to the USACE Civil Works missions, and prioritizing those needs as part of the FY20 research planning process. The top SoNs have been identified, and will be reviewed and/or revised with the FRM Business Line and the Civil Works R&D Steering Committee this spring.

The RARG provides vital input to the R&D process and helps to ensure that R&D is able to deliver on the goal of being a requirements-driven program. Our thanks to all who participated in this year's FRM-RARG and we look forward to everyone's continued participation in the R&D process through identification and submission of SoNs and by discussing R&D needs with CoP leaders. Corps of Engineers District and Division personnel can submit SoNs via the Operations & Regulatory Gateway, https://gateway.erdc.dren. mil/son/index.cfm at any time in the FY. Submissions received within each calendar year (e.g., 2019) will be ranked for consideration at the subsequent RARG (e.g. FY20 RARG), and, pending funding availability and support from HQ leadership, higher priority SoNs would initiate new research at the start of the following Fiscal Year (e.g. FY21).

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.

31 July – 1 August 2019 – U.S. Department of Homeland Security Centers of Excellence Summit – Arlington, VA – <u>https://cina.gmu.edu/</u> <u>coe-summit-2019/</u>

19-22 August 2019 – NAFSMA Annual Meeting – Los Angeles (Rancho Palos Verdes), CA – <u>http://www.nafsma.org/event/nafsma-flood-stormwater-management-2019</u>

3-6 September 2019 – 2019 Floodplain Management Association Conference – San Diego, CA – <u>https://floodplain.org/page/</u> <u>AnnualConference</u>

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

12-16 January 2020 – 100th American Meteorological Society Annual Meeting – Boston, MA – https://annual.ametsoc.org/index.cfm/2020/

23-26 March 2020 – 2020 AWRA Spring Conference – Austin, TX – <u>https://www.awra.org/Members/Events_and_Networking/Events/</u> Spring_2020_Specialty_Conference.aspx

7-11 Jun 2020 – ASFPM Annual Conference – Fort Worth, TX – https://www.floods.org/index.asp?menuID=223&firstlevelmenuID=181&siteID=1

17-19 August 2020 – 8th International Conference on Flood Management – Iowa City, IA – https://icfm2020.org/

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

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, <u>http://</u> <u>operations.usace.army.mil/flood.cfm</u>, 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, <u>https://</u> <u>operations.erdc.dren.mil</u> 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 <u>Stephanie.N.Bray@usace.army.mil.</u>





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