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**Utah Floodplain and Stormwater
Management Association**

Annual Conference

November 16 - 19, 2021
Hilton Hoodoo, Moab

Agenda

Tuesday, November 16th

7:30am - 5:00pm NFIP 101 and CFM Exam (extra cost)

Utah DEM

1:00pm - 5:00pm Benefit Cost Analysis Training (extra cost)

Laura Stahnke -
FEMA

Wednesday, November 17th

7:30am *Registration (Breakfast Provided)*

8:00am Welcome

8:30am *Plenary Session 1*

Risk Rating 2.0 – What Does It Mean to You

Diana Herrera -
FEMA Flood Insurance Specialist

10:00am Break

10:30am *Breakout Session 1*

1.1 Sandy City Floodplain
Management Program

Tyler Shelley – Sandy City
Ben Rood – CRS Engineers

1.2 River, Bridge and Scour Using
2D Models

Brad Hartman – Jacobs

11:30am *Breakout Session 2*

2.1 Flood After Fire

Mike Kellogg – JE Fuller

2.2 Instream Diversion Designs

Michael Scurlock – AECOM

12:30pm Lunch (Provided)

2:00pm Breakout Session 3

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| 3.1 | Alluvial Fans in Utah | Jamie Huff – UT Risk Map Coordinator
Margaret Doherty– FEMA Region VIII
Matt Buddie – FEMA Region VIII |
| 3.2 | Mitigating Hazards through Land Use Solutions | Chris Tagert –
Michael Baker International |

3:00pm Breakout Session 4

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| 4.1 | Southwest Creek and Canal Study | Lizel Allen –
Salt Lake County Flood Control
Kameron Ballentine – Bowen Collins |
| 4.2 | Improving Accuracy of Municipal Stormwater Runoff Models | Mark Christensen – JUB |

4:00pm Adjourn

Thursday, November 18th

7:30am Breakfast (Provided)

8:30am Plenary Session 2

Stormwater Panel Discussion	Panelists
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10:00am Break

10:30am Breakout Session 5

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| 5.1 | Post Fire, Ice Jamming & Snowmelt | Isaac Allen – AECOM |
| 5.2 | Determining Infiltration Rates for Stormwater Volume Reduction | Kraig Rasmussen –
David Evans and Associates |

11:30am Breakout Session 6

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| 6.1 | Detailed Studies using Rain-on-Grid 2D Modeling Methods | Rachel Mares – Wood |
| 6.2 | Optimizing Compost Amendments for Stormwater Mitigation in Urban Soils | Dr. Erin Rivers –
USU Assistant Professor |

12:30pm Business Meeting Lunch (Provided)

2:00pm Breakout Session 7

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| 7.1 | Hydraulic and Sediment Transport for Watershed Operation Funded Projects | Ahmad Salah - JUB
John De Leon- JUB |
| 7.2 | Provo West Side Levee Plan | Rob Mills – Provo City
Ben Rood – CRS Engineers |

3:00pm Breakout Session 8

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| 8.1 | Cost Effective Erosion Control in Burned Areas | Joshua Prettyman – CRS Engineers |
| 8.2 | Detailed Rain-on-Mesh to Inform Post Fire Emergency Planning & Recovery | Geoff Uhlemann –
Michael Baker International |

4:00pm Adjourn

Friday, November 19th

7:30am Breakfast (Provided)

8:30am Plenary Session 3

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| Geology based flood mapping, limitations and strengths/
UGS update on work in the Matheson Reserve | Jessica Castleton – UGS
Kathryn Ladig – UGS |
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10:00am Break

10:30am Plenary Session 4

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| North Moab Regional Drainage &
Water Quality Improvements | Jay Meacham – Civil Science
Brandon Weight – Civil Science |
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11:30am Field Trip – Moab Main Street

Drive Safe and See You Next Year!

Presentation Information

Plenary Session 1:

Risk Rating 2.0 – What does it mean to you? As the NFIP implements Risk Rating 2.0, the effects it will have on floodplain management are just as important as the new rating program has on insurance. See what changes are coming.

Diana Herrera, Diana has over 40 years in the insurance industry specializing in the National Flood Insurance Program since 1992. She has conducted over 800 training sessions on flood insurance and floodplain management to stakeholders from the local to the Federal level. She is an instructor at both FEMA's Emergency Management Institute and in the field in mitigation for flood insurance, floodplain management, including the Advanced Floodplain Concepts, and disaster operations. For ten years, Diana had the position of Natural Hazards Program Specialist in Region 6 Mitigation Division located in Denton, TX. She currently is the Regional Flood Insurance Specialist in FEMA Region 8 located in Denver, CO. She has expedited FEMA mission goals for mitigating floods by providing technical assistance to NFIP stakeholders, individuals, communities, local, state and Federal officials, Federal lending regulators and lenders, insurance agents and companies.

Breakout Session 1:

- 1.1 **Sandy City Floodplain Management Program;** Sandy City has developed the Floodplain Management Program as part of the Comprehensive Stormwater Management Plan. Phase 1 of the plan updated the Sandy City Floodplain Ordinance and provided a Floodplain Development Permit. Phase 2 is assessing existing floodplains throughout the city and identifying capital improvement projects needed to reduce flood risk. This phase will also include BLE mapping of several Zone A floodplain areas to identify needed re-mapping and provide best available information.

Tyler Shelley, Tyler grew up in California and moved to Spanish Fork, Utah just before starting high school. He graduated with an Associates at Utah Valley University and later with Bachelor's and Master's Degrees at Utah State University. After graduation, he worked for Hansen, Allen & Luce, Inc for almost 10 years. Tyler now works for Sandy City Public Utilities as the Chief Engineer, Storm Water Program Manager, and Floodplain Manager. He and his wife live in South Jordan City with their four children (three girls ages 15, 13, and 10 and a 7-year-old boy). Tyler enjoys spending time with his family, playing sports (especially pickleball), coaching his kids' soccer teams, camping, and vacationing with his family at the beach.

Ben Rood, Ben specializes in surface water, hydrology, and hydraulic engineering. He has a passion for hydraulic modeling of rivers, storm drains, and bridge scour. Ben has assisted in many public infrastructure projects including

roadway bridges, debris basins, channel restoration, levee rehabilitation, and storm drain system. Ben's favorite vacation destination is boating at Lake Powell.

- 1.2 **River, Bridge and Scour using 2D Models;** Preparing 2D hydraulic models for river, bridge, and dam breach scenarios is getting easier, faster, and more common and beneficial than ever before. A number of tips-n-tricks, case studies, lessons learned, and comparisons between SRH-2D and HEC-RAS 2D can be presented. How 2D tools benefit river work, highway bridge design, and scour analysis will be included. Material will be based on actual projects in Utah, Colorado, Texas, and California.

Brad Hartman, Brad completed his engineering degrees at Brigham Young University in 2001, is a Certified Floodplain Manager, and a registered professional engineer in several US States and Canadian Provinces. Most of his 20 years of experience has been with drainage, flood control, hydrology, and hydraulics, with a current focus on highway, bridge, rail/transit, and aviation project needs both locally and throughout the world. Starting with CH2M 13 years ago, he works for Jacobs and leads his solution group in the Southwest Geography. With staff in several states, Brad provides client solutions, technical mentoring, and career development to his team. Personally, Brad is a master SCUBA diver, cycled before the pandemic, is obsessed with Smart Home automation, and loves the outdoors and animals (just like everyone else). He *thought* he liked backpacking and camping until a mid-life crisis led to his discovery of towable travel trailers.

Breakout Session 2:

- 2.1 **Flood After Fire;** Trends of increasing wildfire size and severity, and continued development leading to encroachment into the wildland-urban interface (WUI) place more people, property, and infrastructure at risk from wildfires and post-wildfire flooding and debris flows. Yavapai County, Arizona is no stranger to wildfires nor to the risks and impacts from post-fire floods and debris flows to infrastructure, residential and developed areas, and human life and health. To reduce and mitigate the risks in Yavapai County from these hazards, JE Fuller and the Arizona Geological Survey are assessing the potential for post-wildfire debris flow and flooding hazards, and their impacts to downstream communities, in the immediate aftermath of a reasonable-scenario wildfire. Results from this study will identify for the County and local municipalities previously unrecognized hazard zones, and mitigation, emergency planning and response needs. The purpose of this study is to develop a comprehensive mitigation strategy to reduce risks to life and property from post-fire flows. Results from this study will also identify potential mitigation opportunities including targeted fuel reduction treatment areas and flood reduction measures. The analyses and lessons learned from this study have high applicability to communities in Utah that are susceptible to post-wildfire flooding and debris flows risk.

Mike Kellogg, PG, CFM, GISP, Mike is the Chief Operating Officer and Principal Geomorphologist with JE Fuller/ Hydrology & Geomorphology. He has over 20 years of experience in flooding, sedimentation, and debris flow risk studies throughout the western U.S. Away from work, Mike is a scuba diving instructor and enjoys diving the world's oceans.

- 2.2 **Instream Diversion Designs in an Avulsing Planform**, The Gila River Headwaters is a unique and ecologically vibrant riparian corridor situated in Southwestern New Mexico. The Cliff-Gila Valley at the foot of the Mogollon Mountains has long-standing agricultural water use through historical acequias and has been the recent focus of a large interstate water storage and delivery project. The Gila River was examined by AECOM for the development of instream diversion structures for both of the above cases while accounting for a highly dynamic river morphology, sensitive riparian habitat concerns, a minimal aesthetic and environmental footprint, and an engaged local stakeholder group. This presentation discusses the site-specific river designs and lessons learned for this case study.

Michael Scurlock, PhD is a river and open-channel hydraulics engineer specializing in river morphology, instream structure design, computational fluid dynamics, fish passage and barriers, recreational design, and construction implementation. He has 14 years of applied engineering research and design experience including time at the Colorado State University Hydraulics Laboratory.

Breakout Session 3:

- 3.1 **Alluvial Fans in Utah**; According to the 2020 US Census, Utah now has the highest growth rate in the nation. With growth, brings more development pressure. As valleys and low lying areas become developed or "built out," development will shift to the valley benches and those areas adjacent to mountain canyons or on alluvial fans. Geologic mapping has identified these for years but this hazard has been overlooked. Alluvial fans can produce flooding with high-velocity flows; active processes of erosion, sediment transport and deposition; and unpredictable flow paths. The State is currently working on a project to identify some of these alluvial fan hazard areas to help communities identify where they are located in order to plan for the risks associated with these landforms. This session will provide an overview of the project, discuss how the information can be used for planning purposes in your community, and address building code requirements and challenges in this zone. We will also discuss resources to mitigate risks to alluvial fan hazards and provide examples of what some communities have already done to take action to reduce their risk.

Jamie Huff, Jamie is the Risk MAP Program Manager for the Utah Division of Emergency Management. She manages the floodplain mapping program for the state, coordinating with Federal, State, Tribal, and local community partners. She provides flood risk data, training, and technical assistance to identify, assess, communicate, and mitigate flood hazard risks within Utah. She has spent 18

years in or around the National Flood Insurance Program that has included various Mitigation positions within FEMA Region 10 and disaster response. Jamie received her Bachelor of Science degree in Geography from the University of Utah and is a member of the Association of State Floodplain Managers (ASFPM) the Utah Floodplain and Stormwater Management Association (UFSMA), and the Utah Emergency Managers Association (UEMA).

Margaret Doherty, Margaret is a Risk MAP Program Specialist with FEMA Region VIII working on FEMA's Risk MAP flood mapping program in South Dakota and Utah. She works with state, tribal, and local governments on understanding the risks to natural hazards and communicating the benefits of mitigation. Prior to FEMA, Ms. Doherty spent 15 years in the private and public sectors as a Community Planner working primarily with local governments in Colorado and Virginia. She has a Bachelor of Arts in Metropolitan Studies from Michigan State University and a Master's of Urban and Regional Planning from the University of Colorado at Denver.

Matt Buddie, Matt has spent his entire career focused on creating solutions for communities that reduce risk from natural hazards. Matt started his career with FEMA in 2006 following Hurricane Katrina working with communities on identifying unique risks and vulnerabilities while advising on mitigation strategies to reduce those risks. He currently works as the Senior Floodplain Management Specialist in the National Flood Insurance Program at FEMA Region VIII. Here he continues to help communities identify and understand flood risk. Matt has a Bachelor's degree in Emergency Management and an Associate's degree in Criminal Justice both from the University of Akron.

- 3.2 **Mitigating Hazards through Land Use Solutions;** The State of Colorado and FEMA Region VIII partnered to produce and deliver a workshop series focused on providing assistance to communities for planning, selecting, and implementing a chosen strategy to reduce natural hazard risk through planning approaches. This presentation will investigate some of those community strategies for reducing flood risk, such as higher regulatory standards, protecting sensitive areas, and site-specific development requirements. We will also review available tools, such as the State of Colorado's "Planning for Hazards" website, highlight some community best practices and provide an update on community progress with their selected strategies and tools.

Chris Tagert, Chris is a project manager and the Regional Practice Lead for Water in Michael Baker's mountain region. Chris has worked on and around FEMA's flood and disaster programs for the entirety of his 23-year career. Today Chris enjoys working with local communities to solve their flood risk problems and help them make their communities more resilient.

Breakout Session 4:

- 4.1 **Southwest Creek and Canal Study;** The original Southwest Canal and Creek Study (SWCCS) was completed in 2002 for Salt Lake County Flood Control. The primary purpose of the 2002 SWCCS was to identify improvements needed to

manage stormwater runoff conveyed in the creeks and canals located in the southwest quadrant of Salt Lake County in a cost-effective, efficient manner. Since the 2002 SWCCS was completed, the combined population of Herriman, Riverton, and South Jordan Cities has increased from about 56,000 to 154,000, and significant changes have been made to some of the critical planning and development assumptions used in completing that study. Because of those changes, the County is updating the 2002 SWCCS. Several lessons were learned in regards to pre-development hydrologic discharge rates and long-term storm water management over the course of the update to the SWCCS which will be discussed in the presentation.

Lizel Allen, Lizel has more than 17 years of professional experience and is currently the Associate Director for Salt Lake County Flood Control Engineering. Ms. Allen specializes in water resource engineering for flood protection, stormwater drainage, and public infrastructure projects; planning, coordinating and supervising countywide flood control, detailed hydraulic and hydrologic modeling and floodplain mapping. Lizel received her B.S. and M.S. degrees in Civil and Environmental Engineering from the University of Utah and is a registered Professional Engineer in Utah. In her free time Lizel enjoys reading, outside fun with her husband especially hiking and skiing, hula hooping and fostering animals for local rescue organizations. She has fostered over 150 homeless pets, mostly kittens.

Kameron Ballentine, Kameron graduated from USU with a B.S. and M.S. in civil engineering and is a P.E. and CFM. He has 12 years experience in Master Planning, hydrologic & hydraulic modeling, design and has worked on a variety of stormwater and floodplain management projects.

4.2 **Improving Accuracy of Municipal Stormwater Runoff Modeling**; Predicting storm water runoff rates is integral to stormwater management. The SCS runoff curve number is commonly used in modeling stormwater runoff, but there are some pitfalls associated with it. The effect of on-site stormwater detention common in many developed sites presents another challenge to accurate runoff prediction. This presentation is a case study of the Lindon stormwater model and how J-U-B Engineers dealt with limitations of SCS curve numbers and approximated discharge from scores of local detention basins without modeling them individually.

Mark Christensen, Mark is a civil engineer with nearly 30 years of experience. He was raised in Richfield, and after graduating from BYU in 1992, his career has been with J-U-B Engineers. He has had broad experience, working in many types of public and private projects in Utah. His focus has been municipal engineering and he has represented J-U-B as a consultant city engineer for multiple cities in Utah County.

Plenary Session 2:

Stormwater Panel Discussion; This panel discussion will address basic questions some non-engineers may have when discussing floodplains, storm drains and how they may affect communities. After the question-and-answer portion, we will discuss some of the high flows seen this summer throughout the state.

Breakout Session 5:

- 5.1 **Post Fire, Ice Jamming & Snowmelt;** Non-regulatory products developed as part of FEMA Risk MAP studies are intended to augment regulatory products and provide community decision makers and emergency managers with useful information to better understand and mitigate flood risk. Typically, these products include changes since the last FIRM, depth and velocity grids, and areas of mitigation interest but additional products can be added that are tailored to specific needs of the community. This presentation will focus on examples of useful products derived from flood studies that are not typically created. Such products were produced for the Animas River Watershed where events such as the Gold King Mine disaster, 416 fire, and higher than usual snowpack this year have created unique challenges for community officials. Per request of the community, CWCB with their mapping contract AECOM, have generated several uncommon non-regulatory products including post-fire hydrology and hydraulics, snowmelt runoff analysis, and point source timing, some of which were used in real-time to inform community decisions. Development of these products will be overviewed, and discussion on their benefits and the benefits of similar products for other watersheds will be highlighted.

Isaac Allen, Isaac is a water resources engineer with AECOM's surface water team based in Denver, Colorado. Isaac has 6 years of experience with a variety of water resources engineering projects at the state and national levels, focusing primarily on flood hazard analysis and mitigation and water resources management. Isaac has worked with various state agencies in Colorado to help identify and understand previously understudied sources of risk. Isaac received his undergraduate degree in environmental engineering from Syracuse University and master degree in water resources engineering from the University at Buffalo.

- 5.2 **Determining Infiltration Rates for Stormwater Volume Reduction;** Findings from infiltration testing using various methods on UDOT's SR-30 project. Selecting a design infiltration rate based on measured results and NCHRP guidance. How to use the NCHRP Volume Reduction tool.

Kraig Rasmussen, Kraig is a senior drainage engineer at David Evans and Associates. Over the past 10 years Kraig has been involved in a wide variety of projects that involved drainage design for mining, industrial, private development, and roadway applications. Kraig's main area of expertise is in roadway drainage and stormwater quality. Recently, Kraig has developed a deep curiosity and interest in stormwater quality and volume reduction design. His focus is to find

practical and sustainable volume reduction solutions that benefit his clients, the environment, and all of us since we all live downstream.

Breakout Session 6:

- 6.1 **Detailed Studies using Rain-on-Grid 2D Modeling Methods;** This presentation will showcase the use of HEC-RAS Rain-on-Grid 2D modeling methods to complete detailed study analyses on a range of stream sizes and watershed characteristics in eastern Missouri. We will focus on model development, calibration, and quality control, including the use of new HEC-RAS 6.0 features such as gridded infiltration and bridges within a 2D model area.

Rachel Mares, Rachel manages Wood's Water Resources service line in the Salt Lake City office. She has 6 years of professional engineering experience in the areas of watershed and urban stormwater hydrology and hydraulics (H&H), statistical frequency analyses, and geographical information systems (GIS). She has contributed to numerous DFIRM Development and Flood Risk Analysis studies across Arkansas, Colorado, Kansas, and Missouri, including management of Floodplain Mapping Studies tasks for 7 county-wide studies. When not going cross-eyed looking at 2D model meshes, Rachel enjoys taking in the beautiful Utah landscapes on skis, a bike, or trail running shoes.

- 6.2 **Optimizing Compost Amendments for Stormwater Mitigation in Urban Soils;** Compost amendments are a recommended strategy to improve soil physical properties and growing conditions to promote stormwater infiltration and mitigation, and the specifications of compost amendments have the potential to dramatically alter SW treatment potential. This presentation will identify the current recommendations for compost applications and present the state of research on compost use for stormwater mitigation. Effects on infiltration rates, soil physical properties, and water quality will be covered.

Dr Erin Rivers, Dr. Rivers is an assistant professor and Extension Specialist at Utah State University. Her research focuses on water quality in human-impacted systems with an emphasis on green stormwater solutions. She has investigated compost applications in roadside vegetated filter strips and bioswales to identify the benefits for stormwater runoff capture. She is currently working on a project to optimize the use of compost for stormwater treatment to define the optimal source and application rates for Utah soils and quantify the mitigation potential for runoff reduction and water quality improvements.

Breakout Session 7:

- 7.1 **Hydraulic and Sediment Transport for Watershed Operation Funded Projects;** In 2018 the Pole Creek Wildfire denuded several sub-basins in the mountainous regions of Southern Utah County. J-U-B Engineers, Inc. partnered with Jones & Demille Engineering to protect/restore infrastructure from the

potential floods and debris flows after the fire as part of the NRCS's Emergency Watershed Protection program. These flood mitigation efforts continue with more permanent rehabilitation, restoration, and new construction under the Watershed Operations Program, funded by NRCS. In order to be eligible for this funding, all engineering analysis and modeling must be performed according to the requirements that NRCS has in-place.

This presentation will review the engineering analysis and modeling required in order to be eligible for this funding. These requirements are based upon the economic analysis needed to show favorable cost/benefit ratios, the NRCS TR 210-60 design guide and the Utah Dam Safety Rules (R655-10). Thirty-nine different flood mitigation measures were designed ranging from riprap along bend ways, to structural rehabilitation, to debris basins. These measures were located in areas as far south as Birdseye, Utah, as far east as Thistle, as far north as the mouth of Spanish Fork Canyon, and as far west as Spring Lake. Because the sub-basins in the mountainous regions of Southern Utah County are still in a hydrologic recovery period, special research-based adjustments were made to the hydrologic calculations to account for it. A 15-year recovery period was assumed to estimate weighted average hydrographs resulting from pre and post fire modeling to produce effective design hydrographs. The hydrologic modeling involved extensive use of the Watershed Modeling System (WMS) program and the use of NRCS SITES. The results of multiple sediment transport analyses were generated using the Revised Universal Soil Loss Equation, RUSLE. The hydraulic modeling was performed using various programs ranging from 2-D models in the Surface Water Modeling System (SMS) to the Federal Highway Administration's (FHWA) hydraulic toolbox.

This presentation provides a brief outline on analysis and modeling for flood mitigation structures in sub-basins that are still recovering from wildfires. Although 2-D modeling provides a comprehensive approach to a cost / benefit analysis based on flooding, this is not always required, especially if there are budget and schedule restraints. In many cases, such as riprap revetment, culvert improvements, or cross-sectionally uniform channels, other methods of analysis including 1-D modeling and "0-D" modeling may suffice.

Ahmad Salah, Ahmad is an expert in hydrologic and hydraulic (H & H) and water quality modeling, analysis and mapping. With 26 years of experience in GIS-based modeling and CAD-GIS interoperability, he brings value by the efficient and reliable modeling efforts. He was a member of the software development team of the Watershed Modeling System (WMS), a GIS interface for a number of FHWA and USACE models. He has developed code for 0, 1, 2 and 3D models for hydrology, hydraulics, water quality and sediment transport. He has extensive experience in working with 2D hydrologic, hydraulic and water quality models and interfaces. He has experience with the Surface Water Modeling System (SMS) and has provided training on the use of GIS-based interfaces including WMS and SMS to local, national and international clients. He has used software tools to automate the integration of design, drafting and linkage of road way design to storm drain features. He has worked extensively with local, state, federal and international clients on integrated H & H modeling. His work is presented in local, national and international conferences as well as professional periodicals and journals such as the American Society of Civil

Engineers and the American Water Resources Association. Ahmad is a peer-reviewer on a number of hydrologic, hydraulic, water quality, sediment transport scientific periodicals.

John De Leon, John received his bachelor's and master's degree from Brigham Young University in civil engineering specializing in materials. He has three years of experience in construction inspection and design for roadway reconstruction, irrigation pipes and powerhouses, and earth dams. He has been a P.E. for almost two years and has moved into water resource engineering where he has developed sanitary sewer models, maintained city-wide water distribution pressure models, created specialized hydrology models, and produced detailed hydraulic models. He has provided these services for local clients. He hopes to continue to grow in the water resources engineering field and is planning to become a C.F.M. this year.

7.2 Provo West Side Levee Plan; The presentation will showcase the Provo West Side Levee Plan. We will provide an overview of the FEMA LAMP project and then focus on Provo's current plan to address the levee deficiencies on the west side of Provo City.

Rob Mills, Robert is the Long-range Planning Supervisor, Sustainability Coordinator, and Floodplain Administrator for Provo City, where he has worked for the past six years. Robert was born and raised in the small town of Huntington, Utah. He graduated from Brigham Young University with a bachelor's degree in Geography and then graduated from the University of Hawaii with a master's degree in Urban and Regional Planning. While living in Hawaii, Robert worked in both the public and private sectors as a land planner. Robert now specializes in helping Provo City administrators and elected officials improve the quality of life for Provo residents by planning for future growth and development, advocating for the preservation of natural systems and the environment, and providing policy recommendations. Robert finds great satisfaction in community engagement and enjoys working with residents to improve their neighborhoods. Robert loves to travel, cook and eat great food, and take in the beauty of nature with his wife and kids.

Ben Rood, Ben specializes in surface water, hydrology, and hydraulic engineering. He has a passion for hydraulic modeling of rivers, storm drains, and bridge scour. Ben has assisted in many public infrastructure projects including roadway bridges, debris basins, channel restoration, levee rehabilitation, and storm drain system. Ben's favorite vacation destination is boating at Lake Powell.

Breakout Session 8:

8.1 Cost Effective Erosion Control in Burned Areas; In 2019, Knolls Fire burned a large area south of the City of Saratoga Springs. The fire crossed several large drainages and normal burn remediation measures were expensive at the large scale or ineffective. The presentation covers methods used to keep burn scar remediation effective and affordable.

Joshua Prettyman, Joshua has worked in engineering and construction for 18 years. He has worked on a range of water projects around the world with

construction methods ranging from cutting edge technology to hand tools and burros. He currently works at CRS Engineers leading their water team supporting cities and irrigation companies in the design and modeling of their culinary, irrigation, and stormwater systems.

8.2 Detailed Rain-on-Mesh to Inform Post Fire Emergency Planning & Recovery; 2D rain-on-mesh models are gaining widespread use for specific applications, yet have many untapped abilities just waiting to be leveraged! I'll share a robust 2D analysis conducted in RAS 6.0 for a post-fire assessment in Boulder County used to identify overtopping bridges for route closures and a community warning system, as well as informing recovery efforts. Our team applied differing rainfall intensities and storm distributions to assess results at various locations throughout the larger watershed and downstream reaches. Results can be extracted anywhere within the model and include discharges, elevations, velocities, depths, durations, and more! I'll also speak to various scenarios of recovery including near, long-term, and pre-fire conditions.

Geoff Uhlemann, Geoff is a Team Leader and Project Manager at Michael Baker with 13 yrs of experience. He loves leading teams through floodplain mapping studies, detailed watershed assessments, probabilistic innovations, and automation efforts. Geoff enjoys working on cool sciency stuff with great coworkers and clients. He is also a proud father of five girls, happily involved at church, camps a lot, and rock climbs.

Plenary Session 3:

Geology based flood mapping, limitations and strengths and UGS update on work in the Matheson Reserve; UGS flood mapping is driven by previous geologic mapping which is critical to determine the distribution of geologically young flood-related deposits. Using geology-based information, as opposed to using only landscape topography, aids in identifying flood-prone areas and in evaluating their relative susceptibility to flooding and/or debris flow. The distribution of geologically young flood-related deposits shown on recently completed geologic mapping is used to identify flood-prone areas and their relative susceptibility. Many challenges have presented themselves especially in urban environments and areas such as Moab with exposed bedrock and little mappable Quaternary deposits while still having a very high flood hazard.

Jessica Castleton, Jessica is a Senior Geologist with the Geologic Hazards Program. She earned a B.S. degree in applied environmental geoscience from Weber State University in 2005 and a M.S. degree in engineering geology from the University of Utah in 2015. In addition to mapping hazards, Jessica responds to debris flows, floods, and other geologic hazard events, and provides outreach for communities to inform about local geologic hazards.

Kathryn Ladig, Kathryn is a licensed Professional Geologist who joined the UGS Groundwater & Wetlands Program as a Geologist in 2021. She received a B.A. in geology and environmental studies from Gustavus Adolphus College and a M.S. in earth science from the University of Maine. She has had the opportunity to study geomorphology in

New Zealand, Mongolia, Alaska, Washington, Minnesota, Maine, Colorado, and Utah. Prior to working at the UGS, Kathryn was employed by the National Park Service to examine water quality of lakes and streams, calculate glacier mass-balance, mitigate geologic hazards, maintain weather stations, and map surficial geology. Her passions lie in tracking the impact of climatic variability through both proxy and direct observation. Her current projects include studying evapotranspiration through eddy covariance, logging water-well cuttings, and water-budget analyses.

Plenary Session 4:

North Moab Regional Drainage and Water Quality Improvements; UDOT, in partnership with the City of Moab, recently completed drainage and water quality improvements in the north Moab area as part of the US-191 roadway improvement project. This session will discuss the regional drainage improvements constructed, the agency coordination completed for the system outfall into the Scott M. Matheson Wetland Preserve, various water quality measures, and a discussion about the issues and lessons learned during construction. Following the presentation, a site visit has been organized where the group will travel to the project site and review the sedimentation basin, drainage outfall, and wetland mitigation improvements.

Jay Meacham, Jay has over 30 years of extensive experience ranging from project management of large multi-disciplined projects to the lead technical role in water resources engineering, drainage design, and hydraulic structure design. He is a registered Civil Engineer and has a Master of Science degree in Water Resources and Hydrology. Jay has provided engineering design, project management, and construction management services for numerous municipalities statewide throughout his career.

Brandon Weight, Brandon has over 10 years of roadway and drainage improvement design experience ranging from regional hydraulic designs to localized storm drain systems. Brandon provided a lead role in the roadway and drainage designs for the US-191 North Moab project. He is a registered Civil Engineer and has a Bachelor of Science degree in Civil Engineering from Brigham Young University.

2021 UFSMA Conference Schedule

	Tuesday (11/16)		Wednesday (11/17)		Thursday (11/18)		Friday (11/19)			
	A	B	A	B	A	B	A	B		
7:30 - 8:30	NFIP 101 & CFM Exam: Utah DEM Cost Benefit Analysis Training: Laura Stahnke		Registration & Welcome (Breakfast Provided)		(Breakfast Provided)		(Breakfast Provided)			
8:30 - 10:00			Risk Rating 2.0 - What Does It Mean to You: Diana Herrera		Stormwater Panel Discussion		Geology based flood mapping, limitations and strengths/UGS update on work in the Matheson Reserve: Jessica Castleton & Kathryn Ladig			
10:00 - 10:30			Break		Break		Break			
10:30 - 11:30			Sandy City Floodplain Management Program: Tyler Shelley & Ben Rood	River, Bridge and Scour Using 2D Models: Brad Hartmen	Post Fire, Ice Jamming & Snowmelt: Isaac Allen	Determining Infiltration Rates for Stormwater Volume Reduction: Kraig Rasmussen	North Moab Regional Drainage & Water Quality Improvements: Jay Meacham & Brandon Weight			
11:30 - 12:30			Flood After Fire: Mike Kellogg	Instream Diversion Designs: Michael Scurlock	Detailed Studies using Rain-on-Grid 2D Modeling Methods: Rachel Mares	Optimizing Compost Amendments for Stormwater Mitigation in Urban Soils Erin Rivers	Field Trip : Travel on your own to Moab Main Street See You Next Year Safe Travels			
12:30 - 2:00			(Lunch Provided)		Business Meeting (Lunch Provided)					
2:00 - 3:00			Alluvial Fans in Utah: Jamie Huff, Margaret Doherty & Matt Buddie	Mitigating Hazards through Land Use Solutions: Chris Tagert	Hydraulic and Sediment Transport for Watershed Operation Funded Projects: Ahmad Salah & John De Leon	Provo West Side Levee Plan: Rob Mills & Ben Rood				
3:00 - 4:00			Southwest Creek and Canal Study: Lizel Allen, Kameron Ballentine	Improving Accuracy of Municipal Stormwater Runoff Models: Mark Christensen	Cost Effective Erosion Control in Burned Areas: Joshua Prettyman	Detailed Rain- on-Mesh to Inform Post Fire Emergency Planning & Recovery: Geoff Uhlemann				
5:00			Adjourn		Adjourn		Adjourn		Adjourn	