

Virtual Live Concurrent Session Narrative Program

Virtual Session A1: NFIP Policy & Programs: NFIP

The Opportunities Stemming from Changes in the NFIP

Doug Bellomo, PE, AECOM, doug.bellomo@aecom.com

Co-presenters: None

Abstract: Risk Rating 2.0 and recent reforms to FEMA's flood mapping authorities opens doors to a world of opportunity, yet the risks and challenges associated with those changes can sometimes be overwhelming. No doubt there is a need to manage and execute carefully as the role of the FIRMs evolves but placing too much focus on the negative consequences of change without careful consideration of the opportunities may keep our profession in the past longer than it needs to be. The FIRMs no longer have the impact they once did on flood insurance prices, there is an increased appetite to get a more comprehensive view of flood hazards and risks, there is a large and increasing pool of funds to reduce risk, and flood damages continue to escalate. Harnessing the power of change in a positive way requires courage, a willingness to take chances, new thinking, creative approaches, and collaboration across disciplines. We preach the power of adaptive capacity regularly - it's time to put that power into practice. This presentation will focus on how floodplain managers might leverage the opportunities stemming from these changes to increase flood resilience and reduce the environmental, social, and economic harm stemming from flooding.

Biography: Doug Bellomo is Vice President in the water business line at AECOM focusing in the area of flood risk management and resilience. Previously Doug served as a senior technical advisor for flood risk management at the US Army Corps of Engineers Institute for Water Resources working in the areas of Dam and Levee Safety, the National Flood Risk Management Program, coastal flood risk management efforts, and floodplain management services. Before joining the US Army Corps, Doug was the Director of the Risk Analysis Division within the Federal Insurance and Mitigation Administration at the Federal Emergency Management Agency. There he oversaw implementation of several National Programs including the Risk Mapping, Assessment, and Planning (Risk MAP) program, the National Dam Safety Program, and FEMA's Mitigation Planning operations. In his capacity at AECOM, Doug is assisting clients in improving delivery of floodplain management services, helping them prepare and recover from flood disasters, by working collaboratively across disciplines.

Floodplain Management Program Enhancements in Henrico County

Kristin Owen, AICP, CFM, Henrico County, VA, owe042@henrico.us

Co-presenters: Ben Felton, fel021@henrico.us

Abstract: This presentation will provide an overview of recent changes to Henrico County's floodplain management program. Beginning in early 2021, the County embarked on several projects to enhance its floodplain program, including revising its floodplain ordinance and utilizing recent legislation to adopt regulations outside of zoning. This update included incorporating higher standards, such as prohibiting fill and critical facilities in the Special Flood Hazard Area. To support the ordinance update, the County also developed a Floodplain Technical Guidance Manual to provide developers with addition

information and outline submittal standards. Additionally, the County implemented website enhancements to increase outreach and education, including creating a new online floodplain map and online flood model repository for engineers to easily access and download available HEC-RAS models in the County. This presentation will outline various activities that NFIP communities could undertake with relatively few resources available in order to enhance their programs for NFIP compliance, increase public understanding, and improve permit review procedures.

Biography: Kristin Owen is the Floodplain & Dam Safety Manager for Henrico County, Virginia, and the current president of the Virginia Floodplain Management Association. Kristin has extensive state and local government experience in floodplain management and land use planning. Prior to joining Henrico County, Kristin worked for the Commonwealth of Virginia as the Acting NFIP Coordinator, State CRS Coordinator, and co-chair of the Virginia Silver Jackets team. While in this role, she assisted Governor Northam's Office with developing and implementing two executive orders aimed to reduce flood risk and increase Virginia's resiliency to natural hazards. She also partnered with Virginia Tech to create and teach a graduate-level course on local floodplain management, which earned her FEMA's 2019 Best Innovation/Project Award. Before joining the Commonwealth of Virginia, Kristin was the Planning and Floodplain Administrator for Teton County, Idaho. Kristin received a Bachelor of Science in Biology from West Virginia University, and a Master of Urban and Regional Planning, a Master of Natural Resources, and Graduate Certificates in Watershed Management and Geospatial Information Technology from Virginia Tech. She is an AICP professional planner and a Certified Floodplain Manager.

Applying Lessons Learned for Future NFIP Changes: Implications for Stakeholders

Susan Tarkenton, IBM, starken@us.ibm.com

Co-presenters: Fatima Akhtar - fatima.akhtar@us.ibm.com

Abstract: This presentation will share lessons learned from Risk Rating 2.0 - the success stories, best practices and even better ifs. Risk Rating will continue to evolve and NFIP's next major transformation will be policy forms related to flood insurance. This session will focus on the above and how to best inform future transformation efforts. This presentation will apply the lessons learned from Risk Rating 2.0 to inform best practices for managing change to the next major transformation of NFIP.

Biography: Susan Tarkenton is a Senior Manager in IBM's Talent Transformation practice where she is an experienced Project Manager, specializing in enterprise-wide technology-driven transformation. Ms Tarkenton has led clients through technology enabled process change for Enterprise Resource Programs (ERP), Commercial-off-the-Shelf (COTS) and custom technology solutions. Ms. Tarkenton is currently the Project Manager for organizational transformation and business integration efforts surrounding FEMA's recent implementation of Risk Rating 2.0, the new approach to the pricing of insurance for the National Flood Insurance Program (NFIP). She has experience with IT, financial management and budgeting, human resource management, and procurement processes within the Federal Government.

Virtual Session B1: Modeling Unique Features & Problems: Modeling

Case Studies with Rain on Mesh and Integrated Coupled Coastal, Fluvial and Pluvial Modeling Approach in Urban Areas

Rahul Parab, PE, CFM, Dewberry, rparab@dewberry.com

Co-presenters: Ashok Khadka, akhadka@dewberry.com; Michael Hanley, mhanley@dewberry.com; David Bedoya, dbedoya@dewberry.com

Abstract: Dense urban environments such as New York City are subject to flooding from high intensity rainfall events and coastal storm surge. Tropical Storm Ida exposed flood vulnerabilities within New York City's neighborhoods with extensive flooding in basements and along roadways. Frequently occurring high intensity rainfall events have led to flash flooding in dense urban areas of New England. These pluvial flooding events are exacerbated with inclusion of coastal storm surge and fluvial events (compound flooding). A holistic modeling approach is required to simulate flood vulnerabilities within urban areas such as flooding within basements while integrating coastal, fluvial and pluvial sources of flooding. Dewberry has developed innovative modeling approaches using integrated rain-on-mesh technology across urban areas of New York and Massachusetts. The rain-on-mesh modeling approach allows to simulate pluvial event flows inside and around buildings and structures at varying levels (including rooftops, basements, building interiors, building/pedestrian overpasses, etc.), modeling of spatially and temporally varying rainfall, and modeling of multifaceted green and grey stormwater management systems. A 3-way coupling model with rain on mesh modeling approach allows to simulate coastal hydrodynamics, fluvial and pluvial sources to provide a holistic analysis of flood vulnerability. This modeling approach may help communities develop a better representation of their flood vulnerabilities beyond what is shown on traditional FEMA FIRM maps. This presentation shares case studies highlighting modeling approaches – including a Flash Flood Vulnerability and Flood Mitigation Assessment for the Massachusetts Institute of Technology in Cambridge, Massachusetts, and a 3-way coupled modeling test case project for New York City. The presentation will provide background and context for each of the projects, describe the innovative modeling approaches that were used using variety of modeling software programs, explain benefit of using modeling technique to the project, best practices and lessons learned.

Biography: Mr. Rahul Parab is currently Department Manager of the Integrated Water and Flood Resilience group in Dewberry's New York City office. He has 20+ years of professional and academic experience from planning to design and construction on various types of water related infrastructure in pluvial, riverine and coastal environments. Mr. Parab has led multi-disciplinary planning and design projects for a range of clients including FEMA, USACE, the states of New Jersey and New York, New York City, and other states/ local governments. Prior to moving into the New York area after Superstorm Sandy, Rahul worked in various engineering capacities in Jacksonville, Florida, for a coastal and water resources engineering firm and in Vicksburg, Mississippi, for a construction shipyard that fabricated offshore oil rigs. Rahul is a water resources engineer with a strong desire to give back to the community through his engineering profession. He is a thought leader in the water resources and climate resiliency field with contribution such as being the co-author of New York City's Climate Resiliency Design Guidelines. He has a B.S in Civil Engineering from the University of Mumbai, India and a Masters degree in Civil Engineering from the University of Toledo, Ohio.

Wishing for a Merry Christmas: a Feasibility Study of Christmas Wash and the city's wishes that they wanted fulfilled. A new approach to flood reduction in Tucson

Zach Whitten, PE, Stantec/STARR II, Zach.Whitten@stantec.com

Co-presenters: Inger Sarappo, CFM, inger.sarappo@stantec.com; Michael Bishop, michael.j.bishop@fema.dhs.gov

Abstract: Christmas Wash is a highly urbanized four-square mile watershed in Tucson, AZ with a dense mixture of residential and commercial properties. The watershed was developed during the pre-floodplain ordinance era and thus was constructed with no flood mitigation measures in place. In July of 2016, a short-duration, high-intensity “microburst” rainfall event occurred over the watershed producing severe localized flooding throughout the watershed. The flooding generated major damage to residential and commercial properties. There have been over 300 flooding complaints recorded within the Christmas Wash watershed since 1994. FEMA with support from the City of Tucson contracted STARR II to perform a feasibility analysis to test flood mitigation project concepts that would potentially reduce flooding hazard and risk to life, health, property, and function in the watershed. Utilizing a watershed-wide hydrologic and hydraulic FLO-2D model, STARRII developed detailed modeling of the numerous concepts. These concepts included storm drainpipe systems, detention basins, road inversion design and green infrastructure. Because this area of Tucson is fully built out, there are physical constraints (i.e. utility, easements, local access) on project design that project team needed to be conscious of when developing potential concepts and solutions. This presentation will discuss how the FLO-2D modeling was used to understand how flooding occurs within the watershed and how that knowledge was used to develop flood mitigation concepts that may potentially reduce the known flood hazards. We will discuss how the alternatives were based upon an in-depth discussion with the City of Tucson to ensure the mitigation fit the City's Operations and Maintenance abilities.

Biography: Zach Whitten has more than 15 years of experience as a specialist in water resources engineering for a wide variety of projects across the country but with a focus on the arid southwest. His experience includes performing complex hydrologic and hydraulic analysis on local, regional and national levels, while serving multiple roles from lead engineer to project manager. His projects have included complex hydrologic and hydraulic modeling, design of intricate hydraulic structures, dam and levee design, dam failure modeling and drainage master plans. He is a graduate from the University of Dayton in Ohio.

Better understanding and prioritizing localized flood risk in the flash flood alley of Texas using 2D modeling

Rupali Sabnis, City of Austin, rupali.sabnis@austintexas.gov

Co-presenters: Annabell del Castillo, annabell.delcastillo@austintexas.gov

Abstract: This presentation will review 2D modeling efforts in the Watershed Protection Department in the City of Austin to understand and prioritize localized flood risk in Austin, TX. Austin is in the “Flash Flood Alley” of Texas and experiences frequent flash flooding. Therefore, it is critical to understand the behavior of the stormwater and how it affects the localized flooding. One of the effective tools is the use of 2D modeling with Innovyze’s InfoWorks ICM. City of Austin’s 2D program has evolved over the years, as our understanding of the software and the capabilities of InfoWorks ICM 2D have expanded. The City of Austin is evaluating ways to use the 2D modeling data to assess localized flood risk within the city and prioritize efforts to implement solutions. This presentation will explore the history of local flood modeling in Austin, TX, the current modeling efforts, and the future goals.

Biography: Rupali Sabnis is Supervising Engineer at the City of Austin Watershed Protection Department. She has over 15 years of experience in the field of water resources engineering involving 1D/2D modeling and project delivery. She has been working with the city of Austin for over 10 years. Her experience ranges from identification and prioritization, of flooding problems, planning and implementation of small- and large-scale infrastructure projects.

Virtual Session C1: Local Mitigation Initiatives: Mitigation

A Homeowner's Story: Elevation and Historic Preservation of an Upstate NY Property

Julie Nucci, PhD, Village of Owego, jn28@cornell.edu

Co-presenters: James Overhiser, joverhis@gmail.com

Abstract: In late 2015, our 1840's house in Owego, NY became the first home on the National Register of Historic Places in New York State to elevate for flood mitigation. We mitigated in response to devastation from Tropical Storm Lee, which flooded 75% the Village of Owego in 2011. In this talk we share our story of planning and executing an elevation project amidst the emotional challenges of surviving a flood in a devastated village. We chronicle our experience navigating FEMA, the NFIP, the SHPO (State Historic Preservation Office), the OHPC (Owego Historic Preservation Commission), and the historic tax credit program. We also highlight the lessons learned for how under-resourced communities, like Owego, can better recover from disasters and proactively work towards a more resilient future.

Biography: Julie Nucci is the Flood Resiliency Coordinator for the Village of Owego, a volunteer position she created with village leadership. Her efforts, which integrate village, town, and county governments, are focused on acting in the best interest of climate adaptation and historic preservation for her village, much of which is within the Owego Central Historic District. She is an Ex-Officio member of the Owego Historic Preservation Commission and serves on the Village of Owego Planning Board. Nucci holds a BS in Materials Engineering from RPI, an MS in Applied Physics from Harvard University, and MS and PhD degrees in Materials Science and Engineering from Cornell University. In her day job, she is the Manager of Innovation Engineering Projects for Rheonix, Inc., a molecular diagnostics company located in Ithaca, NY.

Using the Substantial Damage Process as a Mitigation Tool in Central NJ

Cleighton Smith, PE, CFM, Taylor Wiseman & Taylor, smithc@taylorwiseman.com

Co-presenters: None

Abstract: Performing Substantial Damage (SD) assessments after a major flood is part of the community's responsibility under the NFIP. However, this process has been overlooked and under-enforced historically, which has contributed to the current repetitive loss, severe repetitive loss structures. After the flooding caused by the remnants of Hurricane Ida, one community in central NJ was very proactive in performing SD assessments. This presentation covers the work performed in one central NJ community (Manville), which saw devastating flooding after Ida. Manville is a community that knows flooding, but Ida was the worst ever. The SD process was welcomed by residents who were looking to use the letters for either ICC (towards elevating) or to receive prioritized consideration for a

State of NJ program known as Blue Acres. The presentation also covers the current state of the various mitigation efforts in Manville today.

Biography: Cleighton Smith has over 40 years of experience with the National Flood Insurance Program (NFIP). He is a civil engineer specializing in water resources; his expertise covers floodplain analyses and mapping, dam safety, highway drainage, flood hazard mitigation and permitting associated with these projects. He has assisted several FEMA regional offices with outreach efforts. He is Certified Floodplain Manager (CFM) and has taught many floodplain management classes which have helped individuals prepare for becoming a CFM. He graduated from Clarkson University in Potsdam NY with a BS in civil engineering in 1977 and received his masters from Clarkson in 1978. He is currently the Hydrology and Hydraulics and Environmental Permitting Practice Leader for Taylor Wiseman & Taylor in Mount Laurel, NJ.

Highlight Co-Benefits to Drive Project Funding: The Meriden Harbor Brook Success Story

Elsa Loehmann, Fuss & O'Neill, eloehmann@fando.com

Co-presenters: None

Abstract: Through incorporation of co-benefits, the Meriden Harbor Brook Flood Resilience Project protects a vulnerable community and is a catalyst for community improvement. The project is a result of a watershed level planning study and design completed in 2000. Based on this study, the City has implemented flood-risk reduction measures over the past decade to protect the developing Transit Oriented District and downtown commercial sector, in addition to high density residential housing. The layers of co-benefits that are built into the project benefit a socially vulnerable community, and also create opportunities for funding. Below are some of the key benefits of this project.

REDUCING RISK

- Protects vulnerable community from future flood loss events
- The proposed condition provides 100-year flood protection to 1,648 residents
- Reduces risk to 14 residential and 25 commercial structures

COMMUNITY RESILIENCE

- Creates open space and public amenities
- Benefits a designated Distressed Municipality
- Benefits high density development area with over 1,500 low-income minority residents
- Nature Based Solutions allow for adaptive response to changing climate conditions

ENHANCING HABITAT

- Restoration of 1,800 linear feet of stream channel
- Improves to habitat with pools/riffles and boulder features
- Creation of 5.6 acres of floodplain, riparian buffer, and wildlife habitat

PROTECTING LIFELINES

- Reduces flooding to police station and main police vehicle parking area, courthouse, a senior center, and a church
- Protects flood evacuation routes

- Protects access to medical facilities and food, water, and shelter during storm events This presentation will identify three project co-benefits that you can highlight in your project to increase funding success and improve quality of life for the surrounding communities.

Biography: In my role as Water Resources Group Lead at Fuss & O'Neill, I inspire teams to innovate and create works of life. We provide community resilience through flood risk reduction, heat mitigation, and adaptation to changing ecological conditions. My design philosophy aims for dynamic stability, and pairs traditional engineering practice with fluvial geomorphology and nature-based design to create living, adapting, and resilient systems. I drive funding to resiliency projects, and achieve project visions by balancing ecological, economic, and social impacts.

Virtual Session D1: Dam Projects and Design: Dams & Levees

Glenville Lake Dam Rehab Case Study for No Adverse Impact Requirement

Seungho Song, PE, CFM, CDM Smith, songs@cdmsmith.com

Co-presenters: None

Abstract: Floodplain managers should be familiar with the floodplain development permitting requirements which satisfy No Adverse Impact / No-Rise Certification for construction activities within the FEMA floodways/floodplains. Though a Letter of Map Revision (LOMR) can be obtained in some cases, they are not feasible for every floodplain and cannot be obtained in settings where adverse impact to residential developments or adjacent/downstream properties is projected or anticipated. Glenville Lake is one of the primary drinking water sources for the City of Fayetteville in North Carolina. Located just upstream of downtown Fayetteville, the Spillway Replacement Project was initiated to protect critical water supplies and meet current dam safety requirements. CDM Smith performed detailed hydrologic/hydraulic, geotechnical, and structural analyses for the existing dam/spillway. Based on the investigation results and analyses, it was determined that the existing spillway could not pass the design flood event from the 1/3 Probable Maximum Precipitation (PMP) without overtopping the dam. Due to these concerns, it was decided that the existing ogee spillway should be replaced with a three-sided straight-drop concrete spillway. The spillway was designed to have no rise in the upstream and downstream water surface elevations for the 100-year event and to pass the 1/3 PMP event with one foot of freeboard. This presentation will discuss how to meet the City of Fayetteville's requirements through special spillway design in a dam rehabilitation project while meeting the FEMA's No Adverse Impact for No-Rise Certification process. Specific spillway design, modeling techniques, and tips to satisfy No Adverse Impact and no-rise certification conditions will also be covered in this presentation.

Biography: Seungho Song is a senior water resources engineer with 37 plus years of experience including technical director and project manager roles in storm water master planning, flood insurance studies, flood mitigation, watershed management, BMP design, stream restoration, and hydrologic and hydraulic (H&H) computer modeling. Seungho has extensive experience conducting H&H modeling and performing QA/QC roles in support of Flood Insurance Studies throughout the Regions I, II, III, IV, V, VI, and VIII. Seungho Song is currently serving as a Subject Matter Expert (SME) in Hydraulic Modeling and Dam for FEMA Map Information eXchange (FMIX) for Compass.

Norfolk Coastal Storm Risk Management (CSRM) Project: Bridging the Gap from Feasibility Study to 35% Design

Matthew Fanghella, EIT, CFM, City of Norfolk, Virginia, matthew.fanghella@norfolk.gov

Co-presenters: None

Abstract: In 2019, the United States Army Corps of Engineers (USACE) in collaboration with the City of Norfolk published the final Norfolk Coastal Storm Risk Management Program (CSRM) Feasibility Study. The Feasibility Study recommended construction of a 8.5 mile floodwall, three surge barriers, multiple pump stations, and the structural elevation or floodproofing of nearly 1,000 private structures across the City of Norfolk. Since the publication of the 2019 Feasibility Study, the City and USACE have continued this partnership and entered the Pre-construction Engineering and Design phase to move forward with the largest public project in the City of Norfolk's history. This massive project will be divided into smaller phases over a proposed 10-year period. Currently, the City and USACE are reviewing the design plans for Phase 1A of the Floodwall Alignment, which will extend from the Berkley Bridge to the Campostella Exit Ramp from Interstate 264, and developing a pilot program of initial structures to elevate as part of the Phase 1A Pilot Program. Matt Fanghella, Coastal Engineer from the City of Norfolk City Manager's Office of Resilience will provide a project update and highlight lessons learned from the Feasibility Study to the 35% Design Plans. Topics and lessons learned include integrating horizontal construction and vertical construction design elements and timelines within the overall project timeline, developing public outreach tools and data apps soon to be unveiled, developing a Floodplain Management Plan based on post-project conditions, ensuring that projects altogether meet requires for FEMA base flood elevations, the Army Corps' North Atlantic Coast Comprehensive Study, and State sea level rise requirements of EO 24 & 45.

Biography: Matt Fanghella, EIT, CFM, serves as the Coastal Engineer in the City of Norfolk City Manager's Office of Resilience working on the Norfolk USACE Coastal Storm Risk Management (CSRM) Project including design and construction of a new 8.5 mile floodwall and elevation of nearly 1000 privately owned structures across the City. As part of his role, Matt also manages the beach damage assessment program, pre and post storm response during hurricanes and other severe weather events where coastal erosion potential is present. Previously Matt served as City Stormwater Engineer and Project Manager in the City of Suffolk, Virginia where he oversaw several multi-million-dollar drainage projects. including championing the first project to integrate a Dig-Once concept integrating both stormwater upgrades and sanitary sewer upgrades within the same project. Matt also recognized the need for and championed the development of a City-wide Resilience Plan and self-studied to become the first Certified Floodplain Manager (CFM) in the City, Matt developed multiple grant applications to receive over half a million dollars in grant and federal funding for drainage and dredging projects. Prior to his time in Suffolk. Matt served as Regional MS4 Coordinator at Virginia Department of Environmental Quality (DEQ) managing the MS4 Program in the Tidewater Region and served collateral duties as the Regional State Safety Officer and on the Pollution Response and Emergency Preparedness (PREP) After Hours Response Team. Matt has earned his designation as an Engineer-in-Training (EIT) in the Commonwealth of Virginia and is a Certified Floodplain Manager (CFM) through the Association of State Floodplain Managers (ASFPM). Matt also recently passed his Professional Engineer Exam as well. Matt serves on the Hampton Roads Planning District Commission (HRPDC) Coastal Resiliency Committee, HRPDC Regional Environmental Committee, and HRPDC Stormwater Workgroup collaborating with leaders from other localities and state and federal partners to provide input and technical expertise on

flood mitigation, resiliency, stormwater and other drainage and public works projects and initiatives across the Hampton Roads region.

Rhodes Pond Dam Recovery from Hurricane Mathew: Marching towards the Finish Line

Dori Sabeh, McGill Associates, dori.sabeh@mcgillassociates.com

Co-presenters: None

Abstract: Rhodes Pond is a 461-acre impoundment on the Black River in Cumberland County, North Carolina that serves as a habitat for wildlife and offers many opportunities for outdoor recreation. During Hurricane Matthew in October 2016, Rhodes Pond Dam was overtopped and suffered extensive breach damages. Since then, ongoing efforts have been undertaken to return the lake to historic water levels and to redesign the dam to safely convey extreme flood events. Detailed Hydrologic and Hydraulic (H&H) analysis were developed for the 56 square mile watershed draining into the lake and an Incremental Hazard Evaluation (IHE) of the dam was performed to determine the most appropriate design flow. The project has undergone through intensive permitting with NC Dam Safety, USACE, and NCFMP/FEMA. In addition to design and permitting, securing FEMA disaster recovery funding was a major undertaking for the project. The 6-cycle 208-foot labyrinth principal spillway and embankment construction is currently under construction and scheduled for completion by February 2023. This presentation will outline accomplished milestones for the design and reconstruction of an upsized dam to meet current codes and standards including H&H dynamic modeling, floodplain mapping, permitting, bidding, and construction. The presentation will also include the extensive coordination and documentation for securing FEMA funding.

Biography: Dori Sabeh is the Director of Water Resources for McGill Associates with diversified experience performing water resources studies, including: conducting watershed level assessment, performing hydrologic evaluations, evaluating alternatives to alleviate regional and localized flooding, and developing construction plans and bid documents.

Virtual Session E1: Mitigation Challenges: Mitigation

Home Improvement: Lessons Learned from the Local Jurisdiction Perspective

Mary Baker, JEO Consulting Group, mbaker@jeo.com

Co-presenters: None

Abstract: Mitigating against future flood damages, in and near the Special Flood Hazard Area, only matters as much as it is effective in protecting lives and preserving property and critical infrastructure. FEMA says disasters begin and end at the local level, and so do mitigation projects. But who executes these projects? Likely a local city or village “official” who has no training or experience with federal funding or grant management. An individual who likely has a passion to help their community but is ill-prepared to champion these meaningful projects through to the end. Sadly, the federal systems are becoming more complex and extremely difficult to navigate. Just completing an application for grant funding requires hoop jumping, benefit cost analysis computations, and research that most local officials don’t have time, energy, or the expertise to complete. But there is hope for those who want to venture into the world of mitigation grant funding. In this presentation we will review the lessons learned

from several different non-structural mitigation projects, ranging from home elevations, filling basements, & relocation of utilities to property acquisitions and the relocation of entire communities. These projects will focus on riverine flooding and some of the best practices for mitigating personal homes, as well as look at how to prepare local officials for what they will need to know to navigate the bureaucratic byways of federal grant funding. If the local community officials cannot negotiate the project from start to finish, it will likely not happen at all. This presentation will give attendees the compass and maps to help communities embark into the uncharted territory of home mitigation success stories. And thereby enable more local champions to bring their home-mitigation projects to completion.

Biography: Mary Baker is the Resiliency Strategist at JEO Consulting Group, where she assists team members of all disciplines with incorporating mitigation and adaptation measures in planning efforts and project execution for our customers. Mary is the client manager for the Hazard Mitigation and Emergency Planning team, assisting with client relations and business plan opportunities for this innovative group of professionals. Mary also assists the company's Environmental Sciences group as an envoy to clients and coordination of possible mitigation banking opportunities. Prior to joining the private sector, Mary worked for the State of Nebraska for over 12 years, seven of which were at the Nebraska Emergency Management Agency. During her tenure with the state, Mary served her last five years as the Hazard Mitigation Officer, where she managed the FEMA Hazard Mitigation Assistance Planning and Grant Programs. Under her leadership the state mitigation staff executed over \$37 million dollars in HMA grants and maintained the 24 regional local mitigation plans for 93 counties. Since the 2019 Bomb-Cyclone event Mary has taken on the role of project manager and has been working with numerous communities to provide some non-structural solutions to the myriad of flood damages sustained to homes across the Midwest. These projects include home elevations, utility relocations, acquisitions, and relocation of complete communities. Her passion for helping the small rural communities become safer and more resilient is evident in her dedication in pursuing grant funds, even when it is difficult.

Don't Rain On My Parade: Weathering the Development of a BRIC Grant Narrative

Brian Kempf, CFM, AICP, NYC Emergency Management, bkempf@oem.nyc.gov

Co-presenters: Lauren Dozier, lauren.dozier@hagertyconsulting.com

Abstract: A shovel-ready BRIC subapplication developed from an awarded Pre-Disaster Mitigation Advance Assistance project. Proposed climate adaptive, green infrastructure improvements to a deeply impoverished community. An innovative drainage project built on years of community planning, outreach, and best practices research. A benefit-cost analysis based on sophisticated hydraulic modeling that showed benefits that were multiple times the project costs. There was just one small piece missing: a grant narrative. In Fall 2021, the NYC Department of Environmental Protection partnered with the NYC Housing Authority and NYC Emergency Management to develop what seemed like a straightforward project subapplication to build rainwater detention into park facilities at the NYCHA Clinton Houses campus in East Harlem. All of the ingredients were there to create a perfect subapplication—yet the project (now Identified for Further Review) faced the critical challenge of putting the pieces together to make a strong subapplication. NYC Emergency Management and Hagerty Consulting will use the saga of the East Harlem Cloudburst project as a lesson to teach prospective subapplicants how to craft a subapplication using effective grant writing that speaks directly to BRIC's qualitative and technical criteria.

Biography: Brian Kempf is the Mitigation Program Manager for NYC Emergency Management and is a certified planner and floodplain manager. Mr. Kempf leads project scoping for FEMA Hazard Mitigation Assistance grant subapplications for New York City agencies and coordinates the City's \$300M+ portfolio of awarded HMA grants. Mr. Kempf also provides support for Emergency Operations Center operations and strategic resilience/mitigation implementation and financing.

Does it Flood in the Whitespace? Zone X Flood Mitigation Challenges and Solutions

Joseph Kirby, Woodard & Curran, jkirby@woodardcurran.com

Co-presenters: Kathryn Hogan, khogan@woodardcurran.com

Abstract: Zone X flood mitigation presents a unique challenge and requires detailed analyses and creative solutions to achieve successful mitigation. Working in the Zone X (unshaded) areas of the FIRM, flooding is less consolidated and typically slower moving, less deep, and in urban areas, often impacting many residential structures. Zone X flood risks have historically been less understood, studied, and mitigated. Even where communities have programs actively working to mitigate Zone X flooding, the underlying problems of capacity, drainage system deterioration, and climate change are not always addressed. This presentation will discuss how we approach flood mitigation in these areas and what we have found can be done for successful flood reductions. First an understanding that no solution will entirely eliminate flooding, the goal must be to reduce the frequency, depth, and/or duration of flooding and identify improvements (large or small) that can have a cumulative positive impact in the community. Second this type of flooding requires a comprehensive analysis, typically basin wide, to evaluate the movement of water across the natural and built environment so we understand the how, what, where and when flooding occurs. Finally, innovative, creative, fiscally responsible, and maybe most important politically possible solutions that can be implemented to reduce flooding. Discussion includes our experiences working in these zones, community programs implemented to mitigate flood, some of the challenges and successes experienced analyzing and building solutions, and a range of lessons learned that can help all communities better adapt to flood risks outside the traditional floodplain.

Biography: Joseph is a Senior Technical Manager in Woodard & Curran's Flood Mitigation Practice with expertise in hydraulic and hydrologic studies, FEMA Flood Insurance Studies (FIS) and Risk Assessments, floodplain mapping, flood mitigation, NFIP regulatory compliance and permitting, drainage design, system modeling, methods, and process development. He has 27 years of engineering experience with most of his career focused on water resources; managing, supporting, and performing drainage system and flood mitigation hydraulic and hydrologic studies for local, state, and federal clients. Joseph is a graduate of the University of Maine with a BS in Forest Engineering and works nationally out of his home office in Portland, Maine.

Virtual Session F1: Nature-Based Solutions and Successes: NBF

A new framework for flood adaptation: Introducing the Flood Adaptation Hierarchy

Stevie Adams, CFM, The Nature Conservancy sadams@tnc.org

Co-presenters: Alison Branco; Andrew Peck

Abstract: Traditional flood risk paradigms and associated strategies are no longer sufficient to address global flood adaptation challenges due to climate change and continued development in floodplains. The current flood adaptation approach is failing to take advantage of the benefits provided by intact ecosystems and perpetuates social and economic inequities, leaving those who are most vulnerable at highest risk. Rooted in the experiences of the United States, we propose a new framework, the Flood Adaptation Hierarchy, which prioritizes outcomes into six tiers. Overall, the tiers distinguish between nature and nature-based solutions, with preference given to natural ecosystems. The most important outcome in our hierarchy is to avoid risk by protecting and restoring natural floodplains; next, eliminate risk by moving communities away from danger; and then to accommodate water with passive measures and active risk reduction measures. We include, but de-prioritize, a defense of community assets using nature-based engineering and hardened engineering. Throughout the hierarchy, we provide guidance on the equity considerations of flood adaptation decision-making and highlight “impacts,” “resources,” and “voices” as important equity dimensions. Implementing the framework through an iterative process, using justification criteria to manage movement among tiers, alongside equity considerations, will support adaptation to changing environmental and social conditions and contribute to risk reduction at scale. Though this approach is focused on U.S. flood management and adaptation, prioritizing risk reduction, elimination of risk, and accommodation of hazards over the defense against threats not only has global applicability to flood adaptation, but should also be evaluated for applicability to other climate-driven challenges.

Biography: Stevie Adams works on climate adaptation strategies with the New York Division of The Nature Conservancy that include protecting and restoring floodplains and coasts. She is a Certified Floodplain Manager with the Association of State Floodplain Managers and co-chairs the Training and Outreach Committee of NY’s state chapter. She has recently co-authored a paper that proposes “A new framework for flood adaptation: introducing the Flood Adaptation Hierarchy,” (Ecology and Society, in press). She holds a Master of Science in Biology from California State University of Northridge.

Implementing Nature-Based Solutions in Flood-Prone Communities

Arsum Pathak, PhD, National Wildlife Federation, PathakA@nwf.org

Co-presenters: Emily Donahoe, donahoe@nwf.org

Abstract: This session offers an approachable starting point for floodplain managers to understand and implement effective nature-based approaches for flood management and climate adaptation in their communities. National Wildlife Federation, through partnership with EcoAdapt, developed a guide to support the integration of nature-based solutions into the U.S. Climate Resilience Toolkit “Steps to Resilience” framework. The five-step adaptation planning framework provides practitioners with the fundamentals of nature-based solutions and how to design and carry out these approaches in an equitable manner that meets the unique needs and goals of their community. The guide identifies seven “key considerations” for incorporating nature-based solutions into community adaptation planning that includes recognizing natural systems and processes as critical infrastructure, considering climate impacts on priority natural assets, considering equity implications in the design and application of nature-based solutions, among others. The guide also offers advice on how to integrate nature-based solutions into each phase of the “Steps to Resilience” community planning process. Additionally, the guide summarizes approaches for overcoming barriers to the adoption of nature-based solutions and highlights funding and financing mechanisms that can help communities implement nature-based approaches. This concurrent session will explore the key considerations for use of nature-based solutions in detail and

walk through applying these considerations at each step of the community adaptation planning with attendees. Floodplain managers and other practitioners will benefit by learning how to embed different considerations of nature-based approaches at various steps of adaptation planning. Ultimately, this concurrent session will equip attendees to identify and select appropriate nature-based options based on their community's specific needs, goals, resources, and hazard concerns. To learn more about the role of Nature-based Solutions in the Steps to Resilience Framework, please visit the following report, "Incorporating Nature-based Solutions into Community Climate Adaptation Planning": <https://www.nwf.org/Educational-Resources/Reports/2022/Incorporating-Nature-based-Solutions-into-Community-Climate-Adaptation-Planning>

Biography: Arsum Pathak is the Senior Adaptation and Coastal Resilience Specialist for the National Wildlife Federation's Southcentral Region. Arsum has more than 5 years of research experience in climate change impacts, adaptation and coastal resilience. At NWF, she strives to advance climate adaptation efforts, particularly nature-based approaches, to deal with the potential impacts of climate change and associated extreme events across the Gulf region. In this role, she distills climate science and highlights effective nature-based approaches to help communities and policy experts understand their risks and develop equitable solutions to tackle sea level rise, storm surge, and other climate-induced threats. Prior to joining NWF, Arsum earned her PhD in Environmental Science and Policy at the University of South Florida where she researched and published on climate impacts and adaptation decision-making using a systems approach. She also holds an M.S. in Environmental Science from Panjab University, India. Through her work, Arsum aims to address the challenges posed by climate change to our social and ecological systems across the Gulf using a science-policy interface.

Restoring the Barataria Land Bridge: A Programmatic Approach to Large-Scale Marsh Creation

Nicholas Cox, Moffatt & Nichol, ncox@moffattnichol.com

Co-presenters:

Abstract: The Barataria Basin has experienced some of the highest wetland loss rates in Louisiana. Since 2010, five successful marsh creation projects totaling 2,800 acres have been implemented using a permitted pipeline corridor and renewable Mississippi River borrow areas. The latest project is the Large-Scale Barataria Marsh Creation: Upper Barataria Component (BA-207) Project which started construction in 2021 and is restoring 1,200 acres of intermediate and brackish marsh habitat, extending and complementing approximately 1,600 acres of marsh previously restored. The success of the Barataria Landbridge restoration is the result of collaboration between local, state, and federal project partners working together to implement a long term strategic approach to planning, design and permitting of the pipeline conveyance corridor and renewable borrow areas for use in a series of projects over the last decade. The now proven approach maximizes restoration funding and provides a model for efficient implementation of large-scale, regional, and landscape level restoration projects. The Barataria Landbridge case is a great example for other coastal regions, and can be applied not only to marsh creation, but also beach nourishment and beneficial use of dredged material efforts. Expansion of available permitted borrow sites in the Mississippi River, will further expedite this programmatic approach, given the long-lead time in getting such borrow sites permitted. This presentation will provide insight into how successful large-scale coastal restoration can be completed to better create resilient shorelines in the face of climate change.

Biography: Mr. Cox is a Coastal Engineer who focuses on small- and large-scale coastal restoration projects across the Gulf Coast. He has worked on the planning, design and construction of over 4,000 acres of marsh restoration projects ranging in size from 25 to 1,200 acres.