

FRM BUZZ

NEWSLETTER

Reducing Flood Risk: Many Partners, One Team



Levee rehabilitation project a partnering success

Significant strides have been made in restoring and constructing the L-536 levee rehabilitation project.

Paul Osman – a true floodplain manager's champion

Paul's "boots on the ground" approach led many to better understand the flood risk and what actions could be taken to reduce the risk.

p.3

HEC-HMS updates and recent tools for rapid model development

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p.9



SILVER JACKETS
Many Partners, One Team



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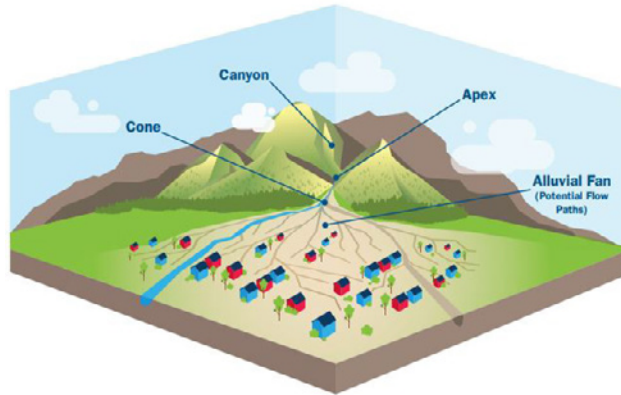
CONTENTS August 2021

- P.1** A partnership success story
- P.2** Sacramento District Silver Jackets Interagency Tribal Workshop team recipient of South Pacific Division 2019 Programmatic Planning Team of the Year award
- P.3** Paul Osman – A true floodplain manager's champion
- P.4** Levee rehabilitation project a partnering success
- P.7** Flood risks during periods of drought
- P.9** HEC-HMS updates and recent tools for rapid model development
- P.11** FEMA Region 8 partners with local TEDx organization to raise risk awareness
- P.12** Life risk modeling for Lower San Joaquin River in California's Central Valley supports emergency response planning
- P.14** Community Rating System virtual symposium fosters floodplain management best practices and partnerships
- P.15** Round the National Silver Jackets table
- P.16** Bulletin Board
- P.17** Upcoming Events

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In this issue



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P.7



FEMA Region 8 partners with local TEDx organization to raise risk awareness

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P.11



On the cover

Levee rehabilitation project a partnering success

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P.4

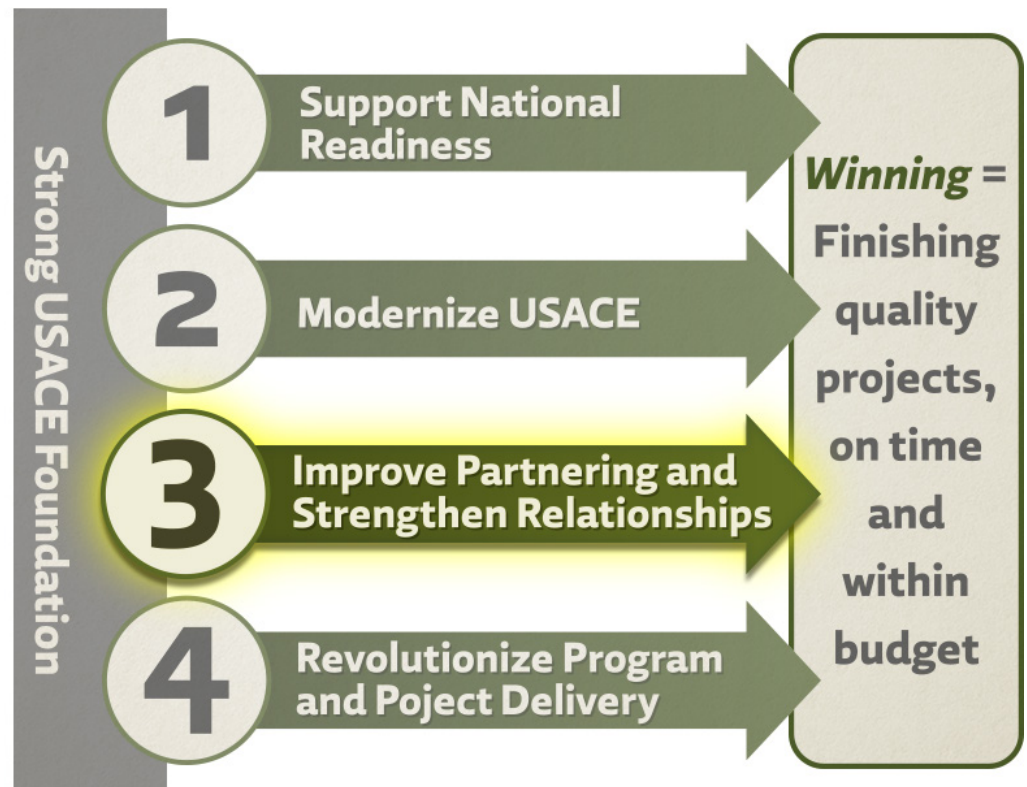
A partnership success story

By Mark Roupas, Deputy Chief, Office of Homeland Security



Greetings and thank you for taking the time to read this edition of the FRM Buzz Newsletter. You may recall that I wrote extensively on the importance of partnership in the December 2020 edition. At that time I was reflecting on a recent trip to visit locations along the Missouri River that were damaged during the 2019 flood event. During that visit I learned about ongoing levee repair efforts, including innovative strategies that were being employed through partnerships with local levee sponsors and others.

I am delighted, in this edition, to celebrate the success of some of those partnership efforts along the Missouri River. In particular I hope you'll read "Levee rehabilitation project a partnering success," starting on page 4. This article describes the partnering that took place between the U.S. Army Corps of Engineers (USACE), other agencies and stakeholders to undertake a levee realignment after it was determined that doing so would be more efficient and cost effective than repairing multiple breaches along L-536 in Atchison County, Missouri. I won't steal the thunder by describing



USACE Campaign Plan

the effort in great detail here; but, I did want to highlight the tremendous partnership that was necessary to bring the realignment, and all its associated benefits, to fruition. The additional data, information, perspectives and expertise various partners brought to the table were invaluable, and the success of the L-536 realignment clearly demonstrates that fact. I extend my deepest appreciation to the many partners, from local levee districts, to state agencies, to other federal agencies and The Nature Conservancy, for their dedication and commitment to working with us through the many challenges.

I am not alone in valuing the many partners USACE works with across all of our mission areas and business lines. To guide the agency through his tenure, the new USACE commanding general, Lt. Gen. Scott A. Spellmon included "Improve Partnering and Strengthen

Relationships" as one of the four goals in his Campaign Plan. His desired end state is to build and maintain strong, meaningful and lasting relationships. One of the ways we have achieved, and continue to achieve, this goal is through our support to state Silver Jackets teams. This newsletter includes a few examples of this successful partnership model at work.

Thank you again for taking the time to read this edition of the FRM Buzz Newsletter. I hope this short celebration of successful partnership, as well as the many other articles in this edition that highlight partnership efforts, inspires you to continue building and strengthening your own partnerships, especially as hurricane and wildfire seasons are upon us again. As we have said so many times before, "Make a friend before you need a friend." 

Sacramento District Silver Jackets Interagency Tribal Workshop team recipient of South Pacific Division 2019 Programmatic Planning Team of the Year award

By Elise Jarrett, USACE, Sacramento District

The U.S. Army Corps of Engineers (USACE) Sacramento District's Silver Jackets Interagency Tribal Workshop team was nominated and selected as the USACE South Pacific Division 2019 Programmatic Planning Team of the Year award recipient. This team exemplified a spirit of cooperation, personal dedication and innovation to support over 40 tribes across California and Nevada and throughout three USACE districts.

Many tribes located within the Sacramento District boundaries have significant flooding issues. Too often when flood emergencies occur on tribal reservations, the necessary communication channels, and relationships to either provide or receive assistance, are not in place or well developed which can lead to life-threatening situations. Some tribes are unaware of available agency resources to assist with planning and recovery. At the same time, agencies are unaware of which tribes might benefit from their programs and capabilities. The Silver Jackets Interagency Tribal Workshop team recognized this disconnect and developed a workshop series to encourage engagement and communication between tribes and agencies to strengthen agency-tribal relationships before an emergency occurs.

The six workshops brought together tribal officials and members, representatives of local, state and federal agencies, non-governmental organizations, and academia to strengthen relationships and share knowledge about available programs and opportunities for tribes related



Patricia Fontanet Rodriguez, a water resources planner with Sacramento District, speaks as part of a panel on the topic of watershed long-term planning opportunities during the Flood Preparedness and Emergency Management Resources Workshop for Tribes held August 13 in Blue Lake, CA. (J. Paul Bruton, August 2019)



Seated at the head table, a panel addresses attendees regarding flooding hazards and communication issues facing tribes and government agencies. From left are, Anita Huff, Blue Lake Tribe, Dean Baker, Yurok Tribe, Denise Shemenski, California Office of Emergency Services and Kathleen Zontos, National Weather Service. (J. Paul Bruton, August 2019)

to water resources and emergency management. The content of the workshops included presentations by the attending tribe(s) and agency representatives, structured discussions, and networking opportunities. Through

this effort, USACE and other agencies were able to learn directly from the tribes about problems they are facing and offer information on available resources and ways they could provide support. ♦

Paul Osman – a true floodplain manager’s champion

By Hal Graef, USACE St. Louis District and Chris Haring, USACE Rock Island District



Paul Osman (Ian Dinham, 2016)

Many in Illinois and its surrounding states know that Paul Osman retired in August 2020. Paul was the statewide floodplain programs manager for the Illinois Department of Natural Resources, Office of Water Resources (IDNR/OWR) and was the Illinois State National Flood Insurance Program (NFIP) coordinator. Those who have met Paul and his outsized personality know that he was more than just a point of contact; he was also a true champion of floodplain management. Paul’s “boots on the ground” approach led many to better understand the flood risk and what actions could be taken to reduce the risk. Yes, some of these actions involved tough love (“elevate or move”), especially with respect to repetitive loss structures; however, Paul always provided the perspective that being proactive is better than reactive ... in short, MITIGATION WORKS!

Paul served as an instrumental member of the Illinois Silver Jackets team by identifying opportunities for the team to fill unmet floodplain management needs. He knew the strengths of each



Paul Osman with David Schien of FEMA on Campbell’s Island, Illinois during an Illinois Geographical Society floodplain management tour on the Mississippi River in 2016. (Norman Moline, 2016)

interagency partner and was skilled at persuading others to contribute to finding a solution.

For example, within the U.S. Army Corps of Engineers (USACE) St. Louis District, Paul was the guiding force behind the Jersey County Loss Avoidance Study. Jersey County went from one of the worst counties in the state for repetitive losses in 1995 to a county to be emulated 25 years later via their \$2.89 return in avoided flood losses for every \$1 invested in mitigation activities (prior to the 2019 Midwestern floods). This mitigation success story has been shared throughout Illinois.

Another example of Paul’s leadership comes from within USACE. The USACE Rock Island District worked closely with Paul, as well as with Ottawa Floodplain Manager Mike Sutfin and State Senator Sue Rezin, to form a Flood Zone Alliance (FZA) regional working group. The working group has been instrumental in providing flood risk management

Under Paul Osmand’s leadership...

Illinois grew to be recognized as a national flood risk reduction leader after being awarded an “advanced” rating by FEMA.

Illinois communities adopted higher floodplain management standards.

Floodplain regulations were strictly enforced.

Cumulative damages were tracked after every flood.

Many buildings were “red tagged,” that is, identified as requiring action for remediation or removal to address flood risk.

Efforts were targeted on addressing the challenges of properties incurring repetitive flood losses.

Many mitigation projects were carried out.

dialogue and options to surrounding communities. Paul worked with other local groups to form additional FZA’s to expand flood risk management issues to other areas within the state.

Even though Paul retired from his day job, he did not retire from floodplain management. Paul remains active in the Illinois Association of Floodplain and Stormwater Management (IAFSM).

Well done, Paul! There is a new generation of floodplain managers trying to live up to your standards. 🙏

Levee rehabilitation project a partnering success

By Michael Glasch, USACE Omaha District



L-536 "A" Breach Closure and Construction. (USACE Omaha District, July 16, 2020)

Like many levees along the lower Missouri River, L-536 in Atchison County, Missouri, suffered massive damage when a bomb cyclone hit the Midwest in March 2019. Like levee after levee along the lower part of the river, L-536 was overtopped, causing five breaches, flooding the land behind it, and cutting off vital transportation routes.

"My first impression when I saw the damage along L-536 was wow! Your jaw drops and for a second you think, 'Am I even in the Midwest? Have I migrated to one of the coasts?' Because it just looks like an ocean out there," recalled Corina Zhang, resident engineer, U.S. Army Corps of Engineers (USACE), Omaha District, Flood Recovery Office. "I was mixed with a lot of emotions. One, of impressiveness of the damage, but

you just suppress that because you're also overcome with sadness and a sort of grief because you know all of these landowners lost all their property, all of the farmers have lost their harvests. It was just devastating."

The perfect storm of events that led to the March 2019 disaster started in 2018. That year the Missouri River saw 165 percent of the average runoff in the basin. That was coupled with above average rainfall and winter snow throughout the lower part of the basin.

Then in March 2019, on top of the already saturated ground, widespread rainfall of 1 to 3 inches was observed across the region with pockets receiving up to 4 inches in eastern Nebraska and southeastern South Dakota, melting

the snow on the ground. With the ground already saturated, the water had nowhere to go except into the river and its tributaries.

As a result, approximately 45 river gauges on the Missouri River and its tributaries throughout the states of Iowa, Missouri, Nebraska and South Dakota set new stage records. Nearly all of these new stage records were on stretches of the river downstream of Gavins Point Dam (Yankton, South Dakota), the most downstream dam on the Missouri River, meaning that all of this water would flow throughout the lower basin without the ability to regulate the flow.

Continued on page 5.

The impact to Atchison County was substantial and included:

- 56,000 acres underwater.
- 121 miles of road destroyed in the county.
- 14 commercial businesses underwater.
- 166 homes flooded.
- 278 citizens forced to evacuate.
- 1,295 agricultural buildings flooded.
- An estimated \$25 million in lost agricultural revenue.

It was determined from a USACE cost analysis of all technically acceptable alternatives that, due to the extensiveness of the damages and scour holes at the breach locations, it would be more efficient and more cost effective to realign the south part of the levee rather than repair it in place. Unlike levee systems north of L-536, the levee rehabilitation construction phase for L-536 was intentionally delayed, allowing the levee sponsor time to obtain the needed real estate for this levee realignment. To do that required cooperation from a variety of stakeholders and outside agencies, including:

- Atchison County Levee District #1.
- Missouri Department of Natural Resources.
- Missouri Department of Conservation.
- Missouri Department of Economic Development.
- Missouri River Recovery Program.
- Missouri State Emergency Management Agency.
- Northwest Missouri Regional Council of Governments.
- The Nature Conservancy.
- U.S. Army Corps of Engineers.
- USDA Natural Resource Conservation Service.

Each partner played a key role in the project. Without their combined efforts, the levee realignment would not have been constructed and the levee would have been repaired in place, which would not provide the same incidental



Dredging in-place seepage berms. (USACE Omaha District, October 27, 2020)

environmental benefits and increased system resiliency.

Acquiring real estate and finding suitable borrow material were two requirements of the levee realignment project that became a focus of partnering efforts. Under the USACE Public Law 84-99 Levee Rehabilitation Program, the levee sponsor is required to provide all real estate and borrow material for a project. However, finding suitable borrow material following the 2019 flood event was a challenge. Additionally, the new levee footprint required significantly more real estate than the traditional rehabilitation process. “A big hurdle [for the Levee Sponsor] to overcome was securing the real estate for the new levee footprint,” said Zhang. “In order to do that, all of the landowners needed to be bought into the idea as well. Those conversations take time and [are] part of the reason it took longer to get started.”

The Levee Sponsor worked with the USDA Natural Resource Conservation Service who helped address the real estate challenge by providing an opportunity for landowners to enroll in the Emergency Watershed Protection Program – Floodplain Easements Program. Through this program, NRCS

will purchase conservation easements from the enrolled landowners later this year, using disaster funds from the 2019 floods. In a complementary effort, The Nature Conservancy secured options to buy properties in full, after the NRCS easement purchases are complete. The Levee Sponsor also engaged the Missouri state agencies who worked together to find funding to obtain the real estate needed for the levee footprint and to pay expenses for real estate appraisals.

Further support for the levee realignment effort came through the USACE Missouri River Recovery Program (MRRP), a habitat restoration program. In addition to providing substantial amounts of borrow material, the MRRP provided land for the new levee. About half of the land that is being reconnected to the river by the levee realignment is currently in the MRRP and will be restored for wildlife habitat. This was truly a win-win scenario with habitat quality improvement also providing significant cost savings, in terms of real estate and borrow material, for the levee sponsors.

Continued on page 6.



Full levee section realigned. (USACE Omaha District, March 11, 2021)

Finally, the Northwest Missouri Regional Council of Governments was a key connection, providing support to the levee sponsors, identifying grant resources, and coordinating with local government.

“The partnership between all of the external stakeholders is a magnitude above all teams I’ve experienced,” said Zhang. “It’s awesome that they’ve all been very solution oriented.”

An interesting sidenote to the restoration efforts on L-536 is that many of the farmers initially impacted by the floods were hired by the USACE prime contractor to help with the construction of the realignment. At one point nearly 70 percent of the equipment operators working on the flood recovery efforts were local farmers and landowners.

“I’ve known a lot of these farmers down here for a lot of years. I’ve done a lot of work on these levee systems. So, really, it’s hard to see the devastation that occurred,” said TJ Davey, USACE Omaha District, lead construction representative. “They gave up a year of crops while we worked together with a multitude of different agencies in order

to come up with a plan to be able to do this realignment. To see them out here working on building this levee is extremely encouraging. We’re helping them as they help themselves.”

The L-536 project was highlighted as an innovative, practical, community supported solution by the Flood Recovery Advisory Working Group, established by Missouri Governor Mike Parsons after the 2019 flooding. The task of the Working Group was to provide recommendations to address this repetitive threat to Missouri communities. In its final report, the Working Group included recommendations to make the process easier for future communities that might want to consider levee realignment as a tool for flood resilience. “I do believe this will be the model of the future,” said Governor Parsons during an interview while on a visit to the project site in early April 2021.

Significant strides have been made in restoring and constructing the L-536 levee rehabilitation project. The final plans called for filling in the first breach and two critical section losses, restoring the upstream section of the levee, and

then realigning the levee from that point on. The contract was awarded May 19, 2020, and construction began two weeks later. Work on the realignment portion was awarded July 31, 2020 and contractors for USACE fully returned the entire system to its pre-flood height the first week of March 2021. Almost 5 miles in length, the realigned portion of the levee reconnects approximately 1,100 acres of floodplain to the river. In addition to giving the river more room to flow, the realignment also creates more wetlands habitat.

Even with this progress along L-536, a heightened level of flood risk remains for the communities and landowners behind the damaged levee system as restoration efforts remain ongoing. This risk is higher than it was prior to the flood event because the levees comprise a series of components that all function together to create a complete levee system. Until all these components (such as seepage berms and relief wells) are repaired, the system does not fully provide the same level of flood risk reduction as it did in its pre-flood condition.

“The L-536 team has worked resiliently to reach this major milestone, continually providing innovative solutions with a focus on the ability to construct a high-quality product through adverse winter weather conditions” said Carlie Hively, L-536 project manager, USACE Omaha District. “Returning the system to full height is a great accomplishment for the team and the district, but we continue to press forward to provide the community with a fully repaired levee system as soon as possible.”

“I’m tremendously proud of the entire team that has worked so hard to restore our federal levee systems. L-536 is another great example of their commitment and expertise,” said Col. Mark Himes, commander, USACE Omaha District. “We’ll continue to keep pushing hard to bring all the federal levees back to their full level of flood risk reduction.”



Flood risks during periods of drought

By Sarah Moore, USACE Albuquerque District, Utah Silver Jackets

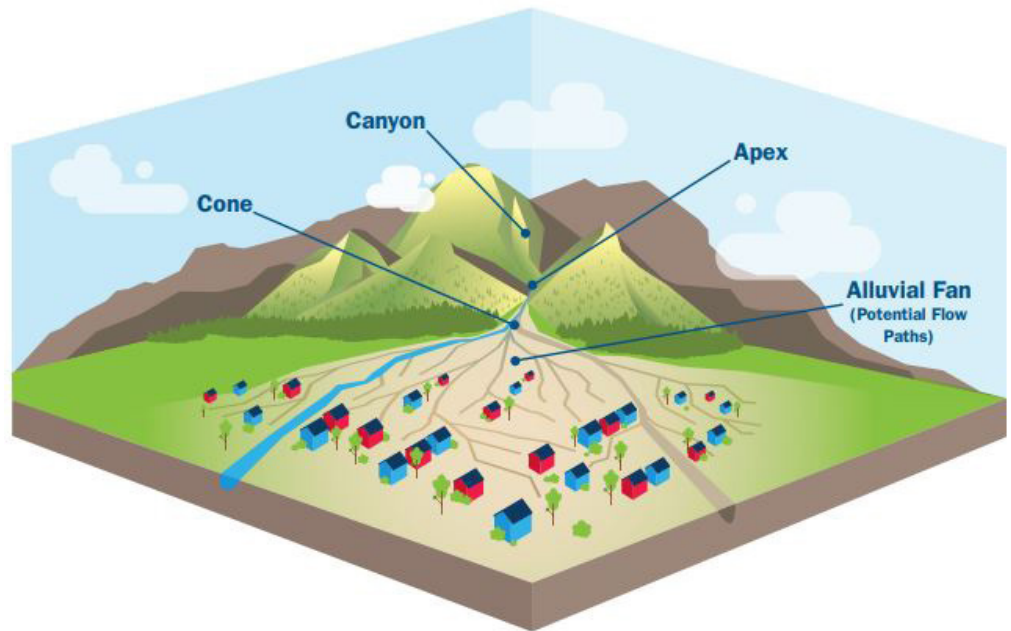
Communities across Utah are joining forces with the Utah Silver Jackets team to plan for flooding during one of the state's driest periods. The [U.S. Drought Monitor](#) has categorized 98 percent of Utah as currently being in a Severe Drought.

It is easy to become complacent about flooding when rain is scarce, however; recent 2020 flooding events across the state – the Emery County flood, the Washington County flood and the St. George flood - make it clear that flooding can happen even during dry periods. Since dry soils can't absorb water as quickly as moist soils, a drought can actually increase flood risk, particularly flash flood risk.

The [Utah Silver Jackets](#) team is a state-led interagency team consisting of state, federal and local agencies that work to build partnerships with Utah communities to better prepare for flood disasters before they strike. The communities and projects highlighted in this article show the diversity of flood preparedness work being completed across Utah – even during this dry weather!

Preparing for flooding disasters begins by understanding your community's flood risks. The city of Ephraim worked with the U.S. Army Corps of Engineers (USACE) to update their floodplain mapping. This process showed that the city was partially located in an alluvial fan. Using this information, the city of Ephraim has worked with the Utah Silver Jackets to complete outreach to city officials and the public regarding the updated floodplain mapping and the associated risks of flooding in alluvial fans.

Utah communities located on alluvial fans, like the city of Ephraim, can have a high flood risk and need



As described in the online resource [What is an alluvial fan?](#) "An alluvial fan is a fan-shaped area where silt, sand, gravel, boulders, and woody debris are deposited by rivers and streams over a long period of time. Alluvial fans are created as flowing water interacts with mountains, hills, or steep canyon walls." (FEMA, Salt Lake County, and Utah DEM, [What is an alluvial fan?](#))

to be empowered to select flood mitigation measures suited to local needs. The [Utah Division of Emergency Management](#) is currently mapping alluvial fans throughout the state of Utah and is partnering with Silver Jackets to develop a guide for communities detailing mitigation options to reduce alluvial fan flooding at the local level.

Common across the Southwest, unexpected cloudbursts can lead to flash floods that happen with little to no warning time. When flash floods impact slot canyons, the results can be deadly for anyone recreating inside the slot canyon. Zion National Park is home to some of the most visited slot canyons in the country and, sadly, the park has experienced multiple fatalities from flash flooding in its slot canyons. The park is currently working closely with the Utah Silver Jackets and local

agencies on a Zion Flash Flood Risk Reduction Project.

Building off the experience and work being completed in Zion, the Utah Silver Jackets are working with Emery County to address flash flooding in slot canyons following a deadly 2020 flood event that occurred near Goblin Valley State Park. People will always want to recreate in slot canyons and communities like Zion National Park and Emery County are taking the steps to educate visitors and plan for the risk associated with flash flooding and slot canyons.

Once a community has an idea of their flood risks, it is important to prepare for those risks by creating a flood [emergency action plan](#) (EAP). The Utah Silver Jackets offers communities help in planning and preparing flood risk

Continued on page 8.



On 4 August 2014, Carbon County received a large amount of rain in a short period of time. This caused the Price River to breach its banks, leaving a path of mud and destruction. ([Utah Natural Hazards Flickr Page](#))

EAPs. Grand, Carbon, San Juan and Castle counties all took advantage of an EAP workshop held January 22, 2020, in Grand County, Utah. For the counties without an EAP, the first half of the workshop outlined the important elements included in an EAP. The second half of the workshop focused on improvements to existing plans, resources, and past experiences in emergency events.

EAPs are not just for county-level emergency managers. The city of West Jordan conducted an EAP workshop in

March 2021 and the city of Bluffdale has been continuously working with the Silver Jackets on an EAP to go along with their “Canal Failure Flood Consequence Study.” The city of Bluffdale went one step further and tested their EAP with a tabletop exercise on February 22, 2021. Tabletop exercises assess an organization’s ability to respond to an emergency and help identify improvements for keeping people safe.

Working together as a team, Utah communities and the Silver Jackets are increasing flood risk awareness and

providing a platform for interagency collaboration and resource sharing across the state. All the communities mentioned above, and many more like them, are proving that the people of Utah understand that flood risks are real - even in periods of drought.

If you know of communities interested in better understanding their flood risks, putting together an EAP, or exercising their EAP with a tabletop exercise, please contact the [Silver Jackets team](#) for your state. ♦

HEC-HMS updates and recent tools for rapid model development

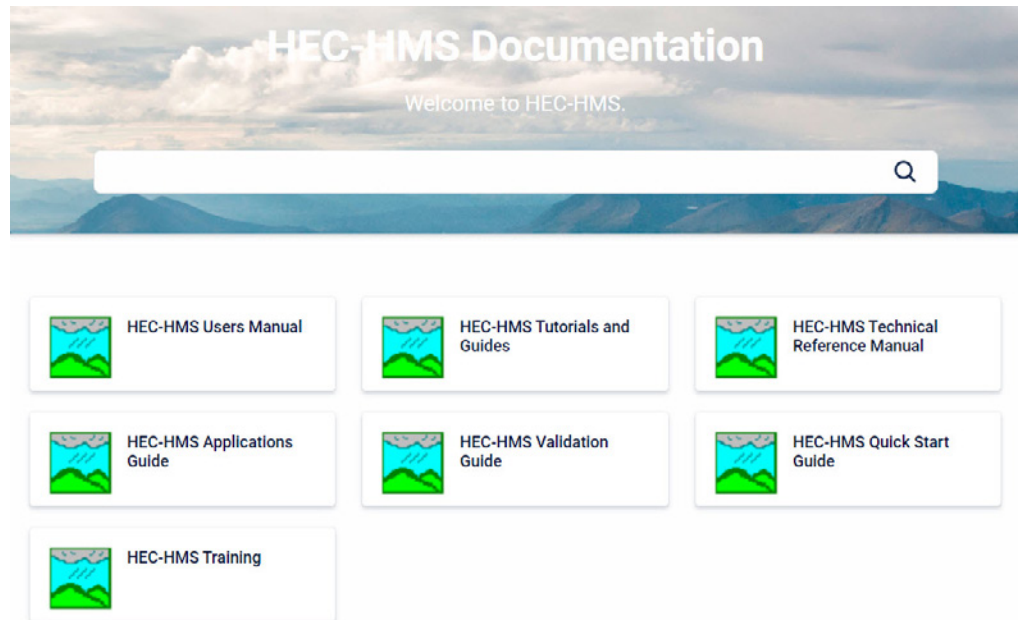
By Greg Karlovits and Matt Fleming, USACE Hydrologic Engineering Center

The development team behind the U.S. Army Corps of Engineers (USACE) Hydrologic Engineering Center's Hydrologic Modeling System (HEC-HMS) is now releasing new versions of this multipurpose, hydrologic modeling software on a more frequent basis than in previous years. Associated training and model documentation are available on a new, online platform that allows for real-time updates and provides a way for users to ask questions and offer feedback.

The HEC-HMS software is designed to simulate the hydrologic processes of a watershed. It was created to meet the needs of the USACE planning and engineering communities, but is also made available for the public to [download for free](#). The software is downloaded over 50,000 times a year and is widely used by agencies and academia alike for water resources planning, forecasting, and disaster response, among other applications.

HEC-HMS is a flexible and versatile modeling software. It can model many different watershed scales, ranging from large river basins to small, urban watershed runoff. It includes integrated GIS tools, automated data management, simulation of hydrologic processes, and results visualization. The software can be used to model precipitation-runoff for single flood events or for long-term period-of-record simulations. One of the many strengths of the software is that it includes user options for simulating different processes in the hydrologic cycle.

The HEC-HMS team increased the frequency of software releases to shorten the software release cycle from years to months while gaining timely feedback from modelers. They have provided over seven updates since 2020,



The new HEC-HMS online platform for model documentation and training. ([HEC-HMS documentation website](#), May 2021)

introducing new software features and providing rapid bug fixes.

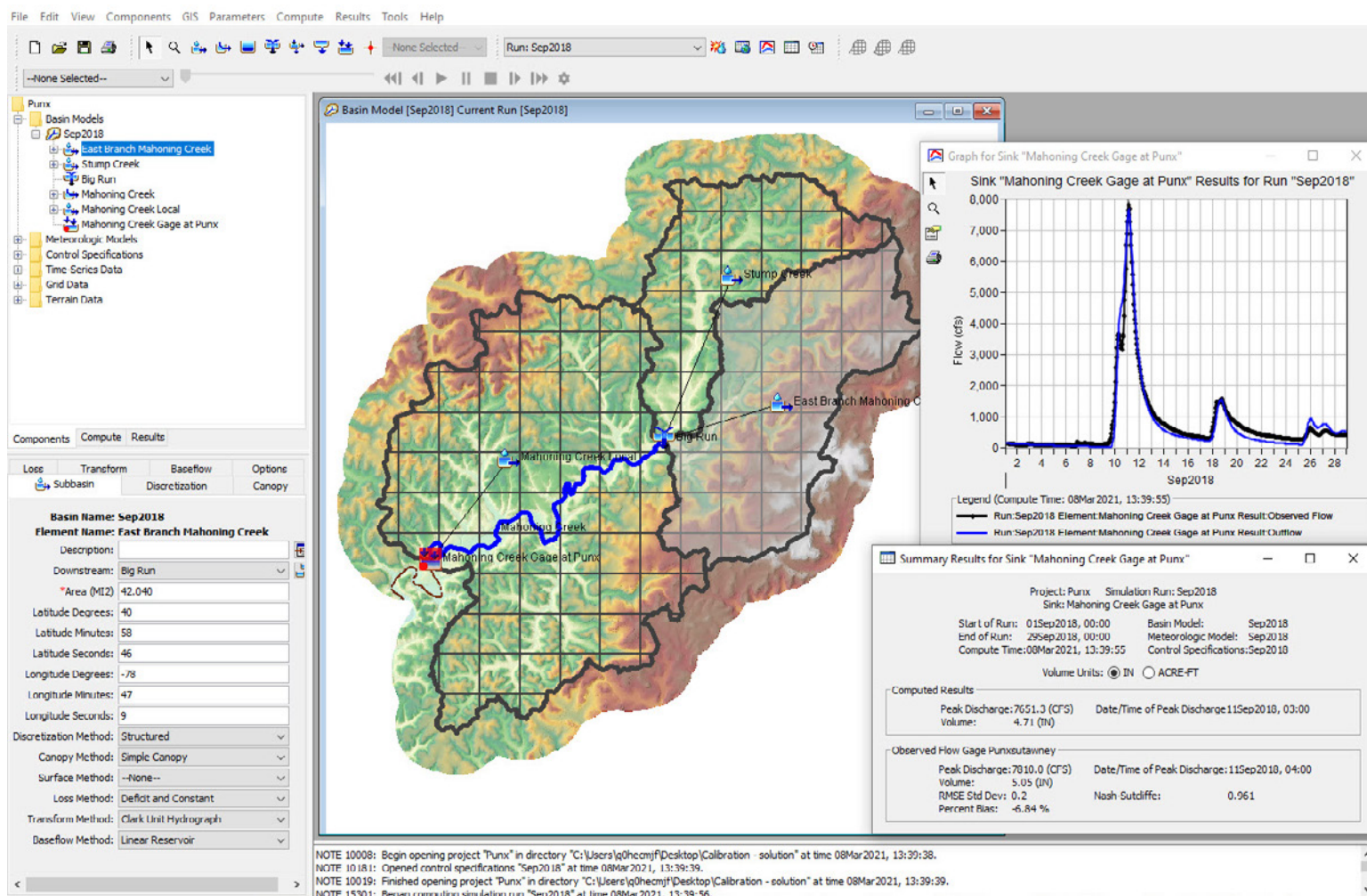
Recent releases provide new software features that improve the speed and quality of hydrologic modeling, such as:

- A watershed delineation toolkit completely within HEC-HMS, allowing users to import elevation data and get working on their watershed model with less dependency on external GIS tools. Watershed delineation can be performed directly in HEC-HMS. New parameter estimation tools for the most common loss, transform, and baseflow methods allow for quick estimation of initial parameters. Support for importing raster-format GIS data was added, making it easier to estimate hydrologic parameters from spatial data.
- Subbasin discretization schemes that make it easier than ever to use gridded meteorological products in

an HEC-HMS model and to develop models with gridded hydrologic parameters. Additionally, a new gridded data import tool streamlines gridded data wrangling from a wide variety of data sources, including popular products such as PRISM, MRMS, AORC, and RTMA.

- The Hypothetical Storm method that gives users a powerful tool for modeling precipitation frequency-based storm events and allows users to directly use NOAA Atlas 14 precipitation frequency grids in their meteorological model. Users can also use custom storm time patterns, such as those provided by Atlas 14. The Hypothetical Storm method can also be used in the Depth-Area Analysis simulation type, allowing users to quickly simulate frequency-based storms for several points in a watershed, applying a depth-area reduction function as the simulation intersects the subbasin areas with a precipitation frequency grid.

Continued on page 10.



Example of the HEC-HMS user interface for a GIS-based project. (Greg Karlovits, May 2021)

- Detailed HTML-based reports for model parameters and simulation results can now be generated using a standard reporting tool. This makes it easy to quickly produce a report about an HEC-HMS model in a standard way, facilitating review and display of parameters and results.

The HEC-HMS development team has also created an online platform to deliver up-to-date model [training](#) and [documentation](#). This platform offers short, recorded tutorials on specific tool features. Additionally, it provides class materials from the HEC-HMS training class, including YouTube videos, PowerPoint files, and links to workshops.

The online platform features the [HEC-HMS Discourse Webpage](#) where

USACE users can submit questions to the development team or offer ideas for future development. Although non-USACE users cannot post on the Discourse Webpage, they can view the content and have the option of sharing ideas or reporting bugs by e-mailing the development team at hec.hms@usace.army.mil.

For more information about new tool features, documentation and training, users can view the quarterly HEC-HMS webinars. Topics for upcoming webinars and presentation materials and video recordings of past webinars are all available [online](#).

HEC-HMS Technology Transfer Resources

The new [HEC-HMS Training webpage](#) provides links to online training material that includes 50+ short videos and hands-on workshops.

The new [HEC-HMS Documentation webpage](#) provides links to our online user documentation. The Tutorials and Guides page provides many examples and datasets of newer software capabilities.

Quarterly [HEC-HMS webinars](#) introduce new tool features and describe documentation and training resources.

FEMA Region 8 partners with local TEDx organization to raise risk awareness

By Tony Mendes, FEMA Region 8



A snapshot of FEMA Region 8's virtual exhibit space for TEDxMileHigh events. (FEMA, January 2021)

Communicating risk can be challenging. It may be hard for communities to visualize how a future natural hazard will affect their neighborhood, home or business. To better illustrate the concept of risk and how communities can prepare for potential hazards, FEMA Region 8 partnered with TEDxMileHigh to bring the concept to life and shift a complex idea to a simple one.

TEDx events are programs created in the spirit of the larger TED initiative with a focus on a specific community and local voices. TEDxMileHigh concentrates on the Denver metropolitan area and has more than 85,000 online community members who participate in the program's activities.

TEDxMileHigh attendees are typically between ages 35-54 and highly invested in social issues. By collaborating with TEDxMileHigh, Region 8 raises awareness on the importance of

understanding risk with people who have a bias for action. Additionally, FEMA is positioned as a thought leader in a new, contemporary and innovative way through a unique outlet, broadening outreach to communities.

Although COVID-19 restricted live event opportunities this past year, Region 8 shifted engagements to a virtual platform through an online exhibit space. The exhibit space featured videos, brochures and handouts covering everything from creating a disaster kit to protecting pets during a disaster to purchasing flood insurance. For the recent December 2020 event, Region 8 had more than 68,000 impressions on FEMA-related content in the digital program and 300,000 impressions in the eNewsletter promotion. Additionally, Region 8 had two personalized Instagram posts promoted to TEDxMileHigh's 10,000 followers.

FEMA Region 8 also hosted and recorded a virtual fireside chat in partnership with TEDxMileHigh on "Building a Culture of Preparedness." The discussion featured experts from Region 8 on understanding risk, flooding after fires and how to prepare against natural hazards. More than 30 people attended the live online chat, and the recorded video was later available to view in the [exhibit space during TEDxMileHigh's December 5 event](#).

For TEDxMileHigh's "Uncharted" event in March and the most recent "All Together" event in June, Region 8 created short, informational videos on key issues in Colorado including equity and mitigation and is exploring additional engagement opportunities. For questions or more information, please contact Tony Mendes, senior emergency management specialist, FEMA Region 8 at tony.mendes@fema.dhs.gov.

Life risk modeling for Lower San Joaquin River in California's Central Valley supports emergency response planning

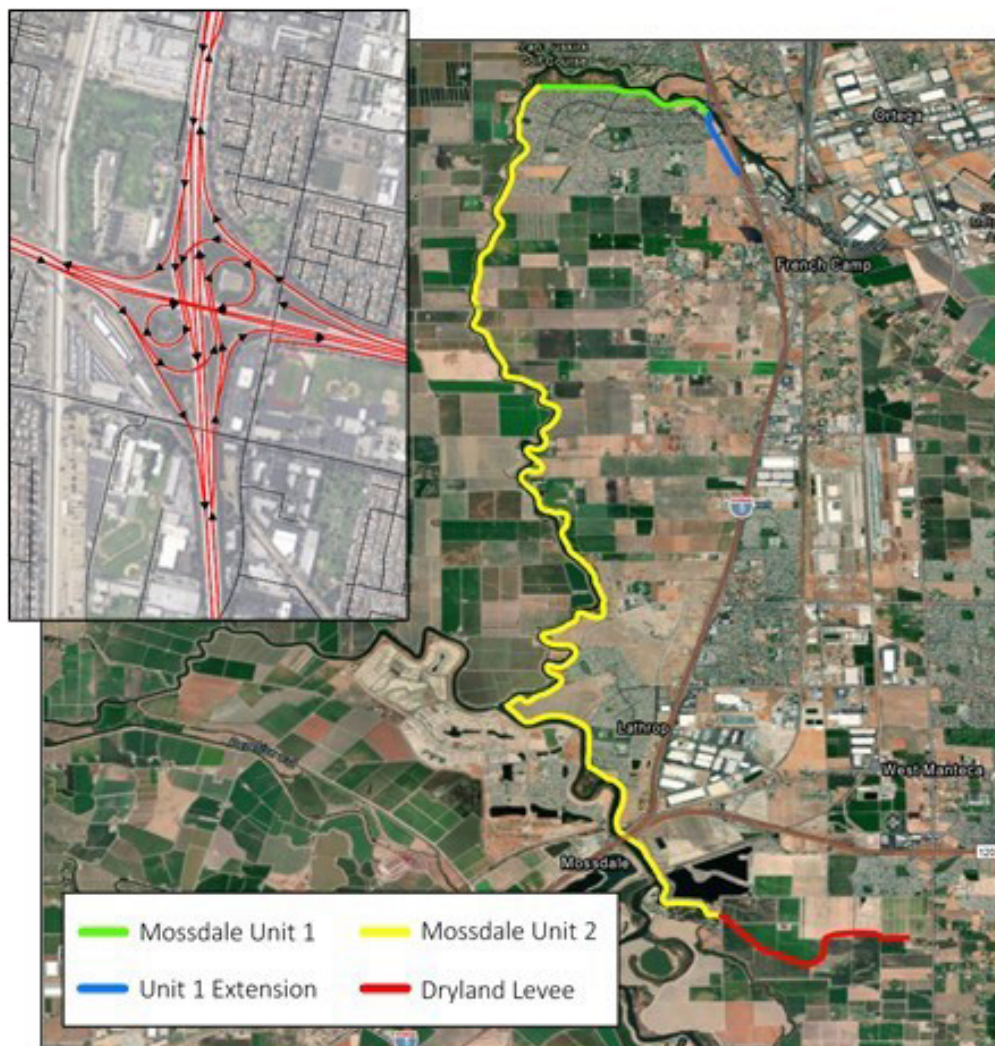
By Carolyn Gombert, USACE Sacramento District

Along the Lower San Joaquin River in the Central Valley of California, emergency response managers in Reclamation District (RD) 17 have a new tool in their toolbelts: results from a life risk assessment conducted by the U.S. Army Corps of Engineers (USACE).

Through the Flood Plain Management Services (FPMS) program, USACE brought together federal, state and local representatives to complete a study looking at potential life loss in RD 17 under both present-day and future conditions. In the past, flood risk assessments within the district have sought to quantify economic damages and structural deficiencies. The RD 17 Risk Assessment, however, is the first study to focus exclusively on life risk. RD 17 includes the southern portions of the city of Stockton, the eastern portions of the city of Lathrop, the western portions of the city of Manteca and areas of unincorporated San Joaquin County.

The RD 17 study employed the USACE Hydrologic Engineering Center's Life Loss model, HEC-LifeSim 2.0. Model inputs for HEC-LifeSim 2.0 allow the user to enter three key pieces of information: (1) magnitude of a flood, (2) likelihood of infrastructure failure, and (3) resulting human behaviors. Five different scenarios were modeled for the RD 17 basin. Two were for future conditions, essentially turning the input "knob" responsible for flood size. Three were for present-day conditions, turning both the "knob" for infrastructure by adding levee improvements as well as the "knob" for human behavior by increasing floodplain development.

Much like life itself, life risk modeling is nuanced. "You can't tell this story with



The Reclamation District 17 Levee System includes four levee segments, as illustrated in the map above. An elicitation with local partners informed the warning and evacuation relationships used in the RD 17 LifeSim 2.0 consequences model. The team simulated evacuation in LifeSim 2.0 to identify impacts to key egress routes using a road network similar to the inset photograph above. (Geographic Information System map of RD 17 Levee Segments and Road Network, 2020)

a single number," said Jesse Morrill-Winter, USACE technical lead for the RD 17 study. In an effort to capture some of the complexities involved in modeling life risk, Morrill-Winter and the USACE technical team met with RD 17 emergency managers and emergency responders. "We wanted to understand

the procedures they had in place for warning and evacuation," Morrill-Winter said, "so we could build those input parameters into our model."

Results from the HEC-LifeSim 2.0 model show that current life risk for RD 17

Continued on page 13.

is relatively high. With climate change expected to increase flows coming down the San Joaquin River, this life risk for the existing population and critical infrastructure in RD 17 will continue to rise without levee improvements in place. However, RD 17 emergency managers now have a more complete understanding of these risks. They can better put their fingers on how flood size is tied not only to infrastructure but also to human behavior. Eric Nagy, who served as the non-federal RD 17 study project manager, put it this way: “You can predict with reasonable certainty when a levee is going to overtop but often can’t predict when a levee is going to fail.” He points out that overtopping of a levee and failure of a levee create two very different emergency response scenarios. “For one, you might encourage people to get in a car and evacuate. For the other, you might tell people to get on the roof of their house,” said Nagy. In the latter case, residents may not have time to sit in traffic.

Emergency response planning falls under the umbrella of nonstructural risk mitigation. While time and resources are required to develop emergency action plans, to educate community members and to encourage evacuation readiness, these nonstructural mitigation measures are much less expensive than pricier structural improvements. Without adopting nonstructural mitigation measures, “We are leaving a lot of life risk reduction potential on the table,” said Jason Needham, a USACE advisor and reviewer for the RD 17 Risk Assessment. “Nonstructural measures may cost some money. Yet, while their economic benefits are pretty minimal, the life risk benefits tend to be really significant.”

Other areas of northern and central Stockton along the Lower San Joaquin River were included in a January 2018 USACE feasibility study, determining remediation measures most appropriate for flood risk reduction. However, due



Above, a dryland levee in the southern section of Reclamation District 17 illustrates the current conditions of flood control infrastructure along the Lower San Joaquin River corridor. (Photo courtesy of Manteca Bulletin, 2020)

to questions around the application of Executive Order 11988 to RD 17, RD 17 was deferred from the first phase of the feasibility study. The RD 17 Risk Assessment has begun to prepare the partners for a subsequent feasibility study by providing needed collaboration and additional analysis around this previously controversial issue. “We are very grateful,” said Chris Elias, executive director of the San Joaquin Area Flood Control Agency (SJAFCA), which requested the FPMS study.

The RD 17 Risk Assessment allowed USACE to act as an objective third party and “review both the system and the

human plans to react to the system,” said Scott Shapiro, general counsel for SJAFCA.

Now, with the results in hand, emergency managers in RD 17 are more equipped to reduce life risk. “We have to sharpen our pencils when it comes to evacuation plans,” Elias said. SJAFCA is seeking federal funding for the subsequent feasibility study. If funded, this subsequent feasibility study would be able to place life risk and economic risk in RD 17 side-by-side and, ultimately, inform future levee system improvements.

Community Rating System virtual symposium fosters floodplain management best practices and partnerships

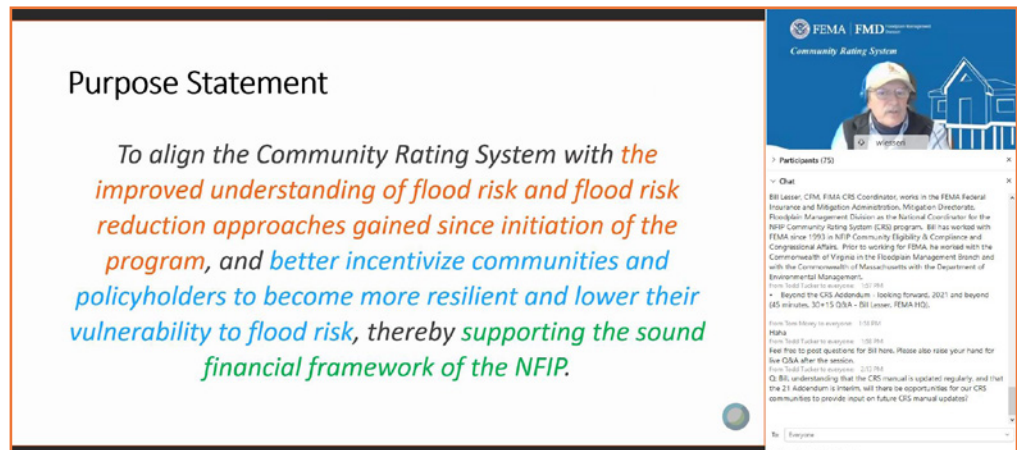
By Brian Rast, USACE Kansas City District

Overcoming the social distancing constraints of COVID-19, FEMA Region 7 conducted its second annual Community Rating System (CRS) symposium via video teleconference March 17, 2021. The event, “CRS 2021, Building Partnerships for Advancing CRS in Region VII,” provided participants an opportunity to share information and ideas for fostering the type of public information and floodplain management activities that promote community resilience and are credited under the National Flood Insurance (NFIP) Community Rating system (CRS).

CRS is a voluntary incentive program that is part of the National Flood Insurance Program (NFIP) administered by FEMA. Communities participating in CRS can obtain discounted flood insurance premium rates for residents by adopting floodplain management practices that exceed the minimum NFIP requirements. FEMA administers CRS to further the goals of reducing and avoiding flood damages to insurable property, strengthening the insurance aspects of the NFIP and fostering comprehensive floodplain management.

CRS 2021 gave communities a chance to learn about opportunities for advancing flood hazard mitigation best practices and partnerships. The daylong set of sessions covered topics ranging from tools and techniques for floodplain management, historic and future climate trends, NFIP program changes, and CRS program features and trends, among others.

FEMA Region 7 partnered with the Silver Jackets teams, as well as state hazard mitigation teams and lead state agencies for floodplain management



Bill Lesser, FEMA Headquarters, presenting via Webex to attendees about the latest from FEMA HQ on CRS. (Screen capture of online symposium, March 2021)

within the region, including Iowa, Kansas, Missouri and Nebraska. This team of state partners drew on their firsthand experiences to help identify specific topics and speakers that would help improve implementation of flood mitigation efforts. Measures that are creditable under CRS are often already an integral part of floodplain management work carried out by states. The interagency nonstructural efforts carried out by state Silver Jackets teams are one example. As of fall 2020 more than 300 interagency efforts had been completed, of which 54 had possible ties to CRS activities.

USACE Kansas City District Silver Jackets support staff helped solve the challenge of effectively delivering the symposium content in light of restrictions on in-person gatherings due to COVID-19. Under the USACE Flood Plain Management Services authority, Kansas City District may provide web hosting to support flood resilience efforts. The district developed a [symposium website](#) providing participants access to videos of the speaker presentations, organized by agenda topic. Following

the symposium, the district continues to maintain the website, making the symposium proceedings publicly available as an educational resource.

Participation in this second annual Region 7 CRS Symposium exceeded that of the first, CRS 2020, by an additional 82 participants. Responding to the event's success, Melissa Mitchell, the Insurance Services Office CRS specialist for Kansas, Missouri, Nebraska, Iowa and Arkansas stated, "Ecstatic for the support and encouragement to take CRS from the 101s to the technical elements. We have well established CRS communities that have been waiting for the platform that Region 7 is offering with their annual CRS Symposium. The program's support is strong at the local, state, and regional levels!"

By partnering on CRS 2021 with states, Silver Jackets teams and Kansas City District, FEMA Region 7 was able to leverage the experience and skills of all to better equip communities to participate in the CRS program and implement successful flood risk mitigation measures. ♦



Round the National Silver Jackets table

By Ellen Berggren, USACE Silver Jackets Program Manager

The National Silver Jackets Team is composed of 13 federal agencies that meet quarterly. “Round the Table” is a standing agenda item at National Team meetings, with each agency sharing new tools, publications, initiatives, and information exchange and learning opportunities. Contact the National Team at IWR.SilverJackets@usace.army.mil.

RECORDED WEBINARS: National Silver Jackets member agencies frequently present at monthly Silver Jackets webinars. Recently recorded presentations are posted on the [Silver Jackets webpage](#) and include:

FEMA

- Effective Communications Strategies for Rural Communities.
- FloodSmart – The National Flood Insurance Program.

NOAA NWS

Introduction to the Office for Water Prediction & National Water Center.

USGS Mini-series

- Emerging Water Monitoring Technologies.
- Data Sharing and Delivery Tools for Flood Response.

EPA: A [Green Streets Handbook](#) was published in March 2021 to provide a systematic process to begin reducing the impervious surface footprint of public rights-of-ways and associated off-street surface parking areas. The handbook is intended to assist state and local transportation agencies, municipal officials, designers, stakeholders and others to select, design and implement site design strategies as well as green infrastructure practices for roads, alleys and parking lots.

FEMA: Resources of interest include:

- [Building Community Resilience with Nature-based Solutions: A Guide for Local Communities](#), dated June 2021.
- The [Flood Risk Communication Toolkit for Community Officials](#) was developed to help community officials begin and maintain an open channel for communication. The toolkit includes templates and guides for designing a communication plan, effective public meetings and a social media strategy for addressing flood risk.
- [Risk Rating 2.0 – Equity in Action](#) is a new flood insurance premium pricing methodology that FEMA is implementing. It does not change how Flood Insurance Rate Maps (FIRMs) and Flood Insurance Studies (FIS) are used for

National Silver Jackets Team Participating Agencies

- Environmental Protection Agency (EPA)
- Economic Development Administration (EDA)
- Federal Emergency Management Agency (FEMA)
- Federal Highway Administration (FHWA)
- U.S. Housing and Urban Development (HUD)
- National Aeronautics & Space Administration (NASA)
- National Park Service (NPS)
- Natural Resources and Conservation Service (NRCS)
- NOAA National Weather Service (NOAA NWS)
- NOAA Office of Coastal Management (NOAA OCM)
- U.S. Army Corps of Engineers (USACE)
- U.S. Fish and Wildlife Service (USFWS)
- U.S. Geological Survey (USGS)

floodplain management and regulatory purposes nor for lender compliance with the mandatory purchase requirement. The new rate schedule will take effect using a phased approach beginning October 1, 2021.

FHWA:

- The FHWA has developed a new web-based tool called the [Coupled Model Intercomparison Project \(CMIP\) Processing Tool Version 2.1](#) (“CMIP Tool” for short). The purpose of the tool is to help planners and designers access climate projections (developed using scientific models of Earth’s changing climate) and calculate temperature and precipitation variables for future time periods that can support analysis at the project and regional scales. The intent is to make highway infrastructure more resilient to a range of future climate scenarios (changes in temperature and precipitation) using this data.
- Numerous [recorded webinars](#) are available for viewing on various topics, including green infrastructure pilot projects, nature-based solutions for coastal highway resilience, and other resilience topics.

Continued on page 16.

BULLETIN BOARD

HUD: In February 2020, HUD published a [Community Resilience Toolkit](#) to help recipients of HUD Community Planning and Development (CPD) funds identify opportunities to use those dollars to mitigate natural hazards impacts. The toolkit addresses six specific natural hazards, including increasing temperatures and extreme heat, sea level rise and coastal storms, inland flooding, wildfire, drought, and erosion and landslides. An overview for each natural hazard is provided as well as suggested mitigation techniques eligible under different CPD programs. The toolkit also includes a financing section with other funding opportunities for resilience projects.

USACE:

- The USACE Hydrologic Engineering Center (HEC) is hosting quarterly demonstration webinars about the HEC-HMS model. Webinars are recorded and posted on the [USACE Hydrologic Engineering Center's website](#). To receive notification about future HEC-HMS releases, updates and webinars, request to be added to the [HEC-HMS email distribution list](#). Virtual Training Material is also available online for [Hydrologic Modeling with HEC-HMS](#).
- The Corps [Water Infrastructure Financing Program](#) (CWIFP) received funding for the first time in the Fiscal 2021 Energy and Water Development and Related Agencies Appropriations Act signed into law December 27, 2020, as part of the Fiscal 2021 Consolidated Appropriations Act. The initial appropriation includes \$12 million for credit subsidy and \$2.2 million for program administration. USACE will issue up to \$950 million in loans focused on projects to maintain, upgrade and repair dams identified in the National Inventory of Dams owned by non-federal entities. Program and fee rules are anticipated to be published in the Federal Register later in 2021.

USFWS: New data have been added to the [Wetlands Mapper](#) for over 21 million acres in seven states, including California, Colorado, Delaware, Mississippi, Montana, Nebraska and North Dakota. The Wetlands Mapper delivers an easy-to-use map-like view of America's wetland resources. It spatially integrates National Wetlands Inventory data with additional natural resource information and political boundaries to produce a robust decision support tool. ♦

The [Insurance Institute for Business and Home Safety \(IBHS\)](#) offers a new, streamlined disaster and recovery planning tool. The [Open for Business-EZ \(OFB-EZ\) toolkit](#) created by IBHS provides the small business community a streamlined version of the original business continuity program, Open for Business® (OFB). This newer, "EZ" tool is simpler to use and allows small businesses and organizations to follow the same disaster planning process undertaken by larger companies – without requiring prior experience or a large company budget.

The OFB-EZ toolkit leads users through 10 modules to help them take the steps needed to make sure they can continue functioning in the event of a disaster. Such steps include identifying activities that are essential for continued business operations; identifying and addressing the risks a business faces; and creating an implementable recovery plan. The modules within OFB-EZ contain fillable forms that, once completed, can be combined. The resulting, comprehensive plan can then be printed to share with staff and backed up in digital format. Also available is OFB-EZ Mobile, an app that includes disaster planning tools, including evaluation checklists that help businesses identify their risks as well as forms that can be used to store contact information for employees, customers, suppliers and vendors.

The U.S. Army Corps of Engineers (USACE) [Guide to Resilience Practices \(EP 1100-1-5\)](#) is now publicly available. The USACE Guide to Resilience Practices describes ways in which USACE practices resilience across the organization. It defines resilience as "the ability to anticipate, prepare for, and adapt to changing conditions and withstand, respond to, and recover rapidly from disruptions." The guide examines resiliency practices at the project, system and community level. Section 2 provides background on factors driving resilience within USACE. Section 3 offers examples of how resilience is practiced in programs throughout USACE and within the different USACE mission areas of Civil Works, Military Programs, and Research and Development. Section 4 describes the partnerships USACE fosters with other federal agencies, non-government organizations, the private sector and others to develop resilience. Section 5 discusses frameworks, tools and guides used by organizations to evaluate resilience.

UPCOMING EVENTS

Workshops and Conferences

NOTE: A number of workshops and conference schedules have been rescheduled or shifted to online due to the ongoing pandemic. Some have reduced their registration fees. Please confirm details with conference organizers regarding the latest status.

[NAFSMA 2021 Flood and Stormwater Management Conference](#). August 16-19, 2021. Nashville, TN.

[Texas Floodplain Management Association 2021 Technical Summit](#). August 24-27, 2021. Lost Pines, TX.

[Floodplain Management Association 2021](#). Virtual Annual Conference. September 7-10, 2021.

[Dam Safety 2021](#). Association of State Dam Safety Officials conference. September 12-15, 2021.

[Indiana Association for Floodplain and Stormwater Management 2021 Annual Conference](#). September 15-17. Evansville, IN.

[Oklahoma Floodplain Managers Association](#). September 20-22, 2021. Norman, OK.

[NORFMA Virtual 2021 Conference](#). Northwest Regional Floodplain Management Association conference. September 28, 2021. Virtual.

[United States Society on Dams 2021 Fall Workshop Series](#). October 5-7, 2021. Denver, CO.

[Minnesota Water Resources Conference](#). October 19–20, 2021. Virtual.

[The 15th Annual Fall Floodplain Institute](#). North Carolina Association of Floodplain Managers. October 20-22, 2021.

[New Jersey Association for Floodplain Management](#). October 26-28, 2021. Atlantic City, NJ.

[2021 MNAFPM/WAFSCM Conference](#). Conference jointly sponsored by the Minnesota Association of Floodplain Managers and Wisconsin Association for Floodplain, Stormwater, and Coastal Management. November 3-5, 2021. La Crosse, WI.

[2021 Climate Adaptation Conference](#). Hosted by the Minnesota Climate Adaptation Partnership. January 20, 2021. Virtual via Zoom.

[35th Annual Conference Michigan Stormwater Floodplain Association](#). March 2-4, 2022. Midland, MI.

[Illinois Association for Floodplain and Stormwater Management 2022 Conference](#). March 8, 2022. Normal, IL.

[2022 NFA Annual Conference. March 27-29, 2022](#). Paradise Valley, Scottsdale, AZ.

[2022 ASFPM Conference. May 15-19, 2022](#). Orlando, FL.

[United States Society on Dams 2022 Annual Conference & Exhibition](#). April 11-14, 2022. San Diego, CA.

[Indiana Association for Floodplain and Stormwater Management 2022 Annual Conference](#). September 14-16, 2022. South Bend, IN.

UPCOMING EVENTS

Courses & Webinars

[Natural Disaster Training Preparedness Center \(NDPTC\) at the University of Hawai'i](#) offers training and educational programs related to homeland security and disaster management, with a specific focus on natural hazards, coastal communities, and the special needs and opportunities of islands and territories. The NDPTC actively engages internally with FEMA and the University of Hawai'i, as well as with [external partners](#) across the region to integrate the delivery of its trainings, products and services.

Natural Hazards Center [CONVERGE Training Modules](#)

- Social Vulnerability and Disasters.
- Disaster Mental Health.
- Cultural Competence in Hazards and Disaster Research.
- Conducting Emotionally Challenging Research.
- Institutional Review Board (IRB) Procedures and Extreme Events Research.

Natural Hazards Center [Making Mitigation Work](#) Webinars feature innovative speakers and highlight recent progress in mitigation policy, practice and research. A schedule of upcoming webinars is listed on the [main series page](#). An archive of past webinars is available [here](#).

[FEMA Podcast](#) covers topics relating to the agency itself, innovation in the field of emergency management and stories about communities and individuals recovering after disasters.

[Community Rating System \(CRS\) Training Webinars](#) include past recorded webinars and a schedule of upcoming, live webinars.

[WebEx Virtual Flood Insurance CE conferences](#) are offered by the North Carolina Department of Insurance. Multiple offerings include Friday, August 27, 2021 (Register by August 20, 2021), and Friday, September 10, 2021 (Register by September 3, 2021).

[Nature vs. Structure: Flooding Beyond Direct Structural Damage](#) is an online webinar available through [Donan University](#). September 15, 2021.

[Climate Adaptation Planning for Emergency Management](#). Illinois Association for Floodplain and Stormwater Management (IAFSM). August 31–September 1, 2021. Virtual continuing education training for CFMs.

[Outreach of ASFPM Conference Sessions](#) provide online access to session presentations from the past ASFPM Annual National Conference. Includes presentations on flood insurance and floodplain management related topics.

NOAA Office of Coastal Management (OCM) Training Resources:

- [How to Facilitate a Virtual Meeting](#). Self-guided online training.
- [Techniques for Facilitating Virtual Meetings](#). Reference guide.
- [Virtual Meeting Engagement](#). Reference guide.
- [Coastal Zone Management Act 101](#). Self-guided training resource.
- [Green Infrastructure Effectiveness Database](#). Self-guided training resource.
- [How to Map Open Space for CRS Credit](#). Self-guided training resource.
- [Risk Communication Essentials for More Effective Conversations](#). Self-guided training resource.
- [A Community Works Together to Restore the Floodplain and Reduce Damages](#). Case study.
- [Coastal Community Resilience Indicators and Rating Systems](#). Report.

Many more resources are available at [NOAA OCM DigitalCoast/Training](#).

UPCOMING EVENTS

[NOAA's new U.S. Climate Normals](#) provides an analysis of U.S. weather of the past three decades by calculating average values for temperature, rainfall and other conditions for the period of 1991-2020. These updated calculations give the public, weather forecasters and businesses a standard way to compare today's conditions to 30-year averages.

FEMA Emergency Management Institute (EMI)

Admissions: 301-447-1000, netcadmissions@fema.dhs.gov. Full course schedule available at training.fema.gov.

[Silver Jackets Webinars](#) offers access to recordings of past Silver Jackets webinars, 2011 through 2021.

[American Planning Association Knowledge Center](#) provides an online repository of planning resources relating to a variety of topics, including:

- [Disaster Recovery](#).
- [Hazard Planning](#).

FEMA Region 2 [Preparedness and Resilience Webinars](#) addressing issues related to preparedness, response, mitigation and resiliency.

[FEMA Virtual K0705 Fundamentals of Grants Management courses](#) are intended to assist FEMA grant recipients strengthen grant management skills.

[Adapting Risk Communications to Create Equitable Mitigation Strategies](#). This recording of an ASFPM presentation provides case studies informing effective strategies for communicating and partnering with socially, politically and economically vulnerable communities.

[Building Alliances for Equitable Resilience](#). This resource from FEMA and the Resilient Nation Partnership Network provides guidance, perspectives, personal stories and resources intended to support community efforts to make equitable and resilient practices part of their day-to-day activities.

FRM BUZZ

NEWSLETTER

Reducing Flood Risk: Many Partners, One Team



SILVER JACKETS
Many Partners, One Team

USACE Flood Risk Management Program:

<https://www.iwr.usace.army.mil/Missions/Flood-Risk-Management/Flood-Risk-Management-Program>

Silver Jackets Program:

<http://silverjackets.nfrmp.us>

FRM BUZZ 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, <https://operations.erdc.dren.mil/ideas/index.cfm?CoP=Flood>, is the place to submit these research Statements of Need (SoNs).

You can find past issues of this newsletter at <https://operations.erdc.dren.mil/flood.cfm>. Both the [Silver Jackets website](#) and the [Flood Risk Management Gateway](#) have weblinks, news items and presentations of interest. Check them 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.



**US Army Corps
of Engineers**