

TMAC

Technical Mapping Advisory Council Meeting

July 27-28, 2020

TMAC Members

Doug Bellomo
Nancy Blyler
Scott Giberson
Jeffrey Giering
David Guignet
Suzanne Jiwani
Carey Johnson
Carolyn Kousky
Tony LaVoi

David Love
Robert Mason
Salomon Miranda
James Nadeau
Ngoc Nguyen
Jon Paoli
Luis Rodriguez
Jeff Sparrow
Michael Tischler

Government Attendees

John Ebersole, FEMA, Legal Advisor
Mike Grimm, FEMA

Brian Koper, FEMA ADFO
Michael Nakagaki, FEMA, DFO

Support Staff

Annelise Buck, Team Deloitte
Henry Cauley, Team Deloitte
Alexis Richmond, Team Deloitte

Jen Marcy, Atkins Global
Heidi Carlin, AECOM
Phetmano Phannavong, Atkins Global
Ryan O'Conner, AECOM

Public Comment

David Conrad, ASFPM (day 2)
Ashley Couch, City of Scottsdale (day 1)
Gerald Galloway (day 1)
Meg Galloway, ASFPM (day 1)
Anaserra Ilobet (day 2)
Alan Luloff, ASFPM (day 1)

Marla Stelk, Association of State Wetland
Managers (day 2)
Jessie Ritter, National Wildlife Federation
(day 1)
Shana Udvardy, Union of Concerned
Scientists (both days)

Other Attendees

Mike Amodeo, First Street Foundation
Matthew Eby, First Street Foundation

Ed Kearns, First Street Foundation
John Dorman

Purpose

The purpose of the virtual Technical Mapping Advisory Council Meeting is to: (1) Receive briefings from Ed Kearns of First Street Foundation and John Dorman of North Carolina's flood mapping program; (2) Receive a briefing about the TMAC survey and Stakeholder Engagement

Plan; 3) Deliberate and vote on the Vision Statement for the 2020 TMAC Report; and; 4) Receive briefings from each subcommittee on their sections of the 2020 TMAC Report.

Day 1: July 27, 2020

Opening Remarks/Administration/Introductions

Mr. Brian Koper, the FEMA Alternate Designated Federal Officer (ADFO), welcomed members and participants to the meeting and introduced the Government attendees and support staff. He then proceeded with a roll call of TMAC members and went through the day's agenda. He provided an overview of the Zoom virtual meeting audio, chat, and voting functions. He reminded everyone of the Federal Advisory Committee Act (FACA) compliance provisions and reminded the members this would be a public meeting. Per FACA requirements, a public comment period would be held each day, offering the public the opportunity to provide remarks or feedback about the topics being considered for a vote. Mr. Koper noted that participants can still register for public comments via the TMAC email address.

Introduction and Goals

Mr. Jeff Sparrow, Chair of the TMAC, put forth a motion to begin the meeting. Mr. Doug Bellomo accepted the motion. Ms. Susanne Jiwani seconded the motion. Mr. Sparrow thanked everyone for attending the meeting virtually. He reminded everyone to please mute their phones unless they were speaking. Mr. Sparrow explained that this year, the TMAC is focused on stakeholder engagement. He noted he appreciates the time everyone has taken out of their day to provide their input. Mr. Sparrow went on to explain that the day's meeting was focused on receiving information, both from First Street Foundation and about North Carolina. The TMAC would also discuss the stakeholder survey. He added that another objective for the day's meeting was drafting a vision statement. Mr. Sparrow explained that the next day's meeting would focus on going over the subcommittee's work thus far. Mr. Sparrow asked that the group stay focused, which he acknowledged can be difficult in the virtual environment. Following his opening remarks, no questions were put forth to Mr. Sparrow or any of the other TMAC members.

First Street Foundation

Mr. Ed Kearns of the First Street Foundation began his presentation by thanking Mr. Sparrow and the TMAC for the opportunity to present during the TMAC Public Meeting. Mr. Kearns explained the background and purpose of the Foundation, which is to be a nonprofit organization with a focus on communicating the risk of climate change to the public, initially through the impact of flooding. Mr. Kearns noted that his background prior to joining First Street includes working with climate data for the National Oceanic and Atmospheric Administration (NOAA) for over 15 years.

Mr. Kearns emphasized that flooding is the costliest natural disaster in the United States and that there is a need to democratize flood hazard data so that all Americans can understand the risk to their individual property. While FEMA flood maps are a step towards achieving this goal, Mr. Kearns added that flood maps developed through FEMA can take several years to develop. Mr.

Kearns provided an example of the shortcomings of the FEMA flood mapping process by referencing the recently adopted maps for a portion of Brooklyn, New York. The appeals process as part of the map adoption extended the timeline significantly, while also reducing the number of properties ultimately included in specific zones of the map.

Mr. Kearns then explained that the hazard information developed by the Foundation incorporates the potential future environmental changes caused by climate change. The First Street Foundation has assembled over 80 specialists across a wide range of expertise and organizations as it has worked to define and communicate this future risk. Mr. Kearns explained that First Street began by modeling every major flood type including tidal, pluvial, fluvial, and surge. First Street analyzed IPCC climate models for future environmental scenarios. First Street assembled their maps using parcel data, building footprints, hazard layer, and max depth. Mr. Kearns explained how the models compared to FEMA flood maps. He noted 70% more properties are estimated to have the 1%-annual-flood level of risk, representing an additional 5.9 million properties, than is currently calculated by FEMA. He went on to elaborate on how First Street also aimed to model future risk. First Street found that an additional 10.9% of coastal properties have a greater 1%-annual-flood risk by 2050.

Mr. Kearns then provided an overview for how First Street modeled their data. First Street used the Fathom-US Model as the statistical analysis. He also listed the sources of input data. Mr. Kearns moved on to describe the surge and tidal model. Mr. Kearns noted the flood model outputs are downscaled to 3m resolution. First Street modeled low, median, and high climate scenarios with 13 hazard layers to model future flood risk. They also validated their model by comparing it with data from historic flooding events. To ensure quality assurance, First Street performed statistical work, compared their model to FEMA hazard layers, analyzed areas of high population density, and compared with historic NFIP claims. Mr. Kearns explained one of the challenges of the Fathom model is that it is very sensitive to adaptations such as levees. First Street tried to include as many adaptation features as possible in their model and currently maintain a database with over 23,000 verified adaptation features. First Street's model assumes these adaptation features mitigate risk in the manner and technical specification to which they were designed. Mr. Kearns also noted that quality assurance of the data is of major importance to the foundation given the 142 million properties covered by their modeling. First Street has addressed this by using interpolation within return periods to fill gaps and uses linear interpolation to model future flood risk.

As a method of sharing this data, First Street has published an 80-page methodology report, a national report that drives to the state-by-state and county-by-county level, and launched [floodfactor.com](https://www.firststreet.org/floodfactor) on June 29, 2020. This free tool allows an individual to identify their individual property's flood risk, displayed as a score from 1-10, with one being the lowest level of risk and 10 being the highest. This risk number is derived from a combination of the potential severity of a flood to a given property and the 20-year probability that flooding to the property will occur. Mr. Kearns noted that since the tool has been released most of the feedback has been positive. Mr. Kearns added that while the tool is free to the public to view the risk to their property, the

data is also sold in bulk to companies and other stakeholders to generate revenue for the Foundation.

Mr. Kearns ended his presentation by noting First Street's goal is to empower individuals to move the needle on climate change action. First Street wants to maximize the use of this data to reduce flood risk exposure today and in the future. As First Street moves forward with their work, they are considering the following questions: 1) How do we maximize the use of First Street's flood assessment data by the public sector to inform and encourage preparedness for climate change impacts while ensuring the ongoing operation of the non-profit?; 2) How can we jointly sustain an on-going, dynamic property-level risk assessment knowing the limitations that FEMA faces with the Privacy Act, Paperwork Reduction Act, etc.?; and 3) Is there an opportunity to securely gain access to FEMA data to further the model development and to develop insights? For example, property level NFIP claims data.

Following the completion of the presentation from First Street, Mr. Sparrow thanked Mr. Kearns and offered the opportunity for TMAC members to ask any additional questions. Mr. Sparrow reminded the TMAC to use the "raise hand" feature in Zoom if they wished to speak. Mr. Bellomo began by asking how First Street plans to maintain the data moving forward and whether there would be additional updates to the model. Mr. Kearns responded that maintenance to the data is currently done on a quarterly bases and a major data release will occur yearly. Mr. Kearns added that it has been very helpful to hear from local officials about the risk scores associated with their communities; this has allowed First Street to drive down to the local community level to make updates to the model.

Mr. Tischler questioned where First Street currently has gaps in their data. Mr. Kearns noted several data gaps including incomplete data related to elevation, LIDAR, and ungauged catchments. He added that First Street is currently working on new coastal maps with higher resolution. Mr. Nadeau questioned how close the Foundation was to be able to identify first floor elevation for the properties within the model. Mr. Kearns confirmed that the Foundation does not yet have a consistent source of information for this data across the U.S. Mr. Guignet requested whether the data is available for download and whether it can be layered over other risk data sets for the sake of comparison. Mr. Kearns confirmed that the data is available at the zip code, county, and congressional level. The Foundation is still exploring how to make the data better available to the public while also keeping the project moving forward.

Ms. Jiwani questioned where the Foundation was getting the gauge data and noted it looked incomplete as it only listed 100 gauges as being used in the model. Mr. Mike Amodeo of the First Street Foundation replied that the 100-gauge number referenced by Ms. Jiwani was not for the entire model but would follow up with a definite answer. Mr. Rodriguez questioned whether the model was performing a risk assessment, with First Street responded that this depends on the definition of risk. Mr. Rodriguez then asked for clarification around the additional 70% of properties not currently covered by FEMA flood maps, are unmapped areas what drives up this number? First Street responded that the pluvial component of the model is a big driver to

including more properties at risk but that First Street has not done a comparison to determine what percentage of these new properties comes from different elements of the model. First Street did acknowledge that their model pushes farther into watersheds than some FEMA maps.

Mr. Giberson asked if a process was established to address complaints from the public, like the appeals process for FEMA? Mr. Kearns replied that First Street has received a great deal of community engagement since the release of the model and that most of this engagement has been positive. Mr. Eby, Executive Director of the First Street Foundation, added that since the release of the tool it has received millions of page views from hundreds of thousands of individuals and that less than a fraction of 1% of these views have led to negative feedback. However, First Street Foundation does have a support center and support staff to work with those individuals who take issue their score. Mr. Mason then noted that the impact of pluvial flooding is something the TMAC has struggled with and should be considered as a topic for future committee review.

Mr. Amodeo added that First Street continues to review and refine the data and effects of the adaptation features in the model, including dams, and hopes for a better level of analysis to be included in the second release of the model. Mr. Sparrow asked for clarification on where First Street got data for levees and other adaptation features. First Street replied that much of this data came from interacting with state and local officials but that in some instances the Foundation also sent teams into the field for data collection purposes. First Street is continuing to search out additional adaptation features and expects this list to continue to grow.

Mr. Rodriguez noted that ground resolution is the biggest driver of good data, does First Street view their current data resolution as suitable for making land use and regulation decisions at the local level? Mr. Kearns replied that yes, First Street believes the data can guide local officials in their decision making. Mr. Love asked for clarification as to whether the increase in the percent of properties covered by First Street as compared to FEMA includes properties without structures; First Street responded that yes, some of these properties do not contain structures. Mr. Sparrow asked whether elevation of structures was part of the assessment. First Street responded that no, as of now only building footprint is included, but elevation data would be the most impactful new set of data that could be incorporated into the model.

Mr. Nadeau asked whether First Street has discussed their tool with the National Association of Realtors. Mr. Eby noted that NAR did send out a note to its members about the Flood Factor Tool and encouraged Mr. Nadeau to review this communication. Mr. Nadeau replied that the communication from NAR was incomplete and did not really address First Street. Mr. Sparrow noted that the next version of Flood Factor would not be released for another year. However, if a community reaches out in the meantime requesting a change would First Street insert that information into the model? First Street confirmed that some updates can be done quarterly but it depends on the nature of the update. Mr. Sparrow followed up by asking for clarification on how First Street conducts data validation during development. Mr. Kearns noted that a paper is

coming out from First Street on this soon, and that First Street was reaching out to various stakeholders before the model was released so that people were not caught completely unaware.

Mr. Sparrow ended the question session by asking what has been the biggest criticism of the data thus far. First Street responded that the biggest criticism thus far has been releasing this information and the unintended effect it has had on some communities that may lose property value because they have not had an opportunity to respond to the data or mitigate their risk as identified in the data. However, First Street contends that this is less of a critique of the model and more of a consequence of making data more readily available. First Street is looking to address these criticisms from communities as quickly as possible but also believes data should not be ignored or hidden just because it is not favorable.

Mr. Sparrow thanked First Street for their presentation and noted that the presentation materials would be shared with the TMAC Members. The TMAC then went into an 8-minute recess before returning for the Public Comment period.

Public Comment Period

Mr. Nakagaki provided an overview of the public comment period. The TMAC received eight written comments and six individuals registered to provide verbal comments.

Mr. Nakagaki called on the registered speakers to begin. Ms. Meg Galloway, a senior advisor at the Association of State Floodplain Managers (ASFPM), and former dam safety professional, who proceeded to speak about the Edenville Dam incident that happened just this past year. She elaborated the data regarding the risk that stems from dam failure is not available to communities. She explained this data is kept from the public due to terrorism concerns. She asserted the public availability of dam inundation information outweighs the risks. Ms. Galloway went on to assert that FEMA should work with the USACE to make this data available so that communities are armed with this information. A written version of Ms. Galloway's public comment is included at the end of the TMAC Public Meeting Minutes.

Mr. Alan Luloff, also with ASFPM, explained the nexus between floodway surcharges and future conditions. Mr. Luloff noted most states have rules for 1-foot surcharge floodways. Other states have their own surcharges. Mr. Luloff asserted that FEMA should provide BFE + 1-foot surcharge and ensure the communities understand the impact of this type of flood. A written version of Mr. Luloff's public comment is included at the end of the TMAC Public Meeting Minutes.

Ms. Jessie Ritter, from the National Wildlife Federation, strongly encouraged the consideration of natural floodplain function in FEMA's mapping process. She explained natural floodplains support both wildlife and are a cost-effective way to mitigate flood risk. She noted the Risk MAP program does not account for the risk reduction of these natural features. Ms. Ritter encourages the Risk MAP program to consider these features in their development of flood maps in the

future. A written version of Ms. Ritters's public comment is included at the end of the TMAC Public Meeting Minutes.

Ms. Shana Udvardy from the Union of Concerned Scientists (UCS), thanked First Street Foundation for their presentation. Ms. Udvardy explained that the climate scenario First Street uses in their model is a conservative estimate, and she implored First Street and the TMAC to consider less conservative models. A written version of Ms. Udvardy's public comment is included at the end of the TMAC Public Meeting Minutes.

Mr. Ashley Couch is in the process of mapping alluvial fan areas in North Scottsdale, Arizona. He explained the flood risk identified in the Flood Factor model is much less severe than the risk expressed in the FEMA maps. He expressed concern citizens will use this information to dispute flood control projects. A written version of Mr. Couch's public comment is included at the end of the TMAC Public Meeting Minutes.

Mr. Gerald Galloway brought up the question, "what is risk?" He noted that most conversations focused on economic costs. He provided the suggestion that social vulnerability be included in future models for a more comprehensive cost-benefit analysis. Mr. Galloway did not include a written version of his public comment to be included in the meeting minutes.

Mr. Nakagaki moved on to the written comment period. Mr. Nakagaki was unable to read submitted public comments during the allotted public comment period and noted that the unread public comments would be included during the public comment period on day two of the TMAC meeting. All written comments submitted to the TMAC are included in the "Public Comment Appendix" section at the end of these meeting minutes.

Mr. Nakagaki formally closed the public comment period.

Survey Feedback/Stakeholder Engagement Plan

David Love began by explaining the TMAC Stakeholder Engagement Plan, which involves an online survey, webinars, and focus groups. Mr. Love explained the survey went out to many stakeholders. The survey has had about 700 responses so far, and the group plans to keep it open until August. Of the respondents, 27% are Professional Engineers. The top five stakeholder respondents include local government officials, engineers, property owners, the general public, and construction professionals. Most respondents are Certified Floodplain Managers (CFMs) and support floodplain management. Mr. Nadeau elaborated further on the survey. The survey seemed to express a lot of uncertainty about the switch from the binary to graduated system. Mr. Nadeau suggested the group send another survey, as there is not a lot of information on stakeholders helping the decision process. Mr. Nadeau went through the objectives of the Stakeholder Engagement Plan, which include 1) Supplying accurate information to others about flood hazard and risk); 2) Lowering the flood risk that currently exists (through mitigation, planning, or other mechanism); and 3) Implementing and complying with standards that are more

stringent than the National Flood Insurance Program minimums for new development. Mr. Nadeau went through the *Top Five Tools and Resources Needed* based on the survey which include 1) Information to help me explain risks to elected officials, homeowners, developers, or others; 2) Information to help me identify and manage stormwater, street flooding or urban flood risk; 3) Information to help me plan for more intense localized rainfalls; 4) Information to support mitigation projects (scenario planning, grant applications, executing and managing mitigation projects, etc.; and 5) Information about extents of past flood events. The survey gave a lot of good information from people that are providing guidance. Mr. Nadeau expressed he would like to extend the survey to those who make back-end decisions. Mr. Love elaborated on the webinar phase, covering the tasking memo and discussing graduated vs. binary risk with stakeholders. Then, during the webinar, stakeholders will be asked for feedback about what information they need. A subset of webinar participants will participate in focus groups, which will involve gathering more feedback. Mr. Love welcomed questions from the group. Mr. Bellomo thanked the survey team, agreed that the Stakeholder Engagement Plan has a great structure. Mr. Giberson noted he reached out to eight associations. He will follow up to encourage the collection of their input. Mr. Nadeau further explained he would like more feedback from the insurance industry. Mr. Sparrow reiterated that the fact that the TMAC had over 30 minutes of public comments speaks to the fact that the TMAC are reaching the goal of more stakeholder engagement. The TMAC then paused for a scheduled lunch break.

North Carolina Presentation

Mr. Sparrow welcomed Mr. John Dorman of AECOM, who spoke about North Carolina's Flood Risk Management tools. Mr. Dorman went through his agenda and began his presentation. He explained that Hurricane Floyd in 1999 led to important changes regarding floods and flood risk in North Carolina. It caused floodplain managers and homeowners to ask themselves the following five questions 1) What is the likelihood and elevation when this property will flood?; 2) What are the impacts and costs to repair when this property floods?; 3) Am I financially vulnerable if my property is flooded?; 4) How can I reduce the likelihood, impact & vulnerability to flooding?; 5) What is the estimated cost of Flood Insurance for my property? Mr. Dorman explained North Carolina broke their effort to address flood risk management into phases. Phase I involved Flood Hazard Identification – Data, Modeling, and Mapping. Phase II Involved Digital Flood Risk Assessment and Mitigation. Phase III involved Flood Risk Insurance and Management. Phase IV focused on the Flood Insurance Program, High Computing, and Intelligent Analytics. The state of North Carolina developed a Risk Mitigation Tool. The planning tools were for “sunny day flooding,” but North Carolina also created a way to look real-time situational intelligence with the data collected for the tool. Mr. Dorman noted response and rescue teams were able to use these tools to save lives. These tools also allowed North Carolina to identify damage hot spots and the tracking of recovery, funding requests, and action plans.

Mr. Dorman went on to describe the lessons learned about this program. One important aspect was leveraging efficient technology such as LiDAR, Environmental Sensors (IOT; Cellular, Satellite; Microwave), Dynamic, Database-Derived Digital Display, and Geodesy & Geographic Information Systems (GIS). He explained efficient technology resulted in better data collected

more efficiently with lower cost. He noted stakeholders are typically two generations behind the newer technology due to change resistance and hard coding systems and processes. North Carolina was able to partner with other states to add their information. They did not have to create a separate system and were able to utilize the tools already in use.

Mr. Dorman went on to express the importance of partnering with others to share data, as data is very important to a quality model. He also noted it is most helpful if data and modeling happens at the structural level. He stated communities and individuals need multi-frequency data enabling Flood Impact Tolerance and Mitigation Analysis Firms should not be the primary tool or face for stakeholder engagement. Stakeholders want to know about flood impact, cost, and mitigation.

Mr. Dorman remarked that being vision driven and including celebratory phases fosters excitement. In North Carolina, this method resulted in less loss of life, financial loss avoidance, rapid and targeted response, data driven Federal Declarations, data driven HMGP and CDBG-DR Action Plan.

Mr. Sparrow thanked Mr. Dorman for his presentation. Mr. Guignet asked if Mr. Dorman has focused on future probability forecasting past the 1%-annual-flood. Mr. Dorman answered he is no longer with the State of North Carolina, but the state is likely heading that way. Mr. Rodriguez asked Mr. Dorman if he had any thoughts on Flood Factor, based on the presentation from the First Street Foundation during the morning portion off the Meeting. Mr. Dorman noted that overall Flood Factor seems to be an impressive tool but also agreed with an earlier comment that how risk is defined has many different perspectives. Mr. Carey Johnson asked if there has been an impact to structures that are at risk, or if there has been an increase in the purchase of flood insurance. Mr. Dorman agreed that would be a good study question. He went on to further explain that many of these properties are in lower income areas without mortgages, which may be the reason why there has not been a significant increase in the purchase of flood insurance. Mr. Dorman noted he is particularly excited about FEMA's BRIC program. Mr. Sparrow asked about the long-term funding put in place in Phase I and how important it was in achieving all that they did in North Carolina. Mr. Dorman said the funding allowed for better partnerships and the development of innovative solutions. Mr. Sparrow asked Mr. Dorman if he had any advice for other communities wanting to do something similar. Mr. Dorman explained that it is important to engage the government right after a disaster. Mr. Tischler commented that this presentation validates what USGS is trying to do.

Mr. Bellomo asked Mr. Dorman to expand on the struggle with tools that can serve a dual purpose. Mr. Dorman answered that if you have the Base Flood Elevation (BFE) for a structure, you do not necessarily need the map. The maps that have been developed show the hazard, but they do not show the true BFE at the property level or the true need for insurance. He further explained the needs of floodplain managers and customers are different. Mr. Sparrow agreed that FIRMs are important but probably do not serve both customer's and floodplain manager's needs.

Discussion – Vision Statement

Mr. Bellomo explained Subcommittee 1 proposed five different vision statements and reached out for feedback. The statement that came out of this process was “A National Flood Mapping Program that forms the foundation of a national framework for managing flood risks by facilitating partnerships, promoting adaptive strategies, enabling people to make risk-informed decisions, and leading to reduced human suffering, economic loss and environmental damage resulting from flooding.” Mr. Rodriguez helped provide feedback on the vision statement. Mr. Rodriguez explained that FEMA’s vision statement is short and simple, and he suggested shortening the TMAC’s vision statement. Mr. Rodriguez’s shortened version reads: “A National Flood Mapping Program that forms the foundation of a national flood risk management framework.”

Mr. Giberson brought up the discussion of hazard vs. risk in the vision statement. He also brought up the question how aligned the statement should be to the statute. Mr. Johnson offered another vision statement: “A National Flood Mapping Program that forms the foundation of a collaborative framework for managing flood hazards and reducing flood risks.” Mr. Johnson explained he wanted to distinguish between hazard and risk and did not include a mention of collaboration. Mr. Mason noted he was looking for a signal of a new approach and managing the flood risk beyond the floodplain. Mr. Bellomo suggested replacing “managing” with “understanding all flood hazards and risk.” Mr. Guignet suggested “understanding the hazard and managing the risk.” The group came up with the following draft statement: “A National Flood Mapping Program that forms the foundation of a collaborative framework for understanding all flood hazards and managing flood risks.”

Mr. Mason suggested inserting the word comprehensively. The group decided that the use of “all” conveys the same sentiment. Mr. Giberson affirmed the group’s suggestions. Mr. Sparrow explained to the TMAC that he does not want to lose the important pieces of the original statement, especially the reduced human suffering, economic loss and environmental damage resulting from flooding. Mr. Rodriguez asked exactly what Mr. Johnson meant by “collaborative.” Mr. Johnson explained that it was meant to be inclusive of stakeholders and partnerships. Mr. Rodriguez also explained he was struck by Mr. Mason’s question about how to signal what is new. Mr. Bellomo mentioned that in the original statement included the word “national” which some readers might mistake with meaning “federal.” Mr. Rodriguez encouraged the TMAC to come up with a shorter statement that focuses on what is coming. Ms. Jiwani explained she thought national meant “consistent across the nation” and “collaborative” meant looking at a broader implementation. Mr. Josh Stuckey noted he likes to start vision statements with the action word. He suggested the TMAC lead the vision statement with their action statement.

Public Comment – Vision Statement

Mr. Nakagaki opened the meeting up for any public comments related to the vote on the vision statement.

Shana Udvardy from the Union of Concerned Scientists stressed that the TMAC vision statement must explicitly speak to climate change as it is a pressing issue directly related to flooding.

Deliberation – Vision Statement

Mr. Sparrow reread the vision statement the team had agreed upon during the discussion. Mr. Rodriguez suggested “a program that forms the foundation for all flood hazards” while removing “collaborative framework.” Ms. Jiwani agreed with Mr. Rodriguez’s edits. Mr. Sparrow asked Mr. Stuckey to explain his suggestion again. Mr. Stuckey explained that he was talking about the longer statement; his edit did not apply to the shorter statement. Mr. Johnson agreed to dropping “collaborative framework” if it is clearly in the text somewhere else. Mr. Sparrow brought up Ms. Udvardy’s statement to address climate change. Mr. Giberson agreed, and asked if the TMAC should put back in the “current and future” part of the vision statement. Mr. Stuckey questioned whether the use of the word “managed” is enough. Mr. Bellomo elaborated people can avoid, reduce, transfer, accept, or manage a risk. Mr. Stuckey replied that the piece that is missing for him is the identification of the flood risks. Mr. Nguyen noted that it is not appropriate for TMAC to write a vision statement for FEMA, and maybe the TMAC should form the vision statement as guiding principles for their suggestions to FEMA. Mr. Bellomo agreed and noted he has had similar thoughts: it could be a recommendation statement to lay a foundation for something new going forward, to move away from binary thinking. Ms. Carolyn Kousky emphasized that flood risk is changing and this needs to be emphasized. She suggested including “current and future” and “collaboration” because these elements are what signal the change. Ms. Kousky proposed another version of the vision statement: “The National Flood Mapping Program, in collaboration with other stakeholders, supports comprehensive understanding of current and future flood hazards so that people and communities can better manage, mitigate, and reduce flood risk.”

Mr. Sparrow asked Mr. Nakagaki if the vote could be tabled and revisited tomorrow provided there would be an additional opportunity for public comment before the vote. Mr. Sparrow asked Ms. Alexis Richmond to send out the iterations of vision statement to the TMAC for review tonight.

Adjournment

The TMAC tabled the vote on the vision statement and Mr. Sparrow adjourned day one of the TMAC public meeting.

Day 2: July 28, 2020

Welcome/Roll Call

Brian Koper, TMAC ADFO, welcomed everyone back to the second day of the TMAC Public Meeting. He then proceeded with a roll call of TMAC members and went through the day’s agenda. Mr. Koper provided an overview of the Zoom virtual meeting functions. He reminded everyone of the Federal Advisory Committee Act (FACA) compliance provisions and reminded the members that this meeting would be a public meeting. Per FACA requirements, a public

comment period would be held each day, offering the public the opportunity to provide remarks or feedback about the topics being considered for a vote.

Introduction and Goals

Mr. Jeff Sparrow motioned to start the meeting. Mr. Josh Stuckey seconded the motion. Mr. Sparrow then welcomed everyone back and provided an overview for day two of the TMAC Public Meeting. He reminded the TMAC that there were a number of written public comments that would be read during the Public Comment Period because time ran out on day one. He reminded the TMAC the focus of the second day would be to have the subcommittees provide an overview of their sections of the 2020 TMAC Report. Mr. Sparrow noted that the TMAC would also finish their discussion of the vision statement that began yesterday and vote on the final statement after the public comment.

Subcommittee 1 Briefing

Mr. Doug Bellomo began by walking the TMAC through Subcommittee 1's draft sections. Mr. Bellomo explained the TMAC would address the vision statement at the end of the conversation. The first section Subcommittee 1 went through was the "Overview of Stakeholder Engagement." Mr. David Love explained the subcommittee will aggregate the survey results into graphics after the survey is closed. Mr. Love reiterated the TMAC Stakeholder Engagement Plan: the TMAC sent out a survey, and a smaller group of respondents will join a webinar series. An even smaller group will continue their discussion through focus groups. He explained his section details the process and the goals of the stakeholder engagement. He went into the details of the survey, which asks respondents about their job, the tools they use, how they think the shift from binary to graduated risk will impact them, and what obstacles they foresee. The TMAC did conduct a pilot survey during the ASFPM conference. Mr. Love questioned whether they should include the pilot survey questions in the body of the report. Mr. Love's went on to say the section also goes through the breakdown of respondents and their job titles. The next part of the section lists the top five elements of the existing mapping program, and then goes on to list the top five expected obstacles resulting from the shift to graduated view of flood risk as detailed yesterday during the presentation about the survey. The section will go on to describe the webinar series and will describe the outcomes. A summary of the outcome of the focus groups and recommendations based on the summary will follow. Mr. Bellomo thanked Mr. Nadeau and Mr. Love for their contribution to this section. Mr. Bellomo noted that the expected obstacles are similar to some of the content Subcommittee 2 is covering in their section. Mr. Sparrow commented that the graphic with the obstacles might be easier to read if the list went from 1-5 instead of 5-1.

Ms. Carolyn Kousky noted that given that most respondents have been engineers, the TMAC might need to do additional outreach to get a broader reach of respondents. Ms. Kousky also asked if the TMAC should get feedback about which non-FEMA products stakeholders use. Mr. Nadeau echoed that it is important to gather feedback from additional stakeholders that are not engineers, such as realtors. Mr. Bellomo agreed finding out what other datasets people are using would be helpful. Ms. Kousky noted that Subcommittee 1 could delve into this in the smaller focus groups. Ms. Jiwani asked how participants will be confirmed for the webinars, and if a selection of different stakeholders will be represented in the focus groups. Mr. Love confirmed that underrepresented stakeholders will be invited to participate in the focus groups. The results

then could include obstacles faced by different types of stakeholders. Ms. Jen Marcy explained those who took the survey and indicated they would like to continue to be involved will get invitations to the webinars. Ms. Marcy explained the focus groups will be selected based on stakeholder roles. Mr. Stuckey noted he is surprised that the disconnect between CFRs and Graduated Risk was not listed as an obstacle. Mr. Bellomo responded that obstacle #3 is related to the issue Mr. Stuckey mentioned. Mr. Giberson explained FEMA sent out information about this issue, and Subcommittee 2 is diving into this topic in their section of the report. Mr. Sparrow reminded the group Mr. Giberson is following up with his contacts to distribute the survey and encouraged other members of the TMAC to send the survey around to other underrepresented groups.

Subcommittee 1 moved on to discuss the section “Best Practices to Understand Flood Hazards in a Graduated Way.” Mr. Guignet explained he wrote this section before he received the briefings from First Street Foundation and North Carolina the day prior, so some of his information may change in light of those briefings. Mr. Guignet told the group to expect this section to change in the coming months. Mr. Bellomo affirmed Mr. Guignet has the right pieces and that this section is a great start. Mr. Bellomo encouraged the group to make comments. Mr. Mason commented that Mr. Guignet had a good start on the section. Mr. Mason mentioned there is a tendency to bring in other types of issues, such as climate change, when discussing probabilistic modeling. Mr. Guignet agreed with Mr. Mason, and explained it is difficult to find best practices at this point as there are not many examples. Mr. Bellomo agreed that there are three issues at play: the shift to probabilistic modeling, future conditions, and the implications of future conditions on probabilistic modeling. Ms. Jiwani agreed it is a good idea to separate these topics. She also noted that FEMA already has floodplain managers compute 1%+ one standard deviation for flood risk. Ms. Jiwani stated that FEMA has allowed floodplain managers to map future conditions. Mr. Guignet explained he was trying to recommend including different bands of risk. Mr. Bellomo noted that in Mr. John Dorman’s presentation yesterday, the TMAC learned maps are used for so many different purposes. Mr. Guignet asked about the term “Best Practices.” Mr. Sparrow responded that the wording comes from FEMA’s tasking. Mr. Giberson responded that FEMA has more data than they are displaying, and that other stakeholders are using probabilistic modeling differently. Mr. Giberson offered to set up a briefing to see how CoreLogic uses the models. Mr. Guignet responded he would welcome all briefings. Mr. Mason reacted to Ms. Jiwani’s comment about the 1%+ one standard deviation comment and explained he recalled that USACE did this as well and setting up a briefing with them may be helpful. Ms. Nancy Blyler offered to find a subject matter expert to brief Mr. Guignet. Mr. Mason also suggested a briefing from Will Logan. Mr. Luis Rodriguez responded to Mr. Giberson’s comment about FEMA not displaying all of their data because of the products produced today. He went on to explain one of the things that FEMA has been exploring is a probabilistic approach to coastal hazards intersected with riverine modeling. He noted the following questions come up: “how do we increase the understanding of that hazard? Is it a visual representation? How do we help stakeholders understand?” Mr. Bellomo thanked Mr. Rodriguez for his input and agreed there is untapped data. He further commented it might be good to include best practices about how untapped data should be pulled to the forefront in this section.

Subcommittee 1 moved onto the next section, “Best Practices to Identify Flood Risk to Improve Property in a Graduated Way.” Mr. Nadeau noted he found this section difficult to compose. He

brought up that he is a surveyor, and he did not have a full understanding of flood risk in the beginning of his career until he became a CFM. He touched upon the importance of precision and accuracy which should not be lost in the transition to new data collection and new types of data. He explained he is more concerned about the users and stakeholders at the community level. Mr. Nadeau explained people do not make decisions based on risk, they will make decisions based on options. Mr. Nadeau noted he is open to suggestions for his section. Mr. Giberson thought the section touched on important concepts regarding the shift to graduated risks. Mr. Giberson agreed the education of the public is critical as we move to graduated risk. Mr. Nadeau mentioned it was surprising to him that the folks that administer the flood program can take three optional certifications. He also mentioned there needs to be better understanding at the homeowner level. Mr. Bellomo noted that the stakeholder engagement pieces can be leveraged in this section, especially in terms of different visualizations. Ms. Jiwani agreed having a requirement for CFM for flood administrators would be difficult to enforce. Mr. Nadeau agreed this would be difficult, but floodplain administrators should have a better understanding of the program. Mr. Bellomo suggested trainings be included as a best practice. Mr. Miranda provided his input that the NFIP is optional so to make the CFM mandatory would be a steep hill to climb. Mr. Johnson explained there was a push by ASFPM promote CFM certifications, so something like that could be noted as a best practice. Mr. Johnson suggested following the lead of the National Weather Service in terms of visualizing and communicating risk. Mr. Nadeau agreed that data can be collected more precisely but with the uncertainty band, flood risk is not necessarily more accurate. Mr. Johnson responded no flood in nature is ever going to exactly match the flood map. Mr. Nadeau reiterated he is open to any additional input to his section.

Mr. Jeffery Giering went through the section “Best Practices to Promote Increased Investments in Flood Mitigation Through New Incentives.” Mr. Giering explained there are not a lot of unique incentives. Mr. Giering and Mr. Stuckey reached out to states but did not receive much feedback. Mr. Giering explained they made sure to include information about Building Codes and Standards in their section. He mentioned they have an understanding it will take communities time to understand what graduated risk means to them. Mr. Bellomo suggested connecting with Mr. Love on the webinars and focus groups to understand what communities are using as incentives. Mr. Love shared that in the HMA program, participants get certain credits for mitigation actions. He continued by saying he is happy to include Mr. Giering and Mr. Stuckey in the webinars to learn more about incentives in communities. Mr. Love explained he is familiar with the North Carolina program and their incentives. Ms. Jiwani wrote in that chat “Minnesota has a program that buys out many properties with state dollars. Would you like to know what drives these communities to buy properties? And what are obstacles that they encounter?” Mr. Mason asked if there are economic studies about communities with higher requirements for developments, and whether they have higher real estate value growth rates. Mr. Bellomo noted he is helping FEMA with a study about freeboard and the money saved by higher standards. Mr. Giering brought up a study in Harris County that looked at something similar and they did not see any correlation. Mr. Johnson wrote in the chat “Kentucky has statutory authority for a program - KRS 151.550. Community Flood Damage Abatement Program. But the program has never been funded by the KY legislature. Maybe not a best practice but it does outline that there are some opportunities out there.” Mr. Giering thanked the TMAC for their input.

Public Comment Period

Mr. Nakagaki opened the meeting up for any public comments. There were three preregistered commenters, and six additional written comments that were not read yesterday due to time constraints.

Ms. Marla Stelk, Director of Association of State Wetland Managers, detailed how wetlands reduce flood risks which saves communities money in avoiding damage costs. She explained that FEMA rewards communities for maintaining wetlands in floodplains due to their mitigating effects. She went on to say that it is difficult to map these areas, and therefore difficult to receive credit for these beneficial changes. She asserted FEMA should collect geospatial data of floodplain functions to enhance land use decisions in the future. A written version of Ms. Stelk's public comment is included at the end the TMAC Public Meeting Minutes.

Mr. David Conrad, Water Resources Policy Advisor at ASFPM, started by thanking the TMAC for reaching out to stakeholders this year. He explained that ASFPM is urging FEMA to explore updating the Atlas 14 Rainfall models. Mr. Conrad noted that the models are not updated and are therefore inaccurate. He said that flood maps are inaccurate because the rainfall models are incorrect. He explained NOAA claims that the update of these models would cost \$3 million per year. Mr. Conrad asked the TMAC to include a suggestion to update the Atlas 14 models in their 2020 Report. A written version of Mr. Conrads's public comment is included at the end the TMAC Public Meeting Minutes.

Ms. Shana Udvardy from the Union of Concerned Scientists provided a statement on a few key points made by ASFPM and the Nature Conservancy. She noted she supports the update of the Atlas 14 models and urges the TMAC to include future conditions modeling in their 2020 Report. She suggested including disadvantaged communities and communities of color in their report. Ms. Udvardy finally suggested the TMAC update its Future Conditions Report that has not been updated since 2015. A written version of Ms. Udvardy's public comment is included at the end the TMAC Public Meeting Minutes.

Mr. Nakagaki followed the verbal comments by reading the remaining written comments that were not shared with the TMAC yesterday. All written comments submitted to the TMAC are included in the "Public Comment Appendix" section at the end of these meeting minutes.

Mr. Nakagaki formally closed the public comment period.

Discussion – Subcommittee 1

Subcommittee 1 continued the discussion on the vision statement. Mr. Bellomo summarized the discussion about the vision statement the TMAC had yesterday. Mr. Bellomo explained he leaned toward a shorter vision statement. Mr. Bellomo offered the option "a more flood-resilient nation." Mr. Bellomo also offered the following framework: Prepare, Adapt, Recover, Strengthen (PARS). He explained the TMAC could use this framework to go through their recommendations. Mr. Sparrow responded that he liked the simpler idea. It would allow the TMAC to further explain the how, what, and why. Mr. Nadeau agreed that "a more flood resilient nation" is what we are aspiring to. Ms. Jiwani asked if the phrase could be linked back to the NFIP. Mr. Johnson suggested in the chat "A National Flood Mapping Program that

supports a more flood resilient nation.” Mr. Giberson commented he liked the brief statement, and he wondered what Mr. Nguyen thought based on his comments yesterday. Mr. Nguyen agreed with the statement. Mr. Mason agreed he liked the short clean vision statement. He noted the word “more” conveys the change but suggested taking out the word “more.” Mr. Bellomo noted that word “more” is there because of Mr. Mason’s comment yesterday. Mr. Mason asserted that currently, the US is not a very flood resilient nation. Mr. Johnson explained he was thinking that since the TMAC makes recommendations for FEMA’s flood mapping program, that the statement should include the NFIP. Ms. Jiواني put forward the statement “Empowering a more flood resilient nation.”

Mr. Sparrow summarized the group’s discussion and agreed having the verb “empowering” makes the statement sound more like a mission statement. Mr. Sparrow suggested the final vision statement read “A more flood resilient nation” and asked Michael Nakagaki to begin the voting process.

Public Comment Period

Mr. Nakagaki asked the public if there were any comments. One comment was submitted via the chat by Ms. Anaserra Ilobet: “Suggestion: If you use the word “resilient” make sure you define very well what TMAC means by that. The word resilient is being used in very different ways, from a more classic engineering view, to build more “protection” structures, to allow more developments in high hazard zones to a more holistic view, a long term vision that includes the co-equal goals (social and environmental) for a more sustainable flood risk management approach, as already mentioned 26 years ago in the 1994 Galloway Report.”

Mr. David Conrad commented that the vision statement is positive because it helps put the work of the TMAC and the flood mapping program in context and all of the pieces of the vision can be related to that context through the phrase.

Mr. Nakagaki made one final ask for comments before he put the vision statement to a vote. No further public comments were received.

Vote

The TMAC members voted in the Zoom chat box. The TMAC voted unanimously to approve the vision statement, “A more flood resilient nation.”

The TMAC then adjourned for lunch.

Subcommittee 2 Briefing

Mr. Sparrow welcomed the group back from lunch and shared the link to the TMAC survey in case anyone was interested in sharing or completing the survey referenced in earlier discussions. Mr. Johnson had to drop off the call. Mr. Miranda went on to discuss Subcommittee 2’s progress and their current outline. He explained they will start their section with a summary of the survey results and then discuss the available opportunities to achieve the future of the program, starting with current opportunities. Mr. Miranda continued by saying the next pieces Subcommittee 2

will discuss are transition opportunities. After, Subcommittee 2 will go into future opportunities in moving from binary to graduated risk. In discussing the future, Subcommittee 2 will go into Risk Rating 2.0, BRIC, Building Codes, statutory and regulatory updates, and climate change. Mr. Miranda explained Subcommittee 2 will then go into a discussion of outreach. Mr. Miranda also discussed including the potential for an all hazards insurance program.

Mr. Giberson gave a high-level overview of Mr. Jonathan Smith's section. He explained their section will go into what should be continued, enhanced, and improved upon from the current program. Mr. Giberson welcomed feedback from the group. He explained the section will go through the broad concepts, IT infrastructure and tools, and data and tools. Mr. Bellomo noted he supports the idea of continuous improvement and appreciates the work the subcommittee has done. Mr. Miranda noted that within the Risk MAP discovery process there are chances to learn more about the accuracy and origin of the data. Ms. Jiwani described the importance of collecting information about the data. She suggested Coordinated Needs Management System (CNMS) should be added to section 3.3.2. Ms. Jiwani added that while the goal is always to streamline the map development process, there is also a need for stakeholders to be able to provide input and feedback, which often causes tension in the process. Mr. Bellomo added that often the stakeholders who do the modeling have a rigid view of what is right and wrong, when there is no right answer. Mr. Mason countered that there may be a right answer but not a precise answer.

Mr. Bellomo reiterated there is an importance in understanding each community's unique flood experience. Mr. Mason followed up that he finds communities have issues due to bad hydraulics, and that anecdotal information may not be helpful. Mr. Mason clarified the point he was trying to make was to meet people where they are in the process. Mr. Miranda inserted a placeholder under the Risk MAP program to include some discussion of the delivery process.

Mr. Rodriguez shared a comment about a missed opportunity for a transition framework. He posed the question, "does the program continue to use the same delivery process that has been used in the past?" Mr. Rodriguez explained it is time consuming and costly. It has taken Risk MAP over ten years to reach 80% NVUE. Much of the delay is due to the process. He asked, "should there be a different delivery process? Should the scale be different? How can we make the process more efficient? Is there more room for us to think about doing a delivery process at a larger scale e.g. Base Level Engineering?" Mr. Mason recalled Mike Grimm saying "we are creating a National Flood Model," and suggested the TMAC propose working toward a National Flood Model with local expression.

Ms. Jiwani began discussing her section, which focused on state, local, tribal, and territorial (SLTT) partnerships. She explained the federal partnerships involve information sharing from other federal projects. Ms. Jiwani noted in terms of tribal partnerships, tribes are interested in how they can get the FEMA data in ways that suit them. At the state level, most partnerships are with the Cooperating Technical Partners (CTP) program. She explained the CTPs get the FEMA data out to their community in ways FEMA is not getting it out. Ms. Jiwani suggested promoting CTP work to other states. She explained that many local communities are CTPs. However, much

of the local data is independent of FEMA. Ms. Jiwani finished by saying there is a lot of regional work being done currently. She noted inconsistencies with FEMA data vs. local data can make users doubt FEMA maps. Mr. Guignet brought up CTPs and an opportunity for collaboration. Ms. Kousky explained she pulled together an overview of the main nongovernmental flood modeling programs. She sorted her list by private sector (Catastrophe Modeling Firms, Jupiter, ESRI), nonprofit organizations (First Street Foundation, Climate Central), and academia. Some academic institutions, such as the University of Florida, make their flood modeling tools more public. Ms. Kousky noted in the future, Zillow and Google Maps could be leveraged in visualizing flood risk. Ms. Kousky brought up the issue of confusing or conflicting data as more private sector and nonprofit agencies create flood modeling tools. Mr. Rodriguez asked a clarifying question about the structure of Subcommittee 2. Ms. Jiwani and Ms. Kousky clarified that their section is supposed to cover what is being done at the SLTT level and what can be done in the future. Mr. Bellomo suggested adding a section regarding the appropriate use of data produced by the nonprofit and private sector. He explained understanding the uses and the risks are important. Mr. Miranda detailed that section 3.4 discusses resource and funding limitations and section 3.5 is a placeholder about how SLTTs can be involved in the process in the future. Mr. Giberson explained to identify obstacles, the TMAC needs to know more about the direction that the program may go. He explained his section states the issues but has not necessarily provided suggestions of the direction the TMAC should go. He continued by posing the question “if probabilistic modeling is the way flood mapping ends up going, how do we get the buy in of the public?” He also asked, “how do we change the thinking of in/out risk?” Then, Mr. Giberson explained his section will go into the statutory requirements. He asked the group for feedback on the best way to display this information.

Mr. Sparrow suggested including mentions of natural beneficial functions, future conditions, and the opportunity for FEMA to support state/local communities that are interested in developing dedicated funding support. Mr. John Ebersole let the group know that he is available to the TMAC if they have specific questions. Mr. Johnson brought up section 3.5.2 relates to how partners create a one-stop shop to find the right data and tool for the right scenario.

Closing Remarks

Mr. Sparrow noted he thought there was some excellent discussion over the past two days, and he thanked everyone for their virtual participation. He stated the TMAC has great direction moving forward in finalizing the 2020 Report. He explained even though much of the report is contingent on the survey, it will be worth the wait. Mr. Sparrow also expressed that holding virtual meetings have resulted in increased participation from members of the public.

Mr. Sparrow announced that Mr. Nguyen is retiring from the TMAC and Mr. Giering is also stepping down as he is being deployed overseas. He thanked them for their participation and hard work.

Mr. Mr. Sparrow moved to adjourn the meeting. Mr. Miranda and Mr. Bellomo seconded the adjournment. Day two of the TMAC Public Meeting was adjourned.

Public Comment Appendices

- Written Copies of Spoken Public Comments
 - Meg Galloway, ASFPM (day 1)
 - Alan Luloff, ASFPM (day 1)
 - Jessie Ritter, National Wildlife Federation (day 1)
 - Shana Udvardy, Union of Concerned Scientists (day 1)
 - Ashley Couch, City of Scottsdale (day 1)
 - Marla Stelk, Association of State Wetland Managers (day 2)
 - David Conrad, ASFPM (day 2)
- Public Comments Submitted to TMAC and Read Aloud
 - Public Comment #1
 - Public Comment #2
 - Public Comment #3
 - Public Comment #4
 - Public Comment #5
 - Public Comment #6
 - Association of State Wetland Managers
 - The Nature Conservancy



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TMAC Comments from ASFPM July 27-28, 2020 Virtual Meeting Federal Emergency Management Agency—Docket IF FEMA-2014-0022

The Association of State Floodplain Managers believes the following issues are critical input to developing a proposed vision statement for the flood mapping program and should be incorporated into the 2020 TMAC report or the 2021 work plan. Some of these have been addressed by TMAC in the past, but have not been implemented by FEMA. The TMAC may need to provide options or added information to assist FEMA in implementing these key issues, which are:

1. **Atlas 14 updates.** Accuracy of the flood maps is dependent on a few key inputs, such as expected rainfall precipitation for the 1% rainfall event, up-to-date LIDAR, and appropriate hydraulic models. One of these inputs is particularly troublesome, the expected 1% rainfall estimate, especially for urban areas. This estimate is most frequently obtained from Atlas 14 publications for watersheds across the nation—there are currently 11 Atlas 14 volumes covering different regions of the nation. The NOAA/National Weather Service publication is developed based on all the years of record so the calculated flood levels are as accurate as possible, but based on past rainfall data. **PROBLEM:** A number of the Atlas volumes are far out of date and no volume has been developed for the 5 Northwest states, leaving them to use other NOAA precipitation data that is over 50-years old. Consequently, the rainfall estimates for these areas do not reflect the recent decades of increased rainfall intensity. As a result, flood maps consistently underestimate risk and do not properly show which properties need to buy flood insurance. It is noted that the Atlas 14 volume (No. 11) for Texas, including Houston was being worked on when Hurricane Harvey struck, and the updated 1% rainfall increased from 13" in 24 hours to about 18", a 38% increase. Flood insurance claims for Harvey were beyond the mapped 1% and 0.2% floodplain. Funding for updates to Atlas 14 need to be a federal data responsibility, but NOAA gets no such funding and relies on voluntary contributions from states and other agencies.
RECOMMENDATION: TMAC should recommend NOAA be funded to update every Atlas 14 in the nation every 5 years.

2. **Future conditions mapping.** In the 2012 NFIP reform legislation (BW-12) Congress directed FEMA to incorporate a number of changes in how they develop and display flood maps. These included showing areas of risk based on expected future conditions for sea-level rise, and increased rainfalls due to a warming climate. In the 8 years since that Congressional directive, the NFIP has not incorporated these updated approaches. Development in the floodway fringe and upstream in the watershed are also future

conditions that result in increased flood levels over time. **PROBLEM:** The result of not including this information in FEMA's current mapping process is that every flood map produced by the NFIP is outdated by the time it is issued, resulting in development occurring outside the identified SFHA that is now or soon will be inside the SFHA. This results in development that does not have up-to-date risk information. Additionally, even those who buy flood insurance pay less than full-risk rates, impacting the solvency of the NFIP.

RECOMMENDATION: TMAC should recommend FEMA move to identify and utilize future conditions on all flood maps. This may require added layers in the digital models for the current flood levels used for flood insurance rating and expected flood levels for future years (e.g. for year 2040, 2070 and 2100). In communities where FEMA provides maps with a measurable amount of floodway surcharge (greater than 0.1 feet) FEMA should develop mapping that shows the additional area that will be inundated beyond the Special Flood Hazard Area as the artificially created floodway fringe is filled. This would help discourage community adoption of floodways with a surcharge that opens up a significant portion of the natural floodway to development, increases flood damages to community residents and increases the area inundated during the base flood. These maps would provide a basis for community planning, adoption of higher standards (i.e. freeboard), and siting of critical facilities like hospitals, emergency shelters and evacuation routes, but would not be used for regulations unless the community so chose.

3. **Publicly available dam failure inundation maps.** Recent dam failures or near failures have shown the need for those living in dam failure zones to be aware they are at risk. Nearly 200,000 people had to be evacuated when the Oroville Dam, the highest dam in the US, threatened failure. In 2017, significant damage to the Dam's principal and emergency spillway and continued heavy rainfall resulted in the concern that the dam was extremely close to failure, which would have released a huge torrent of water into the downstream areas flooding homes of thousands of people. Emergency officials ordered this large evacuation to prevent the potential for thousands of deaths. In the 2012 NFIP reform legislation (BW 12) Congress directed FEMA to also show areas of residual risk that will be flooded behind levees and below dams if the structure is overtopped or fails. **PROBLEM:** after 9/11, DHS was created and looked at every possibility where terrorists might damage critical infrastructure and therefore threaten US lives. DHS felt that terrorists might blow up dams to harm people below the dams and concluded that dam failure maps should not be available to the public. Many dam experts in the nation do not see this as a realistic possibility as the amount of explosive to blow up a large dam could not be moved into position without early detection, and even then, there is only a remote chance that the explosives would be a feasible method to fail a large dam. A far larger risk exists to those living below a dam if the dam fails due to heavy rainfall or structural failure. This was illustrated again in 2020 when the Edenville Dam failed during flooding in central Michigan. That dam failure led to failure of another dam downstream, which then threatened people and property downstream of the dams, including the City of Midland. About 10,000 people downstream of the dam failures were evacuated. The same was true in 2015 and 2016 when over 80 dams failed in South Carolina. Almost none of the people evacuated at Oroville or MI knew they were in a dam failure zone, or had insurance to cover the potential damages.

In 2016, the FEMA Technical Mapping Advisory Council report detailed the origin on the current policy regarding restricted access to failure inundation mapping and reflected TMAC's thoughts on the matter:

An ongoing issue is the lack of public access to dam failure inundation information. Much of such data from the Federal Government is restricted; it is usually made available to emergency management personnel, but not to the general public. In 2004, The Department of Homeland Security (DHS) released its Security Classification Guide for the Protection of Critical Infrastructure and Key Resources – Information for Dams and Related Facilities, which listed dam failure inundation maps as “For Official Use Only.” This guide was updated in 2010 and the update was silent on dam failure inundation maps.

In 2015, the Dams Sector Government Coordinating/Sector Coordinating Councils Information Sharing Workgroup developed a white paper outlining the benefits and potential risks associated with sharing dam safety and security information with stakeholders. Although no consensus was reached, a majority of the workgroup members agreed that the public should not be able to access information related to inundation maps. A minority of the workgroup members believed inundation maps should always be made easily accessible so members of the public can make personal decisions about risk and promote risk awareness.

At the state level, the availability of this information ranges widely. The Association of State Dam Safety Officials does not have an official position on this issue. Supporting wider public availability, a Virginia law passed in 2008 essentially requires that all inundation mapping developed for state-regulated dams be made available to communities and the public. Organizations like the Association of State Floodplain Managers believe that the benefits of public availability of inundation mapping far outweigh any perceived security risks of that data by adversaries for exploitation.

This position would be consistent with the congressional intent of the National Flood Mapping Program (BW-12) requirement to provide inundation mapping on FIRMs. As the flood mapping program transitions to incorporate the statutory requirements of the National Flood Mapping Program, the technical credibility of the program will be negatively impacted if residual risk and inundation data is not developed and provided to communities. The 2012 NFIP legislation recommends the National Flood Mapping Program Outputs provide technically credible products into the future: FEMA should work to identify residual risk areas behind levees, and other flood control structures and downstream of dams.

Recently, USACE has determined that it is in the public interest to provide dam failure inundation mapping, and that all dam failure maps in their portfolio will be made public and available through the National Inventory of dams by summer 2021.

RECOMMENDATION: TMAC should continue to advise FEMA to make progress on this as well as other recommendations for residual risk information (e.g. failure areas from levees, levee protected areas and level of protection by a levee or dam) from the mandatory Biggert Waters legislation inclusions on FEMA's flood maps. It is recognized that FEMA's continued evolution in serving up these data via platforms such as the NFHL actually provide an opportunity to work with the USACE and build an interface to serve that data

much like the public-facing map interface that was established with Coastal Barrier Resources Area (CBRA) zones.

4. **Integrating flood risk and natural floodplain functions.**

There has been a significant increase in the intensity of precipitation events across most of the U.S. over the last fifteen years, resulting in a significant increase in flood losses. More and more often, federal, state and local efforts to protect and restore natural floodplains and wetlands are being employed to support flood risk reduction while also improving overall watershed health. For example, the U.S. Army Corps of Engineers has used the hydro geomorphic approach to mapping for compensatory mitigation projects to ensure that any impacted wetland or stream functions are replaced by the mitigation project. Similarly, the U.S. Forest Service recently completed its National Riparian Inventory Base Map, which recognizes the dynamic and transitional nature of riparian areas by accounting for hydrologic, geomorphic and vegetation data as inputs. **PROBLEM:** The NFIP's Community Rating System (CRS) promotes comprehensive floodplain management planning, analysis and evaluation related to the protection of the natural functions of floodplains and habitat protection. Communities that produce maps of the natural functions and resources of their flood-prone areas can receive CRS credit for taking that step toward broader management of their local floodplains. However, FEMA's Risk Mapping, Assessment and Planning (MAP) program generally only includes data on elevation, hydrology, infrastructure, hydraulics and land use for the purpose of informing NFIP rates, not data on natural systems which can reduce flooding, or significant habitat which might be critical for endangered or threatened species.

RECOMMENDATION: Floodplain management efforts and compliance with the requirements of the ESA would be dramatically improved if they were informed by geospatial data that illustrates floodplain functions (including wetlands, coastlines, streams and rivers) as dynamic, hydrologically connected components of a larger watershed to support more strategic local land use decisions (e.g., restoration and/or open space conservation priorities), reducing flood risk while increasing co-benefits such as recreation, clean drinking water, and avoided damage costs.

The ASFPM and its 37 Chapters represent over 19,000 state and local officials as well as other professionals engaged in all aspects of floodplain management and flood hazard mitigation including management of local floodplain ordinances, flood risk mapping, engineering, planning, community development, hydrology, forecasting, emergency response, water resources development and flood insurance. All ASFPM members are concerned with reducing our nation's flood-related losses. More information on the Association, its 14 policy committees and 37 State Chapters can be found at: www.floods.org.



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TMAC Supplemental Comments from ASFPM July 27-28, 2020 Virtual Meeting Federal Emergency Management Agency—Docket IF FEMA-2014-0022

My name is Alan Luloff with the Association of State Floodplain Managers. Thank you for providing me with the opportunity to speak today on future conditions.

ASFPM was very pleased that BW12 included direction for FEMA to include future conditions on FIRMs.

ASFPM has provided written comments on the future conditions issue. In my oral comments today I will be focusing on the future conditions associated with FW surcharge. The concept of a floodway surcharge was established by the TVA in the 1950s. It was intended to be a compromise that would allow some development in the floodplain in the steep terrain of the Great Smokey Mountains but would limit the increased flooding to an amount deemed not significant – the amount they landed on was one foot.

A number of states felt that one foot of increased flooding was problematic. Illinois and Indiana in particular felt that one foot of increased flooding would impact a large area and there was no topographic restrictions that prompted the need to build in the floodplain. Presently there are 8 states that have higher standards and in those states FEMA maps floodways based on those standards.

However, according to the FEMA November 2019 Floodway Guidance document outside of those 8 states it is FEMA's policy to put one-foot surcharge floodways on FIRMs even if the community wants a higher standards floodway.

So what ASFPM is recommending is that when FEMA does provide a floodway with the surcharge that they identify the impact of that surcharge. They can do this by providing an additional map that shows the inundation that will be caused by that surcharge. The surcharge associated with pinching in the natural floodway is not reflected in the BFE. So as the floodway fringe is developed the surcharge or in other words the increased flooding that those encroachments cause extends beyond the SFHA. How far the base flood will extend outside of the SFHA really depends on the topography of the area. In the Tennessee valley one foot of increased flooding might not go very far but obviously in Illinois or the Red River of the North it could go for a very, very long ways.

The present process for providing default one-foot surcharge floodways increases the flood impacts in communities without ensuring communities understand the impact.

So this would be a simple move for FEMA to begin to address the future conditions mandate of BW12 by addressing future conditions associated with land use. They could create an additional inundation layer that would show the BFE plus one foot. This would make communities aware of the impact of that surcharge. By acknowledging they are aware of the impact and affirming that they are willing to have new development increase flooding on existing community residents – without compensation or even notification - does 2 things. This not only helps ensure the community understands the impact but it creates a potential liability issue for the community - both legally and politically. This could prompt the community to request a higher standards floodway.

This can be implemented with no change in regulations.

Comments, TMAC meeting, 7//27/2020

Jessie Ritter, National Wildlife Federation

Good afternoon, and thank you for having me. I'm Jessie Ritter, Director of Water Resources and Coastal Policy at the National Wildlife Federation.

For those unfamiliar with NWF, we are a national conservation organization representing 6 million members and supporters, with a network of 52 state and territorial affiliate organizations.

Thank you so much to the Technical Mapping Advisory Council for the chance to provide public comment as you develop your 2021 workplan. We submitted written comments last week, but one point I'd like to briefly underscore today:

As TMAC works on the 2021 workplan, we strongly encourage you to prioritize consideration of approaches for a more systematic and integrated way of accounting for natural floodplain function in FEMA's mapping efforts. This is a critical step to support sound local land use decisions that reduce flood risk while improving numerous co-benefits such as healthier wildlife populations, clean drinking water, outdoor recreation, and avoided flood damages.

We know there is ample and growing evidence that natural features can be extremely effective and cost-effective for reducing flood risk and damages at a community scale. We strongly encourage the TMAC to examine a recently released report, *The Protective Value of Nature: A Review of the Effectiveness of Natural Infrastructure for Hazard Risk Reduction*, to find many examples of the performance of natural features like wetlands and floodplain for flood risk reduction.¹

Currently, FEMA's Risk Mapping, Assessment and Planning (MAP) program generally only includes data on elevation, hydrology, infrastructure, hydraulics and land use for the purpose of informing NFIP rates, not data on natural system functions. This represents a huge gap in our true understanding and communication of flood risk to communities. Further, by failing to adequately account for the flood risk reduction potential of natural system features in mapping efforts, we risk communities and local decision-makers under-valuing their protection as development decisions are made.

There are efforts underway among several other federal agencies, to create maps and data on wetland and floodplain functions, such as the U.S. Forest Service's National Riparian Inventory Base Map and the hydrogeomorphic approach (HGM) used by the Army Corps of Engineers for compensatory mitigation projects to ensure that any impacted wetland or stream functions are replaced by the mitigation project. Additionally, the U.S. Fish and Wildlife Service's National

¹ Glick, P., E. Powell, S. Schlesinger, J. Ritter, B.A. Stein, and A. Fuller. 2020. *The Protective Value of Nature: A Review of the Effectiveness of Natural Infrastructure for Hazard Risk Reduction*. Washington, DC: National Wildlife Federation.

Wetlands Inventory (NWI), which now incorporates hydrography data, included past efforts to evaluate natural wetland function on the landscape.

So again, looking ahead we strongly urge TMAC to engage in identifying and recommending approaches for a more systemic and integrated way of accounting for national floodplain function in FEMA's mapping efforts.

We encourage you to also consider the rest of our written comments, and thank you again for the opportunity to share these thoughts and for all of your good work.

July 31, 2020

Oral comments by Shana Udvardy, Climate Resilience Analyst, Union of Concerned Scientists, to the FEMA Technical Mapping Advisory Council (TMAC), July 28, 2020

My name is Shana Udvardy, I am the climate resilience analyst with the Union of Concerned Scientists. Thank you for the opportunity to provide comments today on TMAC's vision statement for the mapping program, the TMAC report and the 2021 work plan.

I'd like to start by echoing the excellent comments submitted by ASFPM, TNC, and NWF on the need for FEMA to include natural infrastructure in mapping efforts given their importance in attenuating flooding (among other benefits) and the critical need for FEMA to communicate the value of these natural systems to local decision-makers who make land-use decisions.

I have five key points that I would like to speak to and as well as two requests of the TMAC.

First, as I mentioned Monday, July 27, the TMAC's vision statement for the mapping program must explicitly speak to climate change and not rely on using the "future conditions" catch-all term that will not do the issue justice.

Second, TMAC must urge FEMA to model and utilize the projected future conditions due to climate change to reflect sea level rise and extreme precipitation on all flood mapping products as prescribed by the 2012 Biggert-Waters legislation.

Third, TMAC must recommend robust federal funding for best available science to support localized coastal and inland flood mapping. For example, there is a vast gap in funding as it relates to NOAA's Atlas 14 program which provides updated rainfall projections. TMAC should recommend to Congress that NOAA be funded at an amount that will allow them the resources to update every Atlas 14 in the nation every 5 years.

My fourth point relates to mapping dam failure inundation zones. The recent dam failures in California and Michigan make it all too clear that more must be done to communicate the risk of dam failures to communities downstream. TMAC must work to ensure that FEMA maps residual risk of all structures as prescribed by the 2012 Biggert-Waters legislation.

Before I close, I would like to make a few additional requests of the TMAC. I urge TMAC implement processes to ensure meaningful participation and engagement with a diverse set of stakeholders, including representatives of historically disadvantaged communities, communities of color, and low-income communities, since these communities often bear a disproportionate burden of the harms from flooding and other climate-related impacts.

Finally, I would like to ask the TMAC to provide an update on the implementation of the TMAC future conditions report released in 2015.

Thank you for the opportunity to speak with you today.

I can be reached at sudvardy@ucsusa.org; 202-805-0075.

Ashley Couch
City of Scottsdale
Written Copy of Public Comment

Areas of north Scottsdale lie within alluvial fan landforms, including both active and inactive alluvial fans, based on an engineering (100-year) time scale. Recent 2-dimensional hydrology and hydraulic models show substantial flood risk in these areas, using a fixed streambed model. The actual risk considering avulsions on active alluvial fans would be greater. In addition, these active alluvial fan areas are currently mapped as Flood Zone AO, for alluvial fan sheet flooding.

Recently, First Street released Flood Factor data. This new data was widely publicized in local and national media. A comparison of the First Street data to our recent 2-D hydrology and hydraulic model data revealed that the First Street data showed far less flood risk.

The City of Scottsdale, in partnership with the Flood Control District of Maricopa County and the City of Phoenix, are partnering on a \$16 million project to construct FEMA-accredited levees along both sides of one of these active alluvial fan areas known as Rawhide Wash. We are nearing completion of 90% design plans for this project. The City of Scottsdale is also partnering with the Flood Control District of Maricopa County on a \$43 million project to construct FEMA-accredited levees along both sides of another one of these active alluvial fan areas known as Reata Wash. We are working on completion of 30% plans on this project.

While both projects have broad public support, there are several vocal opponents who have the ear of some members of our City Council. Generally, these opponents believe that these projects aren't needed. They have recently seen the First Street data, which has solidified their position. They have brought the First Street data to the attention of our City Council and are arguing that we should cancel the Rawhide Wash project since there is very little flood risk.

I need to explain the reason for the differences between our recent 2-D hydrologic and hydraulic data and the First Street data to our City Council and make a recommendation accordingly whether we should cancel the Rawhide Wash project. We would greatly appreciate the prompt assistance of First Street staff and TMAC members to help us figure out the reason for the differences between the two models. Thank you very much in advance.

Public Testimony by Marla Stelk During TMAC Meeting, July 28, 2020

Hello and thank you for the opportunity to provide comment on the proposed vision statement for FEMA's flood mapping program and TMAC's 2021 work plan. My name is Marla Stelk and I am the Executive Director at the Association of State Wetland Managers, a national 501c3 professional association founded in 1983 whose membership includes wetland scientists, government agency staff, policymakers, consultants, practitioners, academics and more.

The Association's work focuses on watersheds – nature's aquatic ecosystems, including wetlands, streams, coasts, and the floodplains that contain them, thus my comments are focused solely on that aspect of FEMA's mapping program.

The natural and beneficial functions of wetlands and floodplains are well documented. They generate a multitude of ecosystem services for communities, including specifically the reduction of flood risk. This flood risk reduction benefit alone saves local communities, states and the federal government billions of dollars every year in avoided damage costs while also providing open space, habitat, recreational opportunities, clean drinking water and carbon storage. According to the 2016 report "Coastal Wetlands and Flood Damage Reduction: Using Risk Industry-based Models to Assess Natural Defenses in the Northeastern US" - coastal wetlands prevented \$625 million in flood damages to private property during Hurricane Sandy. In New Jersey alone, wetlands saved more than \$425 million in property damages.

Accordingly, FEMA's Community Rating System rewards local communities with credit for adopting floodplain management plans that protect and enhance one or more of the natural functions of their local floodplains within their jurisdiction. However, the burden of mapping these functions and habitat falls on local municipalities who are most often ill-equipped to produce these maps – generally due to a lack of expertise, a lack of understanding regarding the importance of floodplain functions, and/or a lack of funding. This puts low-income, small and underserved communities at an even greater disadvantage, leading to environmental justice and equity concerns.

Several other federal agencies, such as the Army Corps of Engineers, the FWS, the US Forest Service and the NRCS are actively mapping ecosystem functions to improve their programs and to meet the needs of their stakeholders within their missions. FEMA's floodplain management efforts would be dramatically improved if they were to also take on the responsibility of collecting and managing geospatial data that illustrates floodplain functions (including wetlands, coastlines, streams and rivers) as dynamic, hydrologically connected components of larger watersheds to support more strategic local land use decisions that reduce flood risk (e.g., restoration and/or open space conservation), while also increasing co-benefits.

Again, I thank you for the opportunity to speak today and I welcome any questions from the Committee either now or at a later date.

Oral Comments of David Conrad, ASFPM, to the Technical Mapping Advisory Council
in Public Comments period, 7-28-2020

Good afternoon. I am David Conrad, I live in Chevy Chase, MD, and serve as the Association of State Floodplain Manager's Water Resources Policy Advisor in Washington DC. We are especially pleased to hear the TMAC is emphasizing outreach to stakeholders and the public this year.

Both yesterday and this morning, there were numerous mentions of the critical role accurate, up-to-date data plays in flood risk mapping and flood risk identification. I want to highlight a data quality issue that the Association is urging TMAC to explore and specifically address: critical problems facing updating of the National Weather Service's Atlas 14 precipitation frequency estimates.

As Councilmembers know, flood map accuracy depends heavily on certain fundamental inputs that generally include the expected precipitation for the 1% annual recurrence chance rainfall event. Most often this is supplied by the Weather Service's Atlas 14 data server, through the approximately dozen regional volumes that use the historic records of maximum precipitation events over a range of durations for prediction of likely major events that may recur at various frequencies. These are used to calculate runoff and potential flooding events to identify areas of inundation and to anticipate what standards should be met for infrastructure, buildings, sizing of bridges, culverts, and levees, and for community planning decisions.

Unfortunately, we are finding that the current Atlas 14's are becoming increasingly out of date, because they are not being updated regularly, or in some cases, at all. At the same time we see more frequent and larger precipitation events in many regions across the nation, due increasingly to changing climatic conditions where warmer air masses can carry and release more precipitation.

One result of the out-of-date Atlas 14s is that when flood maps are based on old data, they often underestimate the 1 percent chance flood inundation areas and the flood maps are essentially out of date from the first day they are issued.

The primary reason Atlas 14's updating has ground to a near halt is that NOAA and NWS have no dedicated funding for updates, and the current policy assumes that states and local entities will volunteer the funds for the updates.

With ongoing budget trends, and recently, growing Covid-19 budget strains, the States are increasingly unable to find funds for these updates, and to coordinate and align budgets to raise the needed funds.

This is an intolerable situation; given that hundreds of millions are being spent developing new FEMA flood maps and the billions being spent annually on infrastructure and disaster repairs -- to standards, that again, are out of date, thus putting at risk huge sums of public and private investments for lack of accurate data.

States have requested, in addition, that factors reflecting future conditions be developed and displayed with Atlas 14 analyses. The Northwest atlas data has not been updated for nearly 50 years. Much of the nation's Atlas 14's in the continental US have not been updated in well over 10 years. Experts are saying that these documents should, ideally, be updated now every 5 years.

The cost of updating all the Atlas 14's would only be in the vicinity of \$3M dollar per year according to NOAA. ASFPM is urges that NOAA's budgets be modified to modernize and fund the Atlas 14 volumes nationwide, and that TMAC should support and bring attention to such needs. Thank you, and I would be happy to respond to any questions of the Council.

I can be reached at conrad.david.r@gmail.com or at 202-365-0565.

Public Comments Submitted to TMAC

Public Comment #1

Public Comment #2

Public Comment #3

Public Comment #4

Public Comment #5

Public Comment #6

Association of State Wetland Managers

The Nature Conservancy

Written Public Comments

Public Comment #1

From: Floodplain Regulations Committee of the Association of State Floodplain Managers

Bill Nechamen, CFM

Nechamen Consulting, LLC

Stacey Ricks

MS Emergency Management Agency

As co-chair, along with Stacey Ricks, of the Floodplain Regulations Committee of the Association of State Floodplain Managers, I am pleased to submit the following comments for TMAC and FEMA consideration.

We fully agree that the binary nature of Flood Insurance Rate Maps and floodplain regulations provides a less than effective approach to flood risk perception and floodplain management. In particular, there is the erroneous perception that if you are outside of the “zone” that you do not have a risk of flooding. As we know, 20% to 25% of all NFIP claims fall in the X zone. Even the shaded X zone provides an inappropriate perception of risk. A five hundred year event appears rare, but the 0.2 annual change of flooding is actually greater than the probability of your home suffering a damaging fire.

Another issue with the maps as they are currently drawn is that only the outer boundary of the A zone and shaded X zone has the flood probability rate as shown in the map legend. In the shaded X zone, the probability is .2% to 1%. In the A or V zones, it is 1% or greater. These designations do not provide for an acceptable communication of risk. In addition, current maps are based on historical statistics and do not consider changing conditions due to land use or climate.

Floodplain managers recognize that the current FIRMs do not adequately delineate risk. There has never been a flood that can read a map. Hydrologic analyses have a margin of error that is not communicated in the Flood Insurance Studies. Even topographic mapping, while getting better all the time, has a plus or minus of a foot or more depending on the ground conditions and density of LiDAR. Meanwhile, LOMA's remove structures from the "floodplain" due to an inch of measurement.

For all of these reasons, floodplain managers urge states and communities to adopt higher standards. Many have responded with freeboard requirements. Freeboard is a sensible approach to significantly reducing risk. But it is usually limited to the flood zones delineated on FIRMs even though a greater than 1% chance flood will inundate land beyond the Special Flood Hazard Area.

The ASFPM floodplain regulations committee fully supports approaches to make FIRMs and FIS's more informative including features such as future conditions hydrology, depth and probability grids, or by allowing users to include "what if" scenarios such as different sea level rise considerations, or higher peak precipitation rates. For states and communities that have passed freeboard requirements, it is important to be able to extend the higher Design Flood Elevation line horizontally to where it meets the height of land.

The reimagining of FIRMs must go hand in hand with the reimagining of floodplain development regulations. We are concerned that by developing more information for flood maps, that we may lose their primary use as a floodplain management regulatory tool. There will also be a growing disconnect between the flood mapping products and NFIP regulatory needs. 44CFR60.3 has not been updated since the 1980s. Any update in flood map products must be coordinated with floodplain regulatory modernization.

The new flood maps and flood insurance studies must provide information that is easy to use by local floodplain administrators and understandable by developers. In addition, while we understand the need to develop a better approach to floodway designations which may include "no build" hazard zones, that approach should not make it difficult for local engineering companies to calculate the effects of encroachments.

The original concept of a floodway where encroachments that increase flood risk should not be permitted was sound based on engineering tools available at the time, but the traditional manner of determining the floodway has many questions. There should be areas where the risk is so high, that they become "no build" zones by denying flood insurance or disaster assistance to any new structure, with exceptions only for infrastructure that must cross the flood zone, such as roads and bridges. These areas can be depicted on flood maps. In riverine areas, it can replace the current floodway. To do this, though, still requires a method for engineers to determine no adverse impact for unavoidable encroachments.

Flood maps and flood map products, including backup information, should all be readily obtainable and readily understandable. Approaches such as base level A zones should come complete with advisory BFEs that are approved to be used for both development standards and insurance rating purposes, even if those BFEs come with a margin of error warning.

Much of the nation doesn't even have digital maps, and many areas have no flood maps at all. There has never been sufficient funding to complete the nation's mapping inventory, or even to update maps that have out of date data. As such, we are also concerned that by adding new mapping features, only larger or wealthier communities will get updated products, further harming more rural parts of the nation.

We support the need for better and more informative mapping. But as decisions on new mapping standards go forward, please consider the continued utility of maps by local floodplain administrators and developers who are not engineers. Also any floodway determination process should be simple enough to be understood by any capable hydraulic engineer. In short, do not develop products that are so complex that only the contractors who develop them can understand how to use them.

Public Comment #2

From: New York State Floodplain and Stormwater Managers Association

Ricardo Lopez-Torrijos
Chair, NYSFSMA

Janet Thigpen, CFM
Public Policy Committee
Co-Chair, NYSFSMA

William Nechamen, CFM
Public Policy Committee
Co-Chair, NYSFSMA

The New York State Floodplain and Stormwater Managers Association is a professional organization with public and private sector members from throughout New York State. We appreciate TMAC's ongoing efforts to develop strategies for improving FEMA's flood hazard mapping products, particularly to support better risk communication by shifting away from the binary (in or out) representation of flood hazards. We are pleased to respond to your request for stakeholder input.

As the Council explores opportunities for adding a variety of new mapping features, we ask that you focus on features that support the primary use of FIRMs as floodplain management regulatory tools. Although additional information may be highly desirable, we are concerned about the potential for diverting resources away from the country's significant unmet mapping needs (as documented in the Association of State Floodplain Managers' 2020 "Flood Mapping for the Nation" report). Of the 1,506 towns, cities, and villages in New York State that participate in the National Flood Insurance Program, 78 have no flood maps at all and 411 have flood maps but do not have any flood elevations. Almost half of the state's counties (encompassing a population of over 2 million people), still rely on old paper maps. And many of the maps that have been modernized include decades old data on digital FIRMs. We ask that the focus of the flood hazard mapping program remain on providing all communities with easy-to-use products that contain up-to-date flood hazard information to support local NFIP floodplain management programs and the NFIP flood insurance program.

Any updates to the flood hazard mapping products must be coordinated with modernization of the floodplain regulatory program. For example, New York State has enacted a freeboard requirement to significantly reduce flood risk, but only applies this higher protection level within the currently mapped boundaries of the Special Flood Hazard Area. This protection could be extended to adjacent areas if the communities had maps that delineate the boundaries of this

design flood elevation. FEMA's flood hazard identification program could support this by including freeboard boundaries on the maps, but this change should be accompanied by updating of 44CFR60.3 (which has not been done since the 1980s) to encourage or require freeboard nationwide (or applying some other means for the regulations to account for the margin of error in mapping products). Likewise, future conditions should be incorporated into both the mapping and regulatory programs.

The difficulties of mapping floodways using modern mapping techniques (and the related difficulties for hydraulic engineers making no-rise determinations) may signal that it is time for both the mapping and regulatory programs to move away from the floodway concept. This could be replaced by mapping of "extreme hazard zones" where most new development is prohibited. This zone could be based on safety criteria associated with flood depth, velocity, flood frequency, wave height, and erosion hazards (where applicable). Existing floodways could be regulated as "extreme hazard zones" until the current maps are replaced with updated products. However, any floodway approach should be understandable not only to local floodplain administrators but also to the local engineers who are tasked with developing encroachment models.

The majority of the local floodplain administrators in New York State have multiple other responsibilities and thus lack day-to-day familiarity with flood hazard mapping products. Many communities also lack GIS technology or even familiarity with the use of online mapping tools. It is thus essential that new flood hazard maps and studies present information in a manner that is easy to use and understand by floodplain administrators and by developers.

We support the need for better and more informative mapping and thank you for your efforts to do this in a cost-effective manner that enables funding of new and updated mapping for communities that currently lack reliable flood hazard information.

Public Comment #3

From: No Adverse Impact Committee of the Association of State Floodplain Managers

The No Adverse Impact (NAI) approach to floodplain management is to guide development in such a way as to avoid losses from floods and/or mitigate adverse impacts. One of the ways that communities have implemented No Adverse Impact principles is to identify the highest risk areas within their floodplains and then implement policies that prevent or restrict development in those areas. A variety of approaches have been used to identify and map areas that are unsafe, not only for occupants of those properties/structures, but also for first responders who may be called on to assist during a flood event. Areas with significant safety concerns have been delineated by several communities based on flood depth/velocity criteria or mapping of erosion hazard areas. Other communities use floodways shown on Flood Insurance Rate Maps (FIRMs) as a proxy for the highest risk areas. Some communities simply require structure setbacks from identified waterbodies. The Coastal Barrier Resources Act (COBRA) is a program that strives to minimize development in sensitive coastal areas. These examples have demonstrated the improved safety, reduced flood damage, and taxpayer savings that can be achieved by delineating high hazard or sensitive areas and then enforcing development restrictions and/or limiting taxpayer expenditures in these extremely hazardous areas. In addition, the preservation

of natural floodplain features helps to mitigate the severity of flooding in other areas, while promoting the natural and beneficial functions of floodplains in their unaltered states.

In order to promote expanded implementation of this NAI strategy, communities need maps that delineate the highest risk areas of their floodplains. We propose the establishment of a new highest hazard flood zone and development of safety criteria for riverine, lake, and coastal floodplains that could be used to delineate this zone on flood maps. Criteria for delineating this zone could include flood velocities, flood depths, wave height / wave action, flood frequency, mean higher high-water line, documented erosion / erosion potential, historical high-water line, or other factors applicable within the specified community.

Mapping of highest hazard flood zones should go hand in hand with updating of 10CFR60.3 to establish minimum development standards for this new flood zone. We suggest that most development be restricted, except for infrastructure that must cross or encroach into the SFHA and minor structures, such as pavilions, that support recreational uses. Any development should follow a no-adverse impact approach. The no-rise floodway standard should be applied to the limited development that may be permitted in this highest hazard flood zone. Existing development within the highest hazard flood zones could be targeted for buyouts (before they sustain repetitive losses or incur substantial damage). Restrictions should be placed on expenditures of federal funding in the highest hazard flood zone areas, such as not funding in-place mitigation of existing structures and denial of flood insurance and existing/future disaster assistance for new structures built after mapping of this highest hazard flood zone. If federal funds were to be spent in these areas, then it would be for the restoration of natural floodplain features. Existing floodways could also be regulated as highest hazard flood zones until updated maps are available depicting this new zone.

The time has come for floodplain management programs to expand beyond the objective of keeping development “reasonably safe from flood damage” and the focus on “how to build” in the floodplain. Floodplain management policies should do more to promote public safety within our nation’s floodplains. The first step toward achieving this is for FEMA mapping products to delineate the highest flood risk areas within which development is prohibited, or, at best, ill advised. The second step would then be to develop new guidance in 44CFR60.3 to strongly regulate those areas against encroachment, while promoting a “back to nature” approach for re-establishing the natural and beneficial functions of floodplains, wetlands, and their associated ecosystems. Thank you for considering this suggestion.

Public Comment #4

From: Association of State Floodplain Managers

The Association of State Floodplain Managers believes the following issues are critical input to developing a proposed vision statement for the flood mapping program and should be incorporated into the 2020 TMAC report or the 2021 work plan. Some of these have been addressed by TMAC in the past, but have not been implemented by FEMA. The TMAC may need to provide options or added information to assist FEMA in implementing these key issues, which are:

1. **Atlas 14 updates.**

Accuracy of the flood maps is dependent on a few key inputs, such as expected rainfall precipitation for the 1% rainfall event, up-to-date LIDAR, and appropriate hydraulic models. One of these inputs is particularly troublesome, the expected 1% rainfall estimate, especially for urban areas. This estimate is most frequently obtained from Atlas 14 publications for watersheds across the nation—there are currently 11 Atlas 14 volumes covering different regions of the nation. The NOAA/National Weather Service publication is developed based on all the years of record so the calculated flood levels are as accurate as possible, but based on past rainfall data. **PROBLEM:** A number of the Atlas volumes are far out of date and no volume has been developed for the 5 Northwest states, leaving them to use other NOAA precipitation data that is over 50-years old. Consequently, the rainfall estimates for these areas do not reflect the recent decades of increased rainfall intensity. As a result, flood maps consistently underestimate risk and do not properly show which properties need to buy flood insurance. It is noted that the Atlas 14 volume (No. 11) for Texas, including Houston was being worked on when Hurricane Harvey struck, and the updated 1% rainfall increased from 13” in 24 hours to about 18”, a 38% increase. Flood insurance claims for Harvey were beyond the mapped 1% and 0.2% floodplain. Funding for updates to Atlas 14 need to be a federal data responsibility, but NOAA gets no such funding and relies on voluntary contributions from states and other agencies.

RECOMMENDATION: TMAC should recommend NOAA be funded to update every Atlas 14 in the nation every 5 years.

2. **Future conditions mapping.**

In the 2012 NFIP reform legislation (BW-12) Congress directed FEMA to incorporate a number of changes in how they develop and display flood maps. These included showing areas of risk based on expected future conditions for sea-level rise, and increased rainfalls due to a warming climate. In the 8 years since that Congressional directive, the NFIP has not incorporated these updated approaches. Development in the floodway fringe and upstream in the watershed are also future conditions that result in increased flood levels over time. **PROBLEM:** The result of not including this information in FEMA’s current mapping process is that every flood map produced by the NFIP is outdated by the time it is issued, resulting in development occurring outside the identified SFHA that is now or soon will be inside the SFHA. This results in development that does not have up-to-date risk information. Additionally, even those who buy flood insurance pay less than full-risk rates, impacting the solvency of the NFIP.

RECOMMENDATION: TMAC should recommend FEMA move to identify and utilize future conditions on all flood maps. This may require added layers in the digital models for the current flood levels used for flood insurance rating and expected flood levels for future years (e.g. for year 2040, 2070 and 2100). In communities where FEMA provides maps with a measurable amount of floodway surcharge (greater than 0.1 feet) FEMA should develop mapping that shows the additional area that will be inundated beyond the Special Flood Hazard Area as the artificially created floodway fringe is filled. This would help discourage community adoption of floodways with a surcharge that opens up a significant portion of the natural floodway to development, increases flood damages to

community residents and increases the area inundated during the base flood. These maps would provide a basis for community planning, adoption of higher standards (i.e. freeboard), and siting of critical facilities like hospitals, emergency shelters and evacuation routes, but would not be used for regulations unless the community so chose.

3. Publicly available dam failure inundation maps.

Recent dam failures or near failures have shown the need for those living in dam failure zones to be aware they are at risk. Nearly 200,000 people had to be evacuated when the Oroville Dam, the highest dam in the US, threatened failure. In 2017, significant damage to the Dam's principal and emergency spillway and continued heavy rainfall resulted in the concern that the dam was extremely close to failure, which would have released a huge torrent of water into the downstream areas flooding homes of thousands of people. Emergency officials ordered this large evacuation to prevent the potential for thousands of deaths. In the 2012 NFIP reform legislation (BW 12) Congress directed FEMA to also show areas of residual risk that will be flooded behind levees and below dams if the structure is overtopped or fails. **PROBLEM:** after 9/11, DHS was created and looked at every possibility where terrorists might damage critical infrastructure and therefore threaten US lives. DHS felt that terrorists might blow up dams to harm people below the dams and concluded that dam failure maps should not be available to the public. Many dam experts in the nation do not see this as a realistic possibility as the amount of explosive to blow up a large dam could not be moved into position without early detection, and even then, there is only a remote chance that the explosives would be a feasible method to fail a large dam. A far larger risk exists to those living below a dam if the dam fails due to heavy rainfall or structural failure. This was illustrated again in 2020 when the Edenville Dam failed during flooding in central Michigan. That dam failure lead to failure of another dam downstream, which then threatened people and property downstream of the dams, including the City of Midland. About 10,000 people downstream of the dam failures were evacuated. The same was true in 2015 and 2016 when over 80 dams failed in South Carolina. Almost none of the people evacuated at Oroville or MI knew they were in a dam failure zone, or had insurance to cover the potential damages.

In 2016, the FEMA Technical Mapping Advisory Council report detailed the origin on the current policy regarding restricted access to failure inundation mapping and reflected TMAC's thoughts on the matter:

An ongoing issue is the lack of public access to dam failure inundation information. Much of such data from the Federal Government is restricted; it is usually made available to emergency management personnel, but not to the general public. In 2004, The Department of Homeland Security (DHS) released its Security Classification Guide for the Protection of Critical Infrastructure and Key Resources – Information for Dams and Related Facilities, which listed dam failure inundation maps as “For Official Use Only.” This guide was updated in 2010 and the update was silent on dam failure inundation maps.

In 2015, the Dams Sector Government Coordinating/Sector Coordinating Councils Information Sharing Workgroup developed a white paper outlining the benefits and potential risks associated with sharing dam safety and security information with stakeholders. Although no consensus was reached, a majority of the workgroup members agreed that the public should not be able to access information related to inundation maps. A minority of the workgroup members believed inundation maps should always be made easily accessible so members of the public can make personal decisions about risk and promote risk awareness.

At the state level, the availability of this information ranges widely. The Association of State Dam Safety Officials does not have an official position on this issue. Supporting wider public availability, a Virginia law passed in 2008 essentially requires that all inundation mapping developed for state-regulated dams be made available to communities and the public. Organizations like the Association of State Floodplain Managers believe that the benefits of public availability of inundation mapping far outweigh any perceived security risks of that data by adversaries for exploitation.

This position would be consistent with the congressional intent of the National Flood Mapping Program (BW-12) requirement to provide inundation mapping on FIRMs. As the flood mapping program transitions to incorporate the statutory requirements of the National Flood Mapping Program, the technical credibility of the program will be negatively impacted if residual risk and inundation data is not developed and provided to communities. The 2012 NFIP legislation recommends the National Flood Mapping Program Outputs provide technically credible products into the future: FEMA should work to identify residual risk areas behind levees, and other flood control structures and downstream of dams.

Recently, USACE has determined that it is in the public interest to provide dam failure inundation mapping, and that all dam failure maps in their portfolio will be made public and available through the National Inventory of dams by summer 2021.

RECOMMENDATION: TMAC should continue to advise FEMA to make progress on this as well as other recommendations for residual risk information (e.g. failure areas from levees, levee protected areas and level of protection by a levee or dam) from the mandatory Biggert Waters legislation inclusions on FEMA's flood maps. It is recognized that FEMA's continued evolution in serving up these data via platforms such as the NFHL actually provide an opportunity to work with the USACE and build an interface to serve that data much like the public-facing map interface that was established with Coastal Barrier Resources Area (CBRA) zones.

4. Integrating flood risk and natural floodplain functions.

There has been a significant increase in the intensity of precipitation events across most of the U.S. over the last fifteen years, resulting in a significant increase in flood losses. More and more often, federal, state and local efforts to protect and restore natural floodplains and wetlands are being employed to support flood risk reduction while also improving overall watershed health. For example, the U.S. Army Corps of Engineers has

used the hydro geomorphic approach to mapping for compensatory mitigation projects to ensure that any impacted wetland or stream functions are replaced by the mitigation project. Similarly, the U.S. Forest Service recently completed its National Riparian Inventory Base Map, which recognizes the dynamic and transitional nature of riparian areas by accounting for hydrologic, geomorphic and vegetation data as inputs.

PROBLEM: The NFIP's Community Rating System (CRS) promotes comprehensive floodplain management planning, analysis and evaluation related to the protection of the natural functions of floodplains and habitat protection. Communities that produce maps of the natural functions and resources of their flood-prone areas can receive CRS credit for taking that step toward broader management of their local floodplains. However, FEMA's Risk Mapping, Assessment and Planning (MAP) program generally only includes data on elevation, hydrology, infrastructure, hydraulics and land use for the purpose of informing NFIP rates, not data on natural systems which can reduce flooding, or significant habitat which might be critical for endangered or threatened species.

RECOMMENDATION: Floodplain management efforts and compliance with the requirements of the ESA would be dramatically improved if they were informed by geospatial data that illustrates floodplain functions (including wetlands, coastlines, streams and rivers) as dynamic, hydrologically connected components of a larger watershed to support more strategic local land use decisions (e.g., restoration and/or open space conservation priorities), reducing flood risk while increasing co-benefits such as recreation, clean drinking water, and avoided damage costs.

The ASFPM and its 37 Chapters represent over 19,000 state and local officials as well as other professionals engaged in all aspects of floodplain management and flood hazard mitigation including management of local floodplain ordinances, flood risk mapping, engineering, planning, community development, hydrology, forecasting, emergency response, water resources development and flood insurance. All ASFPM members are concerned with reducing our nation's flood-related losses. More information on the Association, its 14 policy committees and 37 State Chapters can be found at: www.floods.org.

Public Comment #5

From: National Wildlife Federation
Jessie Ritter
Director of Water Resources & Coastal Policy

To whom it may concern:

On behalf of the National Wildlife Federation, our more than six million members and supporters, and affiliate conservation organizations in 52 states and territories, we write with specific recommendations for the Technical Mapping Advisory Council (TMAC) to incorporate into its flood hazard mapping program priorities, including through the 2021 TMAC work plan and 2020 TMAC report to the Federal Emergency Management Agency (FEMA), and in development of a proposed vision statement. While TMAC has addressed some of these issues in the past, not all have been implemented by FEMA and we encourage TMAC to provide additional input to FEMA.

We believe the following specific recommendations are critical for TMAC's work to ensure that FEMA's flood maps provide up-to-date information that promote sound, sustainable community land-use decisions that will improve long-term flood risk management, community resilience, and also deliver other environmental, recreational, and economic benefits:

Improve mapping of natural floodplain functions. As the intensity of precipitation events has increased in the past fifteen years across most of the U.S., federal, state and local efforts increasingly turn to protecting and restoring natural floodplains and wetlands to reduce flood risk while also improving overall watershed health. Planning that takes into consideration the dynamic nature of hydrological natural features such as wetlands, coastlines, and streams, can lead to better outcomes for communities. Additionally, there is ample and growing evidence that natural features can be extremely effective and cost-effective for reducing flood risk and damages at a community scale. We strongly encourage the TMAC to examine a recently released report, *The Protective Value of Nature: A Review of the Effectiveness of Natural Infrastructure for Hazard Risk Reduction*, to find many examples of the performance of natural features like wetlands and floodplains for flood risk reduction.¹ In addition, natural features provide numerous ecosystem service benefits to communities, including improving air and water quality, enhancing critical fish and wildlife habitats, increasing recreational opportunities and land values, recharging groundwater, and sequestering carbon pollution, which result in net benefits to society.

Currently, FEMA's Risk Mapping, Assessment and Planning (MAP) program generally only includes data on elevation, hydrology, infrastructure, hydraulics and land use for the purpose of informing NFIP rates, not data on natural system functions. This represents a huge gap in our true understanding and communication of flood risk to communities. Further, by failing to adequately account for the flood risk reduction potential of natural system features in mapping efforts, we risk communities and local decision-makers under-valuing their protection as development decisions are made.

There are efforts underway among several other federal agencies, to create maps and data on wetland and floodplain functions, such as the U.S. Forest Service's National Riparian Inventory Base Map and the hydrogeomorphic approach (HGM) used by the Army Corps of Engineers for compensatory mitigation projects to ensure that any impacted wetland or stream functions are replaced by the mitigation project. Additionally, the U.S. Fish and Wildlife Service's National Wetlands Inventory (NWI), which now incorporates hydrography data, included past efforts to evaluate natural wetland function on the landscape.

As it develops its 2021 workplan, TMAC should prioritize consideration of approaches for a more systemic and integrated way of accounting for natural floodplain function in FEMA's mapping efforts. This is a critical step to support sound local land use decisions that reduce flood risk while improving numerous co-benefits such as healthier wildlife populations, clean drinking water, outdoor recreation, and avoided flood damages.

Include an Advisory Layer (Advisory Flood Map) with future conditions mapping in all new flood maps and map updates as quickly as possible, and make this information

available for community non-regulatory use. In the 2012 National Flood Insurance Program (NFIP) reform legislation, Congress directed FEMA to incorporate a number of changes in how they develop and display flood maps, including showing areas of risk based on expected future conditions for sea level rise and increased rainfalls due to a warming climate. However, in the 8 years since that Congressional directive, the NFIP has not incorporated these updated approaches. As a result, NFIP flood maps are outdated at the time of issue, resulting in development occurring outside the identified Special Flood Hazard Area (SFHA), that is now or soon will be inside the SFHA, without consideration for future risks. All new Flood Insurance Rate Maps should include the 0.2-percent annual chance floodplain and include an Advisory Layer (Advisory Flood Map) for purposes of local building and zoning code enforcement that includes future conditions that affect flood risk such as sea level rise, subsidence, precipitation trends, erosion, and other factors. Such an approach is consistent with TMAC's own prior recommendations. Including future conditions in flood maps may require added layers in the digital models for the current flood levels and expected flood levels for future years. The Advisory Flood Maps would not be used for purposes of calculating annual flood insurance premiums but instead focus on where minimum building, zoning, and land use requirements apply. This will help to ensure that communities have information needed to make sound, sustainable investments that are "future-proofed" to account for increasing risks due to climate change and sea-level rise.

In addition, TMAC should recommend NOAA be funded to update every Atlas 14 in the nation every 5 years. Currently, many of the Atlas map publications – which are frequently relied upon for key flood map inputs such as expected rainfall precipitation for the 1% rainfall event, Lidar data, and hydraulic models – are outdated. Some Atlas publications are more than 50 years old, with a resulting outdated representation of flood risk. **Furthermore, TMAC should continue to advise FEMA to make dam failure inundation maps publicly available.** Recent dam failures and near failures have demonstrated the need for people living in dam failure zones to be aware of that risk. With the risk of dam failures increased by outdated dam infrastructure or increasing precipitation event intensity, it is in the public interest to make all dam failure maps public.

Implementing the above recommendations would also advance two of the four elements and several associated objectives that FEMA identified as areas it "wants to improve in the coming years" in its vision for its future flood hazard mapping:²

- Element 1: "Shift from a binary to a graduated view of flood risks" with associated objectives including to "manage flood impacts, and increase community and individual resilience" and to "offer more comprehensive risk understanding to improve land-use decisions."
- Element 3: "Increase access to flood hazard data to improve resulting mitigation and insurance actions at the local and private levels" with the associated objectives to "make flood risk data easy to obtain and understand," "change behaviors related to flood risk and drive action," and "make information mainstream to improve decision making."

The National Wildlife Federation urges TMAC to implement these recommendations as it develops its 2021 workplan and vision statement. We believe these approaches will help improve the nation's flood risk management, reduce future flood damages, provide the public with access

to information to make their communities more resilient and to recognize the value of our natural systems for their inherent risk reduction benefits and many co-benefits. We appreciate this opportunity to provide comment to TMAC.

Thank you for your consideration.

1 Glick, P., E. Powell, S. Schlesinger, J. Ritter, B.A. Stein, and A. Fuller. 2020. The Protective Value of Nature: A Review of the Effectiveness of Natural Infrastructure for Hazard Risk Reduction. Washington, DC: National Wildlife Federation.

2 Michael Grimm's July 8, 2019 Letter to TMAC, in Technical Mapping Advisory Council 2019 Annual Report Memo, pages A-1 to A-3, https://www.fema.gov/media-library-data/1587482553472-6eb02ebfca359675672bc5ffd022910/Technical_Mapping_Advisory_Council_2019_Annual_Report_Memo.pdf.

Public Comment #6

From: The Association of State Floodplain Managers Risk Communications and Outreach and International Committees

For the 2020 tasking, the Federal Emergency Management Agency (FEMA) asked the Technical Mapping Advisory Council (TMAC) to:

1. Work with stakeholders to identify best practices that can be incorporated into a future flood hazard and flood risk identification program that will equip them to:
 - Understand flood hazards in a graduated way
 - Identify flood risk to improved property in a graduated way, and
 - Promote increased investments in flood mitigation through new incentives.
2. Provide a framework for FEMA's transition to the envisioned flood hazard and flood risk identification program by:
 - Identifying obstacles
 - Highlighting opportunities
 - Identifying useful portions of the current program that are important to continue, and
 - Proposing specific roles that could be played by State, local, Tribal, Territorial, private, non-profit, academic, and other entities in assessing, communicating, and managing flood hazards and risks.

In support of this tasking, and in response to the Federal Register publication requesting input by July 24, 2020 from National Flood Insurance Program (NFIP) stakeholders, the Association of State Floodplain Managers (ASFPM) Risk Communications and Outreach (RCO) and International Committees submit the following joint input.

Our Committees have an interest in assuring that flood risk is communicated effectively to inform decision-making at the individual and local level, and that risk communication products are designed with end-users and the stakeholders they serve in mind. The products developed by the NFIP (Flood Insurance Rate Maps (FIRM), associated Flood Insurance Study (FIS) texts, and non-regulatory FEMA flood risk products) are all "risk communication products" by default. Whether designed for this purpose or not, both technical and non-technical stakeholders use these materials to understand their risk of flooding. These resources are then utilized to support

decisions about development, housing, insurance, or mitigation based on that understanding. The materials are frequently used for purposes beyond their original intent, which was to identify where flood insurance is mandatory, support flood insurance rating (until now), and to support floodplain management objectives.

With the advent of Risk Rating 2.0 and the probabilistic flood hazard information, catastrophic modeling, and mapping data integration data that supports it, FEMA is on the brink of a new era in the NFIP, where a wide array of new products and outcomes are now possible. As FEMA delves into the possibilities of a future program, the ASFPM RCO and International Committees urge FEMA to consider the following opportunities:

- To change the problematic and dangerous “100-year flood” paradigm
- To clearly illustrate that flood risk exists behind levees, dams, and other flood risk management infrastructure
- To re-develop NFIP products, and to do so with users and the stakeholders they serve in mind
- To educate stakeholders and empower community leaders to make informed decisions based on their risk, which will ultimately reduce suffering and flood losses inevitably paid for by the federal tax-payer
- To implement best practices from international programs that also seek to communicate and mitigate flood risk
- To stress the importance of insurance as a supplementary element of protection after avoidance and mitigation portions have been implemented

Changing the 100-Year Paradigm: The NFIP products have driven and continue to support the “100-year” narrative that has become commonplace in the U.S. From a historical perspective, it is interesting to note that the group of experts supporting the Department of Housing and Urban Development led by Gilbert F. White in 1966¹ recommended that flood interval information (such as the 100-year flood) be taken into account as one of many data inputs that the Federal government should provide to States, who would use the information to establish flood hazard areas. There was also widespread agreement that variation in flood risks would need to be considered when delineating an area to be managed. In short, the experts noted that the 1-percent/100-year flood should be taken into consideration, but not necessarily be the standard everywhere. Furthermore, experts never looked at the 1-percent event and said, “this is safe enough for flood protection.”

Redefine “flood hazard areas.” As FEMA re-imagines the program and the products it develops, we see an opportunity to reinvent the program entirely, beginning with the definition of what constitutes an “area of special flood hazard”. The “area of special flood hazard” outlined in the U.S. Code is entirely in the hands of FEMA to define or redefine via regulation. This definition could and should be re-interpreted and re-imagined to be more inclusive than the current regulation, which emphasizes the 1 percent-annual chance flood. For example, an SFHA might include:

- areas where any historical flooding has occurred
- areas of fluvial, pluvial, “urban”/stormwater, coastal, riverine, creek, alluvial fan, or areas of ice-jam flooding

- areas determined by current or former geomorphologic characteristics and processes (for example like the Fluvial Hazard Maps developed in Colorado following the 2013 catastrophic flooding)
- areas protected by dams, levees, or floodplains and wetlands that have been filled and developed

Communities can then determine their own risk tolerances based on the best available information and a clear understanding of the historical and future flood risk.

Language matters. New language is required to support the new risk-informed standard or suite of standards (high, medium, low risk or other language). For example, risk can never be eliminated, should be an essential component of any interaction with communities. A robust reimagining of flood communication must also account for the amount of flood hazard a property is exposed to. A structure that is exposed to 10 feet of flow during a specific flood event is subject to a much greater hazard than a structure exposed to 1 foot of flow in that same flood event. Likewise, even very small flood events may present a significant hazard to a property.

We are not proposing comprehensive language at this time; though we welcome the opportunity to discuss and develop language as the program moves forward. In the meantime, we recommend FEMA consider the significant authority carried by the NFIP to more effectively communicate flood risk to inform decision-making and reduce flood losses across the nation. The language used by the NFIP to talk about flood risk could be a prominent force in changing the face of flood risk, mitigation, and communication for the nation. Therefore, any new messaging developed should be thoroughly planned and thoughtfully executed, as it may become the new language of flood risk communication in the US for another 50 years.

Levees and Dams. Eliminating risk is impossible, and levee-protected lands deserve special treatment in the new direction of Risk Rating 2.0. Prior TMAC reports have discussed the problems associated with levees, including residual risk and risk perception on levee-protected lands that remains unacknowledged by the NFIP, and these issues do not need restating here. Not recognizing and communicating the residual flood risk on levee-protected lands encourages individuals and communities to take uninformed risks—akin to “uninformed consent” in the medical field. This, of course, increases the consequences of flooding when it occurs, including both property damage and loss of life. We owe it to the nation’s communities to ensure they understand their risks, prior to accepting those risks. We propose a number of ideas for the special treatment required of levee-protected lands under Risk Rating 2.0.

- FEMA and the NFIP could (and should) require flood insurance, and flood resilient building designs on lands behind levees and dams; the rate should be commensurate with the risk associated with that levee system or dam. Insurance rates should be reevaluated every time the levee or dam undergoes a risk assessment and should be updated accordingly. Currently, our system communicates “no risk behind levees and dams” because we don’t require insurance or mitigation if a levee is accredited. We recognize this may cause affordability issues for some of our most vulnerable, and we recommend working with programs to develop a rate structure that addresses this issue. However, not requiring insurance or subsidizing insurance fully cannot be an option.

- Land ‘protected’ by levees and dams should still be called, ‘floodplain’ and the concept of “removing properties from the floodplain” must be removed from our vernacular.
- Levee-protected lands should require visible signs of high-water markers of past or future flood events and indication of evacuation routes, or some other visible sign that advises residents that the land is levee- or dam-protected and directs them toward high ground. FEMA has attempted this through the Know your Line Initiative—but sadly (and not surprisingly), cities do not want these signs or reminders in their residential neighborhoods. As a result, signs often go in parks or other areas perhaps less connected to residential properties.
- Each levee segment (similar to the requirement for High Hazard Dams) should have an Emergency Action Plan (EAP) that is written and adopted by the community or neighborhood and not just written by the city’s resident engineer, consultant, or levee sponsor, where it might sit on a virtual or physical shelf. Cities could be incentivized to hold drills or table top exercises to practice their EAP. A similar activity occurs in the CRS program and could be used to incentivize communities, or could be more strictly required.
- Land developers who develop or redevelop property behind levees should be required to put significant funding into a long-term levee maintenance fund as a requirement for developing and selling the floodplain therein. Often developers help build or modify a levee so it is accredited, only then to sell the properties and leave the community. It then becomes the responsibility of the community to maintain the levee. If they cannot raise the funding to do so, the levee falls into disrepair, exposing residents to even greater risk. Developers should be held accountable for a portion of the risk to which they are subjecting residents, including financial support to continuously manage that risk. FEMA could encourage communities to implement such a practice through Community Rating System credits or other incentives.
- FEMA and/or the USACE Silver Jackets Program should provide substantial funding and offer technical expertise to all levee-protected communities to develop and implement effective flood risk communication programs. FEMA has excellent contractors, and the USACE Dam and Levee Safety Programs now deliver specific risk communication trainings to their districts.

Design Products Users and Stakeholders Can Use: The RCO Committee advises great care and attention as the program envisions and develops new products. Recognizing that current Flood Insurance Rate Maps will no longer provide information to support flood insurance rating as Risk Rating 2.0 rolls out, there is an enormous opportunity to redefine and reimagine the products upon which the entire program is based. As with the 100-year terminology, it may be helpful to take a historical view of the NFIP and how the products the program develops today were originally imagined to consider whether these products serve the users and stakeholders they were meant to support. Two examples include the two main regulatory products currently produced by the program: the FIS report and the FIRM.

The FIS report developed to support the FIRMs today can be an enormous resource containing many volumes². It can include multiple sections of text regarding the geography of a community or county, its principal flood problems, its flood history, and other information. The first mention of what may have eventually become the FIS found by the RCO Committee was a set of guidelines first published in 1973³, in which it states, “In addition to the full-scale quadrangle

maps, attractive informational pamphlets that describe the program and the maps will be prepared...” The evolution of an “attractive, informational pamphlet” to what we know of as the FIS today is unknown, but worth considering as FEMA develops the products to support the program of tomorrow.

The FIS and the FIRM work together to provide communities with the information they need to manage floodplain development under the NFIP. The Base Flood Elevation (BFE) is an essential element supporting all aspects of the NFIP, having impacts on whether insurance is mandatory, insurance rates (currently), floodplain management standards, building codes, benefit cost analyses supporting grant applications, etc. A review conducted by Atkins in 2018⁴ found that over 80% of certified documents (such as Elevation Certificates, Elevation Information Forms, MT-EZ Forms, etc.) list an incorrect BFE. If such an important and foundational element of the program is not communicated via the products the program develops, then the products have not been designed with users in mind. Past TMAC recommendations have supported including users in the design stages of new products via user testing and focus groups. If new products are developed in the future, we recommend that these user involvements be an important element of the design process.

Incorporate Best Practices from International Perspectives. Rethinking FEMA flood maps opens a door to explore approaches that have been implemented elsewhere and could potentially be adapted within the US context. Below we summarize a few coming from Europe and Quebec (Canada).

- The watershed scale for the whole territory: EU Floods Directive (2007) applies to all kinds of floods (river, lakes, flash floods, urban floods, coastal floods, including storm surges and tsunamis), on all EU territory. Under the Floods Directive, a preliminary flood risk assessment at a river basin/watershed scale (beyond national boundaries) and associated coastal zones must be carried out to identify areas where potential significant flood risk exists. Current FEMA maps do not cover the US territory in a homogeneous way. A watershed approach for flood risk management covering the whole US territory would allow for a strategic integrated solution to flood risk, instead of the current approach focused on local “protection” measures which can exacerbate human and economic losses elsewhere.
- Detailed flood mapping for areas at risk, taking into account future conditions (e.g. development trends in flood prone areas and climate change): Building on the coarser basin-scale assessment, once areas of flood risk are identified, the EU Floods Directive requires member states to develop more detailed flood hazard maps and flood risk maps for the areas identified as having potential significant flood risk. These maps must identify areas with a medium probability of flooding in addition to extreme events and low probability events, in which expected water depths and velocities should be indicated. Areas with identified potential risk shall indicate the possible impacts to the environment, economic activity, and number of inhabitants residing in the community.
- Different types of information to assess flood hazard: Hazardous areas can be identified using different types of information (H&H models, historical information, geomorphological information, ecological information). FIRMs rely solely on information coming from H&H models. Other countries (France, Spain, Canada) use different types of information to complement the information coming to the models.

Flood risk management plans must be drawn up for hazard zones. These plans are to include measures to reduce the probability of flooding and its potential consequences. They will address all phases of the flood risk management cycle but focus particularly on pre-disaster(mitigation) measures: prevention (i.e. preventing damage caused by floods by avoiding construction of houses and industries in present and future flood-prone areas, or by adapting future developments to the risk of flooding), protection (measures to reduce the likelihood of floods and/or the impact of floods in a specific location, such as restoring flood plains and wetlands), and preparedness (e.g. providing instructions to the public on what to do in the event of flooding). Due to the diverse nature of flooding, Member States are given flexibility on objectives and measures.

- The 3H Method (Quebec): The 3H method, used in pilot projects in Quebec, combines information at a watershed scale from Hydraulic and Hydrologic Models, Historical floods, and Hydrogeomorphology. This expands the existing goals of the regulatory flood maps towards a more sustainable approach to managing floods, so the focus is not only on reducing flood risk in hazardous zones (social goals) but also preserving river connectivity and natural processes necessary for the healthy functioning of floodplain ecosystems (ecological goals), especially in non-urbanized areas.

Communicate risk; then avoid, mitigate, and insure. The RCO Committee recognizes the importance of the full suite of structural and nonstructural flood risk management measures needed to safeguard communities, life, and our environment against flooding. Risk communication is especially important during the early stages of floodplain mapping and community decision-making regarding land use and which flood risk management actions to take. This gives decision makers, residents, and business owners the initial opportunity to understand their risk and shape their communities and future flood losses based on the level of risk they are willing to tolerate. They may choose to avoid risk altogether by not building in harm's way, or they may choose to mitigate that risk in some way, through structural measures or floodproofing. Flood insurance could then be used as a last resort tool to insure (and communicate) the residual risk. All too often, however, flood insurance and risk communication do not become part of the discussion until a community has already accepted (either deliberately or inadvertently) the risk. Additionally, the insurance discussion often takes away from understanding and mitigating the true risk of disaster losses faced by communities.

We firmly believe that risk needs to be fully and fundamentally understood, then communicated to community members and decision makers early in the process. Furthermore, insurance should be seen as a last resort to compliment avoidance, nonstructural, and structural measures that have been selected as part of that community's flood risk management plan.

¹ House Document 465, A Unified National Program for Managing Flood Losses, Task Force on Federal Flood Control Policy, 1966

² The most recent Cook County, Illinois, FIS has 7 volumes and 749 pages

³ National Program for Managing Flood Losses, Guidelines for Preparation, Transmittal, and Distribution of Flood-Prone Area Maps and Pamphlets, U.S. Department of the Interior, Geological Survey, 1973, Revised 1976

⁴ Unpublished report, Office of the Flood Insurance Advocate, 2018

Regulations.gov Comments

Comment submitted by Association of State Wetland Managers

Marla J. Stelk
Executive Director

To the Office of Chief Counsel,

The Association of State Wetland Managers (ASWM) submits the following comments to the Technical Mapping Advisory Council (TMAC) regarding the proposed vision statement for the Federal Emergency Management Agency's (FEMA) mapping program per Federal Register Docket ID FEMA-2014-0022.

ASWM is a nonprofit professional organization that supports the use of sound science, law, and policy in development and implementation of state and tribal wetland programs. Since 1983, our organization and our member states and tribes have had long-standing positive and effective working relationships with federal agencies in the implementation of both regulatory and non-regulatory programs designed to protect our nation's aquatic resources.

ASWM is a founding member of the Natural Floodplain Functions Alliance (NFFA), an affiliation of nonprofit and private organizations, government agencies and individuals dedicated to the protection and preservation of the natural functions of floodplains, including coastal areas. ASWM is also a founding member of the Wetlands Mapping Consortium (WMC), an interdisciplinary group of wetland scientists and managers interested in mapping and monitoring wetlands with remotely sensed images and/or using the resultant products to best manage wetland resources.

Given ASWM's focus on natural aquatic ecosystems, including wetlands, streams, coasts, and the floodplains that contain them, the comments below are focused solely on that aspect of FEMA's mapping program.

FEMA's Fact Sheet titled "The Community Rating System works to Protect Natural Floodplains" states that the Community Rating System (CRS) of the National Flood Insurance Program (NFIP) "rewards a community-centered approach to reducing flood hazards that also protects the natural and beneficial functions of a community's flood-prone lands." Further, the fact sheet states:

"The CRS promotes comprehensive floodplain management planning, analysis and evaluation related to the protection of the natural functions of floodplains and habitat protection. Credit is available for community-adopted management plans that protect and enhance one or more of the natural functions and native species of the local floodplain. The CRS encourages analysis of the potential impacts of growth and development on the local environment, followed by implementation of specific projects for protecting and restoring habitat and other natural functions."

The CRS program issues credits to communities that produce maps of the natural functions and resources of their flood-prone areas. Unfortunately, many communities are ill-equipped to produce maps of floodplain and wetland functions, generally due to a lack of expertise, a lack of understanding regarding the importance of floodplain functions, and/or a lack of funding. With

the significant increases in flooding events, both natural disasters and “nuisance” flooding, communities find themselves embracing the old “tried and true” structural methods for flood control such as sea walls and groins, as they are well understood strategies, supported by existing federal programs and regulations.

Floodplains exist within a greater watershed context and the functions that they provide vary depending on the condition of the floodplain and other land uses within the watershed. As such, floodplain maps that provide data on floodplain functions and condition need to be created on a watershed scale. However, FEMA’s Risk Mapping, Assessment and Planning (MAP) program generally only includes data on elevation, hydrology, infrastructure, hydraulics and land use for the purpose of informing NFIP rates, not data on natural system functions which can reduce flooding, improve water quality, or consider significant habitat which might be critical for endangered or threatened species.

Currently there are efforts among several other federal agencies, to create maps and data on wetland and floodplain functions, such as the U.S. Forest Service’s National Riparian Inventory Base Map (which recognizes the dynamic and transitional nature of riparian areas by accounting for hydrologic, geomorphic and vegetation data as inputs) and the hydrogeomorphic approach (HGM) used by the U.S. Army Corps of Engineers for compensatory mitigation projects to ensure that any impacted wetland or stream functions are replaced by the mitigation project. Additionally, the U.S. Fish and Wildlife Service’s National Wetlands Inventory (NWI), which now incorporates hydrography data, included past efforts to evaluate natural wetland function on the landscape.

FEMA’s floodplain management efforts would be dramatically improved if they were informed by geospatial data that illustrates floodplain functions (including wetlands, coastlines, streams and rivers) as dynamic, hydrologically connected components of a larger watershed to support more strategic local land use decisions (e.g., restoration and/or open space conservation priorities), reducing flood risk while increasing co-benefits such as recreation, clean drinking water, habitat for threatened and endangered species, and avoided damage costs.

ASWM appreciates the opportunity to provide comment to TMAC on priorities for FEMA’s mapping program and vision. While these comments have been prepared by ASWM with input from the ASWM Board of Directors, they do not necessarily represent the individual views of all states and tribes; we therefore encourage your full consideration of the comments of individual states and tribes and other state associations. Please do not hesitate to contact me should you wish to discuss these comments.

[Comment submitted by The Nature Conservancy](#)

Thank you for the opportunity to comment prior to the Technical Mapping Advisory Council’s (TMAC) meeting on July 27, 2020. The Nature Conservancy (TNC) believes there three critical issues that the Council needs to incorporate into a proposed vision statement for the flood mapping program and include in the 2020 TMAC report and 2021 work plan: future conditions mapping, integrating flood risk and natural floodplain functions, and Atlas 14 updates. TMAC has addressed some of these issues in the past but FEMA has not made meaningful changes.

TNC urges TMAC to ensure FEMA's consideration of these issues. Should you have any questions about these recommendations, please reach out to Sarah Murdock (smurdock@tnc.org), TNC Director of US Climate Resilience and Water Policy.

TNC is a global conservation organization dedicated to conserving the lands and waters on which all life depends. Guided by science, we create innovative, on-the-ground solutions to the world's toughest challenges so that nature and people can thrive together. We are tackling climate change, conserving lands, waters and oceans at unprecedented scale, providing food and water sustainably and helping make cities more sustainable. Working in all 50 states and 72 countries, we use a collaborative approach that engages local communities, governments, the private sector and other partners, including farmers, ranchers and other landowners.

TNC engages and invests in conservation and restoration projects in varied ecosystems throughout the United States that result in flood risk reduction. We have drawn on our extensive project experience and expertise in carrying out this work to offer the following comments on these three issues. Incorporating additional data sets and information into FEMA map products will greatly enhance the quality of community vulnerability studies. NGOs like TNC and private companies create decision support tools to assist and supplement the vulnerability assessment process. TNC has developed several such tools such as our coastalresilience.org and Floodplain Prioritization Tool. Adding additional layers of data to FEMA's flood maps will greatly improve communities' ability to develop robust vulnerability assessments and associated strategies aimed at ultimately reducing flood disaster risk.

Future conditions mapping

In the 2012 National Flood Insurance Policy (NFIP) reform legislation, Congress directed FEMA to incorporate future conditions in development and display of flood maps. In the 8 years since that congressional directive, the NFIP has not incorporated future conditions into its maps. Because of this, every flood map produced by the NFIP is outdated by the time it is issued. As a result, communities throughout the nation continue to develop in areas that are not mapped in the NFIP-marked Special Flood Hazard Area (SFHA) without knowing that the SFHA will soon shift due to climate change. Developers are investing in these properties based on inaccurate risk information. Property owners within or outside of the NFIP-marked SFHA also have inaccurate risk information which means they purchase inaccurately rated flood insurance or don't purchase flood insurance at all. Both issues greatly impact the solvency of NFIP.

Recommendation:

TMAC should recommend FEMA move to incorporate future conditions in all flood maps. This may require added layers in the current flood level digital models, which are used for flood insurance rating, as well as added layers in the future expected flood level models.

Integrating flood risk and natural floodplain functions

Over the past fifteen years, the U.S. has experienced increasingly intense precipitation events that have resulted in property and infrastructure destruction and loss of life. In response, federal, state, and local stakeholders have increasingly employed natural floodplain and wetland restoration to reduce flood risk and improve overall watershed health. The NFIP's Community Rating System (CRS) promotes comprehensive floodplain management planning and analysis of natural floodplain function and habitat protection. However, FEMA's

Risk Mapping, Assessment and Planning (RiskMAP) program generally lacks incorporation of natural systems and significant habitat data. This program primarily focuses on elevation, hydrology, infrastructure, hydraulics, and land use data. Because of this, the RiskMAP program does not help inform and facilitate consideration of nature-based solutions, an important and powerful tool in flood risk mitigation and endangered species protection.

If RiskMap products incorporated geospatial data that illustrates floodplain functions (including wetlands, coastlines, streams and rivers) as dynamic, hydrologically connected components of a larger watershed, this would result in better local strategies including restoration and land conservation prioritization. This would reduce flood risk while increasing co-benefits such as recreation, clean drinking water, and avoided damage costs. Examples of existing models that capture aspects of floodplain function include the U.S. Army Corps of Engineers' hydrogeomorphic approach to mapping for compensatory mitigation projects. This approach ensures any impacted wetland or stream functions are replaced by the mitigation project. Similarly, the U.S. Forest Service recently completed its National Riparian Inventory Base map which recognizes the dynamic and transitional nature of riparian areas by accounting for hydrologic, geomorphic and vegetation data as inputs.

Recommendation

TMAC should recommend that FEMA incorporate natural floodplain function and habitat analysis into its RiskMAP program. This would increase development and implementation of local natural and nature-based strategies.

Atlas 14 updates

Precipitation data for the 1% rainfall event, updated LiDAR data, and appropriate hydraulic models are critical to creating accurate flood maps. The precipitation data in flood maps often comes from Atlas 14 publications, which are precipitation frequency atlases produced by National Oceanic and Atmospheric Administration (NOAA). However, a number of the Atlas publications (produced by states or regions) are far out of date, with some being decades old. This means flood maps consistently underestimate risk and do not accurately show which properties need to buy flood insurance.

One reason for the out of date Atlas 14 volumes is a lack of guaranteed federal funding. Funding for updates to Atlas 14 needs to be a federal data responsibility yet NOAA currently relies on voluntary contributions from states and other agencies to fund updates to the volumes.

Recommendation:

TMAC should recommend NOAA receive annual federal funding to update every Atlas 14 publication every 5 years.