# TMAC

## Technical Mapping Advisory Council Meeting
## April 14 – 15, 2016

**TMAC Members**

Juliana Blackwell
Nancy Blyler
Richard Butgereit
Mark DeMulder
John Dorman
Leslie Durham
Scott Edelman
Steve Ferryman
Carrie Grassi
Chris Jones
Howard Kunreuther
Wendy Lathrop
David Mallory
Robert Mason
Christine Shirley
Cheryl Small

**Subject Matter Experts**

Chad Berginnis, CFM, Association of State Floodplain Managers (ASFPM)
Bill DeGroot, P.E., F. ASCE, Urban Drainage and Flood Control District (UDFCD), retired
Jon Janowicz, P.E., US Geological Survey Water Science
Doug Marcy, National Oceanic and Atmospheric Administration (NOAA)
Tim Murphy, P.E., CFM, Flood Control District of Maricopa County
Maria Honeycutt, National Oceanic and Atmospheric Administration (NOAA)**
Suzanne Jiwani, P.E., CFM, Minnesota Department of Natural Resources
Steve Story, P.E., CFM, Montana Department of Natural Resources and Conservation

**Government Attendees**

Kathleen Boyer, FEMA, TMAC DFO
David Bascom, FEMA*
Mark Crowell, FEMA, TMAC ADFO
Sarah Ice, FEMA*
Andy Neal, FEMA**
Lynda Pilgrim, FEMA
Rick Sacbibit, FEMA**

**Registered Public Attendees**

Angela Bidnick, Booz Allen Hamilton**
Susan Gilson, National Association of Flood and Storm Water Management Agencies (NAFSMA)
Gib Jones, Dewberry
Michelle McQueeney, J M Global**
Scott Schelling, Baker International**

**Support Staff**

Heidi Carlin, AECOM
Kirsten Folkedal, Booz Allen Hamilton
Laura Karnas, Booz Allen Hamilton
Jen Marcy, Atkins Global
Krista Bethune Melnar, AECOM
Meredith Tull, Booz Allen Hamilton
Adam Warfield, Booz Allen Hamilton

**Attended Day 1 Only*
***Attended Day 2 Only*

## Purpose

The purpose of the meeting is to allow the Technical Mapping Advisory Council (TMAC) members to hear from Subject Matter Experts (SMEs) on topics related to the *2016 TMAC Annual Report* and *2016 TMAC Review Report*, confirm report assignments and outlines, and discuss progress on topic areas included in the reports.

# April 14, 2016

## Welcome/ Call to Order/ Roll Call

Ms. Kathleen Boyer, TMAC Designated Federal Officer (DFO), welcomed members and participants to the meeting. She then introduced Mr. Mark Crowell, Federal Emergency Management Agency (FEMA), who serves as the TMAC Alternate DFO (ADFO). Ms. Boyer proceeded with a roll call of TMAC members and provided an overview of the Adobe Connect virtual meeting functions. She reminded everyone of the *Federal Advisory Committee Act* (FACA) compliance provisions. Ms. Boyer thanked the Council for their participation and turned the meeting over to Mr. John Dorman, TMAC Chair.

## Meeting Objectives/ Logistics

Mr. Dorman provided an overview of the agenda and said the objective of the day's meeting was to allow TMAC members to (1) discuss and coordinate the two TMAC report delivery dates and resources; (2) hear from subject matter experts (SMEs) and gain better understanding associated with *2016 TMAC Review Report* and *2016 TMAC Annual Report* topics / issues; (3) receive updates on *2016 TMAC Review Report* and *2016 TMAC Annual Report* topics; and (4) communicate and address any issues or topics.

## Adjustments

Mr. Dorman explained that FEMA has requested the Council submit the *2016 TMAC Review Report* no later than July 1, 2016. Given the time needed for final production, 508-compliance and delivery to the FEMA Administrator, this means the report needs to be finalized and approved by the first week of June. Mr. Dorman proposed suspending five of the *2016 TMAC Annual Report* topics until after the submission of the *2016 TMAC Review Report* so that more resources can be made available to help expedite the writing of the *2016 TMAC Review Report*. The proposed topic adjustments are as follows:

Continue:

1. Flood Risk - Standards & Guidelines: for data, models, analysis and products
2. Effective Communication of Hazards and Risk
3. Flood Hazard Identification and Risk Assessment: Study Process Management
4. Database-Derived, Digital Display Implementation Plan - Tasks, Process, Schedule
5. Flood Risk Rated Insurance - Documented Dependencies with Flood Hazard and Risk Data, Models, Methodologies

Suspend:

1. National 5-Year Flood Hazard and Risk Assessment Maintenance Methodology
2. Framework Core Data Management Plan
3. Transition Plan from 1% Annual Flood Determination to Structure-Specific Flood Frequency Determination - Tasks, Process, Schedule
4. Future Conditions Mapping and Risk Analysis – Pilots
5. Cooperating Technical Partners: Metrics, Process and Delegation Methodology

In the interest of expediting *2016 TMAC Review Report* delivery, the TMAC will submit the *2016 TMAC Annual Report* by January 1, 2017. Mr. Dorman will work with support staff to adjust the schedule for report production and plan to conduct the final vote and sign off for the *2016 TMAC Annual Report* for the beginning of December. Mr. Dorman will send out a doodle poll regarding changes in 2016 meeting dates past June.

**2016 TMAC Review Report Discussion**

Mr. Scott Edelman, TMAC member and *2016 TMAC Review Report* subcommittee Chair, led the Council in a discussion on report progress. He reviewed the report production schedule, culminating in a July 1, 2016 submittal to the FEMA Administrator. Mr. Edelman announced that he would contact members with suspended *2016 TMAC Annual Report* topics to help with the *2016 TMAC Review Report* writing and production. He then introduced four SMEs that are helping write report topics, Mr. Steve Story, Mr. Jon Janowicz, Mr. Chad Berginnis, Mr. Tim Murphy and Mr. Bill DeGroot.

Ms. Grassi provided an overview of section 4, *Review of FEMA's Flood Mapping Program Quality Process*. Ms. Grassi noted that FEMA does not appear to have clear guidance or a checklist. She asked if that would even be necessary given the number and complexity of various models in all of the regions. Mr. Chris Jones, TMAC member, responded that guidance is needed and would be helpful in determining what models are appropriate when there are various to choose from. Ms. Sally McConkey, TMAC member, said that on the riverine side, there may be the same concern in the future regarding 2-Dimension (2D) and unsteady models and which is appropriate to use. The *2015 TMAC Annual Report* stated that FEMA needs standards and guidelines on how and when to use certain models. Mr. Robert Mason, TMAC member, suggested checking to see what other Federal and State agencies have for guidance, as well as checking with the local communities as they have knowledge of the severity of historic floods. Mr. Tim Murphy, SME said that FEMA's new thirty day review period for models might need to be factored into this discussion.

Ms. Grassi asked if this discussion was right for the quality assurance/quality control (QA/QC) section or if this topic should be in the section regarding the study process. Mr. Jones said that sometimes it does not come to light that contractors have used different models in a study until the QA/QC process, and it needs to be identified before that time. Mr. David Mallory, TMAC member, said there are several decision points in the process and that verifying whether the models were actually reviewed and determined to be appropriate by the community needs to be a part of the process.

Ms. Grassi then asked if the checks, or processes the mapping partners go through are good enough. She asked about FEMA's process for validating this and how FEMA reviews and documents its review of the Intermediate Data Submission (IDS) submissions. Mr. Jones responded that the IDS process is a good, step-by-step movement through a study that ensures there is enough information and data, but is unsure if there is a comparable process for riverine. When an IDS is submitted, the deliverable produced is sent to a FEMA regional office and technical review oversight committee and then sent to FEMA for review. Mr. Dorman noted that in North Carolina, they do not send their IDS' to FEMA, but to an independent contractor who reviews it, as North Carolina has been given the authority to do that. Ms. McConkey said that in her region, Cooperating Technical Partners (CTP) do their own QA/QC. Their Mapping Activity Statements (MAS) include an independent review of the models as part of the business plan and there is a thorough review list that is used, but it is not sufficient for more complex models. Mr. Edelman noted that the question here is not what FEMA is checking but if a quality product, balancing and schedule, is being produced, or if additional checks need to be added.

Ms. Grassi posed several additional questions, including: "Is there an IDS/TSDN process for riverine studies? Should there be?" and "Once you get to the appeals period, it's almost too late to do any additional engineering checks. Contractors aren't scoped for or budgeted for big engineering-related appeals." She noted that the new requirement for a 30-day review will impact both of these questions, and asked if the QA/QC requirements should be adjusted given the new review requirements. Mr. Dorman said that North Carolina is completely database-derived so that all of the QC is done in the database. They can also put out a preliminary map ahead of time because the map is generated in the database. If TMAC continues down the track of recommending a dynamic, database-derived process, then the QA/QC process will become more efficient. Ms. Grassi said that a lot of the QA/QC process seems to be dedicated in later production stages, getting boundaries, panels etc. right and not on things

that actually affect the quality of the product, but the perception of the quality of the product. With a move to a digital environment, time spent on those efforts would be freed up.

Ms. McConkey disagreed with the idea of automating QC of the modeling process, remarking on the methodology and whether all of the available data has been used would not be part of the automated check. The engineering judgment as well as conversations and decision making with the community cannot be automated. That is where the check list or a check-in with the community ensuring all of the options are considered before modeling begins needs to occur. Mr. Mallory said that the checks that are required in order to prepare paper maps are a problem as they do not catch minor mistakes, like incorrect street names, and it would be good to address that issue as part of the QA/QC process in order to reduce the perception of poorly produced maps.

**Public Comment**

Ms. Boyer announced that, per FACA, members of the public are provided the opportunity to provide oral and written comments on the issues to be considered by the TMAC. She requested that speakers limit their public comments to no more than two minutes and said that the public comment period will not exceed 20 minutes. While the public was offered the opportunity to speak, no comments were received.

**Community Engagement Risk Communications**

Mr. Dorman introduced Ms. Sarah Devaney-Ice, FEMA, and said she would present on Community Engagement and Risk Communication (CERC). Ms. Ice first discussed the challenge and need for community engagement. She noted that FEMA recognized the need to evolve how to communicate about flood risks and other hazards. FEMA is focused on supporting the Risk Mapping, Analysis, and Planning (MAP) vision through increasing public awareness that leads to action through community engagement and risk communication, which includes helping promote the benefit of mitigation actions and how to take them. In order to be successful, FEMA must do more than communicate risk data; it must do so in a way that tells a compelling story, engages communities, and results in mitigation action. This new approach requires more than technically credible data; it requires strategic risk communication and community engagement solutions rooted in communication and behavior change science that enables audiences to understand, embrace, and act upon valuable risk data. FEMA aims to be more than strategic communicators and facilitators, FEMA wants to be an integrator, enabling all organizations involved in Risk MAP to work in synergy in order to move the needle on action and increase resilience in communities.

CERC is comprised of individuals from Ogilvy Public Relations and Michael Baker International, who come together to form the joint venture, Resilience Action Partners. In order to meet the challenges and needs and achieve success, integrated community engagement is needed. As projects progress along the Risk MAP lifecycle through integrated community engagement, FEMA hopes to see the following themes emerge: planning and collaboration; building trust and awareness; activating and supporting local leaders and partners; marching toward action; introducing decision-making products; and building momentum. Alongside those themes, there are additional local engagement opportunities to enhance relationships and the delivery process, such as:

- Identify and activate new partners in the pre-discovery phase and throughout;
- Identify communities' flood risk and their propensity to act to mitigate that risk;
- Move discussions about resilience earlier in the lifecycle (e.g., resilience meeting);
- Support public events for select key projects; and,
- Provide opportunities to identify, prioritize, and fund key mitigation projects.

Ms. Ice said that the idea is to create a movement around mitigation and resilience. Success for CERC depends on changing four key components. First, changing the conversation includes: linking economic drivers, climate change adaptation, and resiliency for a more engaging and all-encompassing discussion;

including diverse thought leaders; improving the strength and validity of the rationale to mitigate; and improving how we tell the story more simply and visually with more interaction. Second, changing who is at the table includes: CERC liaisons (CERC-L) in each region helping generate new relationships based on the National Resilient Nation Partnership Network and local influencers; national partnerships opening doors at the local level; and changing the level and type of participation at the discovery phase and throughout the mapping lifecycle. Third, changing how the Nation views and feels about mitigation action: from back burner to front burner; from Federal directive to local imperative; from “later” to “now”; and from unnecessary expense to needed investment. Lastly, changing what FEMA provides to the regions, including: on-the-ground support and training for ongoing outreach and community engagement; engaging new regional and local advocates for action; surge for tough projects and disaster response; providing new flood risk products to propel action; and facilitating local digital engagement to keep the discussion active.

Ms. Ice explained that changing the conversation includes a comprehensive message platform for the Risk MAP program, implementing Coastal and Levee Strategic Communication and Outreach Plans, and developing a CERC playbook, which provides tools and templates that offer context to the user on the value of communications and help to educate users on or reinforce tenets of behavior change and risk communications in ways that are engaging and accessible.

According to Ms. Ice, CERC’s services on a national level include:

- National communication program planning;
- National training plan and training menu to support capacity building around communication, mitigation planning and action;
- Support FEMA governance structure and Integrated Project Teams (IPTs);
- Special and controlled correspondence;
- Develop training sessions to be deployed regionally;
- Support changes from legislation such as the *Biggert-Waters Flood Insurance Reform Act of 2012* and the *Homeowners Flood Insurance Affordability Act of 2014*; and,
- Support TMAC recommendations.

Ms. Ice said that CERC also provides many regional and local services for strategy and outreach, reviews, and training. Additionally, it provides meeting support for discovery, flood risk review, resilience, and flood risk open house.

Ms. Ice emphasized the importance of hazard mitigation in communities. Creating a movement around mitigation starts with developing strong mitigation plans and strategies within the plans, and that is the first step towards achieving action. Strong mitigation plans should be a community’s long-term vision to getting to action. CERC has a mitigation champion in each region, collaborating with the region, promoting the integration of mitigation planning and action concepts throughout all process areas and with the CERC-L.

She reviewed the importance of mitigation, noting that mitigation is accomplished by using credible and actionable data, building awareness, and incentivizing action. Community awareness campaigns, including the High Water Mark Initiative, help encourage citizens to take action to mitigate their risk. Action plans and incentives help make mitigation a reality.

Ms. Ice explained FEMA’s awareness metric, which measures the percentage of local officials in Risk MAP communities who are aware of the flood risk affecting their community after engagement with Risk MAP. The national level target for fiscal year (FY) 2016 (FY16) is 70 percent. FEMA is working to redefine the awareness metric for FY17.

According to Ms. Ice, working towards more mitigation action is a central theme in the Risk MAP Program. The Risk MAP Multi-Year Plan establishes the vision and goals that guide the Risk MAP

program. The Risk MAP vision states that through collaboration with State, tribal, and local entities, Risk MAP will “deliver quality data that increases public awareness and leads to action that reduces risk to life and property.” This vision, along with the goals outlined in the multi-year plan, provide a framework that advances mitigation action through community engagement and risk communication. Through the Risk MAP program and its partners, FEMA is working to support communities by identifying their flood risk and helping them take actions to reduce that risk.

Ms. Ice said that all of Risk MAP’s goals support its vision; however, goals 2, 3, and 5 most specifically align with action. Goal 2 seeks to increase the public’s awareness and understanding of risk management where actions result in a measurable reduction of vulnerability to flooding. Goal 3 includes leading and supporting States and local and tribal communities to effectively engage in risk-based mitigation planning to implement sustainable actions that reduce or eliminate risks to life and property from natural hazards. In goal 5, FEMA seeks to align risk analysis programs to enhance decision-making capabilities through effective risk communication and management. Beyond developing new maps and using data, building local capacity to take action based on data is the primary means for achieving hazard resilience.

Next, Ms. Ice defined the action metrics. Action Metric 1 is defined as the total number of communities where Risk MAP helped identify new strategies or improved current planned mitigation actions, in direct collaboration with communities. Through collaboration between Risk MAP project teams and communities, previously identified actions (from Hazard Mitigation Plans) are improved on or new strategies are developed "on the spot.“ Action Metric 2 is defined as the total number of communities where Risk MAP processes have helped advance at least one mitigation action, previously identified or otherwise. This includes communities that, at a minimum, advanced or began implementing identified mitigation actions, either from their Mitigation Plan or from new strategies identified during the Risk MAP project. Given that the actual implementation of a project may take years to execute, FEMA will track indicators where actions are initiated, in progress, or completed.

Ms. Ice said that actions fall into three categories for the metric: plans and regulations, natural systems protection projects, and structure and infrastructure projects. Action measure metric is by community. This means that a community can only be counted towards the metric once. If a community takes action on three separate mitigation actions, they are only counted towards the metric once. Actions must be related to the Risk MAP process. This could mean that Risk MAP data or mapping helped identify the action; the action was identified or advanced during a Risk MAP meeting or communication; or a Risk MAP resource helped drive the action. Actions are centrally tracked via the Mitigation Action Tracker, an online system.

Mr. Mallory asked what the thinking was on only counting one action in the community, as it seems like regions are falling short on actions taken, and there is a lot more mitigation going on than is being credited. Ms. Ice responded that FEMA hears that quite often, noting that the actions are still being captured, but it is not being counted and that can be frustrating. FEMA has had changes in governance and is thinking about how to redefine metrics.

Mr. Edelman asked about the rebate programs mentioned and Ms. Ice said CERC uses rebates as a way to illustrate programs that exist and incentivize people to advance actions. She can provide more information to the Council regarding the specifics on rebates. Mr. Edelman said that there is anxiety around how CERC is measuring awareness and the tools used the measures awareness. He asked if FEMA has considered measuring awareness before and after going into a community, so that awareness is based on an increase and not a final score. Ms. Ice said that would be valuable and that FEMA is considering using a weighted score for the awareness measurement, with different elements included. She also said she could get back to the Council with what is counted in the metrics on action.

Mr. Howard Kunreuther, TMAC member, asked how economic incentives might tie into the Community Rating System (CRS) program and whether FEMA is considering the role that insurance premiums will play in encouraging mitigation. Ms. Ice said that neither of those topics are part of the charge right now, and that current economic incentives look at the return on investment for mitigation action. Mr. Kunreuther

asked about behavioral economic incentives and FEMA's role in that. Ms. Kat Friedman noted that one of the things that FEMA knows about getting from awareness to action is that people have to feel as though actions have value and that they can accomplish it and have the tools to be able to do so. Another thing learned from behavioral science is that the brain is wired to reject the idea of risk and reject the idea of taking actions that seem hard. So conversations around behavioral economics look at the short cuts people make in our brain that justify why they do or don't take action. FEMA is working on how to communicate and what kinds of interventions will be most successful for getting communities to take action. Ms. Friedman said she can share some of the tenets FEMA views as being the most applicable. FEMA wants to tackle how to deliberately incorporate those tenets into the decision-making process.

Ms. Leslie Durham, TMAC member, asked if CERC is looking at how to communicate flood risk in terms of the Risk MAP products and how those products communicate risk. Ms. Ice said that is part of changing the conversation. CERC supports regions in the day-to-day operations of Risk MAP and they have initiated more touch points, more visibility and an open dialogue. CERC is about to kick off a flood risk products survey that will be mainly focused on internal stakeholders, but will also include in depth interviews with communities on what products are helpful and how FEMA can better communicate risk to them. Ms. Durham asked how developing community risk products is different than what is currently out there, and why the products would be focused on discovery. Ms. Ice said that they are looking at current risk versus future risk, including climate change and adding the economic cost in terms of the financial impact of not taking action. Ms. Durham questioned if that was different from what is done during a HAZUS risk assessment.

Mr. Jones said that a lot of decisions made with respect to appreciating risk or mitigation are made at the individual level. He asked how much of the CERC effort is devoted to drilling down to the individual level. Ms. Ice responded that the focus is to arm the communities to have those conversations as the community is the main conduit to individuals. Seeing how effective communities are in reaching individuals will be part of the awareness metric that is evolving. Mr. Jones noted that the emphasis seems to be on mitigation as opposed to better depiction and understanding of flood risk, which flood maps currently do not have. Ultimately flood insurance premiums will drive that discussion as well as the in-versus-out discussion. He asked how to get beyond those limitations. Ms. Ice responded that the idea of resiliency as an overarching principle is what FEMA is aiming for.

Mr. Steve Ferryman, TMAC member, suggested that every Risk MAP communication should start with the local mitigation plan because that is how the community has decided they want to deal with mitigation. He also added that the jargon of the program is confusing at the local level in terms of the different metrics.

Mr. Berginnis asked Ms. Ice if the Council could follow up with her in a separate conversation on a deeper dive into the metrics. He said that there seems to be a transition with the flood mapping program as TMAC recommendations are released and as FEMA examines how to implement flood mapping legislation, and he asked if there are any adjustments or considerations in the design of the CERC program that include these new considerations. Ms. Ice said there is a paradigm shift that is happening and all of the aforementioned components are drivers of that.

Ms. Cheryl Small, TMAC members, asked if there are any guidelines that are provided to help translate the communications to the individuals to better promote their individual action and understanding of risk. Ms. Ice said those are the conversations FEMA wants to be having with the communities in order to build trust. FEMA has a pain point currently in trying to translate documents to plain language. The communities regurgitate the information FEMA gives them so FEMA is working on how to communicate in layman's terms. Ms. Small said that communications have been performed in a standard way for years but not much ground has been gained in communication to the public.

Mr. Dorman noted that the dollar is what makes people take action. He also asked if the touch point references are new touch points or whether the will replace existing touch points. Ms. Ice said there are

no new official meetings added to the Risk MAP cycle, but there are more unofficial touch points. In some cases, they have changed the order of meetings so that FEMA can build a trusting relationship early on in the process and get the community on board.

**2016 TMAC Review Report Discussion**

The Council continued their discussion on the *2016 TMAC Review Report*, beginning with section 4, *Review of FEMA's National Flood Mapping Program Structure*. Mr. Story said that the authors are hoping to get feedback on content; structure; any missing elements, areas, or topics; and any ideas relative to refinement. He asked if the way Federal Insurance and Mitigation Administration (FIMA) is organized is sufficient, working well and whether there are any gaps. He noted that there is limited information on the roles and responsibilities within FIMA made publicly available. Mr. Edelman said that in order to have a technically credible product, there needs to be an entry point into the FEMA organization and it is not clear for general users who that is. The Council could consider a finding on how FEMA should be more transparent regarding their organization. Mr. Dorman said that a level of openness is important to have, and the Council should also look at how much authority and autonomy each region has in making decisions versus Headquarters and CTPs. Ms. Durham responded that the QA/QC at the headquarters and regional level could be useful.

Ms. Grassi said that from her personal experience as a community representative, getting started with FEMA was very difficult because it was unclear who to work with and what everyone's roles were; the lack of transparency was glaring. Mr. Mason added that at USGS, they struggle with who to interact with at FEMA in part because a lot of action in FEMA takes place in the regions and USGS does not align organizationally like FEMA. At USGS, different sciences have connections directly down to the field level, so most of their regional organization is administrative, and the majority of technical guidance comes from headquarters. He also noted that it would be useful to know where the 2015 TMAC recommendations sit in FIMA and who is responsible for implementing the recommendations, so that TMAC can know who to engage with and where the dialogue is best directed. Mr. Mason also asked how FEMA fields inquiries to which Mr. David Bascom, FEMA, responded that the Flood Mapping Information Exchange (FMIX) answers routine questions and directs the inquirers to the appropriate program. He also said there is a recurring initiative to ensure the call center staff is trained and up to speed.

Mr. Edelman asked if staffing is adequate for achieving goals such as New, Validated or Updated Engineering (NVUE) or mapping the nation. He asked whether the Council should consider this topic from that viewpoint, and whether they should say more resources are needed or call out staffing needs specifically. Ms. Grassi said this is related back to the QA/QC process and if there is only one person in a FEMA region checking and reviewing the IDS, whether it impacts the quality of the review and/or creates bottlenecks. Ms. McConkey said that she has provided the workflow process for mapping and there is not just one person in the region that does that, and there is a strict timeline associated with each part of the process. The new thirty-day review periods have the potential to become a bottleneck and have the potential to be a serious burden. On a separate note, Mr. Edelman said that having the MT-1 forms [to request FEMA remove structures or parcels of land from a designated Special Flood Hazard Area (SFHA)] and the MT-2 forms (for community officials to request that FEMA revise the effective NFIP Flood Insurance Rate Map (FIRM) and Flood Insurance Study report for a community) readily accessible and available to the public and CTPs could help lead to more credible data.

The Council then discussed three potential findings for CTP-related recommendations:

1. CTPs need multi-year funding commitments in order to effectively plan and staff their programs.
2. A uniform program effort should be led by headquarters and managed by the regions. CTP implementation goals should be assigned to the regional offices.
3. In instances where State and local authorities have State mandated or authorized review authority of flood studies, approvals should be issued under joint letterhead to ensure consistency. Where appropriate, these entities should be delegated LOMR review.

Mr. Edelman noted that FEMA is moving in the direction of putting CTPs in tiers. Mr. Ferryman said that he likes the idea of multi-year funding as it would help speed up the mapping process in some areas. Mr. Mallory said this points to one of the problems with FEMA being housed under the Department of Homeland Security (DHS) because it takes over a year to get money to FEMA, and FEMA also cannot commit money to programs for the future before Congress has passed the budget. The Council discussed the idea of using block grants for some CTPs. Mr. Story suggested including the relevance of other federal agency efforts, including interagency agreements, and how they plays a role with flood mapping.

The Council then discussed section 5, *Review of FEMA's National Flood Mapping Process*. Mr. Mallory noted that the process by which the level of accuracy is appropriate might be best included in this section under the discovery part of the mapping process. Mr. Mark DeMulder, TMAC member, said that nationwide LiDAR is needed and the Council should emphasize the 3D Elevation Program (3DEP) program and the continued need for funding. Mr. Kunreuther noted that there is an opportunity to ask what the cost, time, and issues associated with rolling out a nationwide LiDAR program would be and discuss the tradeoffs, including costs and benefits, so that FEMA can move forward with the program. Ms. Durham said there is also an opportunity to talk about multiyear planning because funding needs to be balanced between LiDAR collection and performing flood mapping studies.

The Council further discussed what is needed for the section on Data Generation, and how to keep LiDAR data up to date. Mr. Dorman discussed how his state of North Carolina is collecting LiDAR data and suggested that bringing mapping partners into the process is integral to the success of the program. Mr. Kunreuther noted that many States (e.g., North Carolina) have pilot programs that the Council should highlight to FEMA. Mr. Edelman responded that the concept of best value should be talked about in this section because 3D modeling would be hard for the whole nation, but the Council can make recommendations on the best value in terms of the difference between limited and detailed studies. Mr. Mallory agreed, noting there needs to be guidance on when it is appropriate to use unsteady or 2D models; and also noted the need for a push for a robust stream gage program.

The Council discussed section 5.2.4, *Transparency in the decision-making between the "art" and the "science" of flood hazard ID*. The "art" refers to the engineering judgment and the decision making involved. The Council agreed that the Flood Insurance Study (FIS) needs to be revised as it does not do a good job of explaining how the modeler came to the decisions made, how the hydrology was developed, and other important characteristics that influence why certain decisions are made. Ms. McConkey noted that the FIS acts as an executive summary, and more supporting documents need to be made publicly available in order to increase transparency and, as a result, make the program more credible. Mr. Dorman responded that the move to the digital environment would address a lot of these issues.

**National Flood Insurance Program Reform**

Mr. Bascom reviewed the actions that FEMA has taken thus far in assessing the TMAC's 2015 recommendations. Since the submission of the final TMAC reports, FEMA created a repeatable, transparent process for addressing the TMAC recommendations annually, and for submitting the required report to Congress on the recommendations. Implementation of the recommendations will require integration with providers and span the Risk Management Directorate (RMD), as well as external stakeholders and other FIMA offices. FEMA has assigned recommendations to RMD branches based on best fit, and Branch Chiefs have identified FEMA staff to own each recommendation.

FEMA staff identified owners responsible for the development and delivery of "business case" assessment templates, identifying and coordinating integration across Risk MAP and FIMA, escalating issues or risks to Branch Chiefs as appropriate, initiating coordination to leverage contract support, and reporting progress to Branch Chiefs once implementations is underway. RMD leadership will use the business case assessments to make implementation prioritization and sequencing decisions. The Engineering Resources Branch will be responsible for the capture of all TMAC recommendations inputs,

to inform the development of the Report to Congress. The business case assessments are due shortly to the Branch Chiefs, and then the prioritization will take place. FEMA will not be able to take action on everything at once. FEMA looks forward to continued engagement and collaboration with the TMAC and plans to continue to have an informed and transparent approach for addressing the TMAC recommendations.

Mr. Dorman asked when the Report to Congress is planned for submission. Mr. Bascom said the current target is to submit the report to Congress by the end of July, which means that the report needs to be delivered to DHS by the end of May for internal vetting and concurrence. Mr. Dorman asked about FEMA's plan for prioritization of the recommendations and their consideration of implementing recommendations that have dependencies with other recommendations. Mr. Bascom said once the business case assessments are done, FIMA will convene a meeting to determine the connectivity between recommendations in order to make decisions about investments. FEMA will look to prioritize recommendations that will result in transformational changes, as opposed to addressing easier recommendations at the expense of not being able to address the larger, more expensive ones.

Mr. Dorman asked if FEMA will identify the costs associated with implementing the recommendations and if that will play a part in the FY17 budget request. Mr. Bascom responded that, realistically, the report to Congress will not have a specific dollar amount associated, as the assessment will be more qualitative. The Congressional Justification for FY17 has already been submitted, but a critical decision to be made is determining what TMAC recommendations to implement with the FY16 money that was set aside for TMAC. Mr. Edelman thanked Mr. Bascom for all of the work FEMA is doing to address the recommendations, and requested a separate meeting with Mr. Bascom to review the legislative crosswalk that shows what FEMA has done to implement legislative requirements that are related to mapping.

**2016 TMAC Review Report Discussion**

The Council resumed discussion on section 7, *Review of FEMA's National Flood Mapping Program Quality Process*. The Council discussed the question, "How does the new move toward greater transparency at earlier steps in the process (e.g., towards the end of discovery sharing modeling decisions and outputs, work maps, etc.) affect the current QA/QC review or documentation requirements? Do they need to be adjusted?" Mr. Mallory noted that during Discovery, communities come forward with the data they have. In the past, there has been reluctance for communities to develop hydraulic data, and although that is improving, there needs to be more engagement with the community before the preliminary map comes out. The Council then discussed whether or not to focus on QA/QC for non-regulatory products.

Mr. Edelman then reviewed the first three sections of the *2016 TMAC Review Report*. Members discussed the term "non-regulatory" products and whether or not to refer to "non-regulatory" products as "flood risk products". Mr. Jones questioned the use of the word "correct" to describe technically credible flood hazard data showing flood elevations, and suggested looking back at the *2015 TMAC Annual Report* to find a word the Council has already defined. The Council discussed the idea of quality and best value, and determined that more work is needed to define these terms.

**Next Steps**

Mr. Dorman told the Council that he would work with Ms. Bethune to revise the *2016 TMAC Annual Report* production schedule and send out a doodle poll for future meeting dates beyond June. Mr. Edelman will identify what *2016 TMAC Annual Report* authors can assist with the *2016 TMAC Review Report*.

**Adjournment**

Ms. Boyer thanked meeting participants and announced that the meeting will resume the following day at 10:00 a.m. The meeting was adjourned.

# Day 2: April 15, 2016

## Call to Order / Roll Call

Ms. Boyer opened the second day of the meeting. She took roll call, reminded participants of FACA compliance stipulations, and reviewed tips for using Adobe Connect. She then turned the meeting over to Mr. Dorman.

## Meeting Objectives/ Logistics

Mr. Edelman summarized the discussions from April 14, 2016, and stressed the importance of completing the *2016 TMAC Review Report* and submitting it to the FEMA Administrator by July 1, 2016. Ms. Blackwell asked if the TMAC would discuss the *2016 TMAC Annual Report* and their meeting in May. Mr. Edelman said that the meeting will likely focus on finalizing the *2016 TMAC Review Report*. Ms. Lathrop stressed the importance of *2016 TMAC Annual Report* authors having the opportunity to meet and discuss the report in person. Mr. Dorman said that the meeting will include some designated time to discuss the *2016 TMAC Annual Report*.

## 2016 TMAC Review Report

Ms. Durham discussed section 6, *Review of FEMA's National Flood Mapping Program Outputs*, and explained that FEMA's non-regulatory products are referred to as flood risk products. She noted that United States Geological Survey (USGS), National Oceanic and Atmospheric Administration (NOAA) and the United States Army Corps of Engineers (USACE) also have flood related products. Mr. Edelman reminded participants that the report should focus on what is a technically credible product for FEMA. Mr. Mason said that products should be based on hydraulics and hydrology. He added that USGS does not show the FEMA flood map because FEMA asked them not to show it. Mr. Jones said that the TMAC should discuss any topics that lead to potential credibility issues. In addition, Ms. McConkey said that the TMAC may want to discuss examples of best practices.

## Risk Rating 2.0

Mr. Andy Neal, FEMA, explained that Risk Rating 2.0 is a redesign of FEMA's approach to risk rating. He added that it is derived from several sources including the TMACs recommendation to have a mapping program with more probabilities than the 1-percent-annual-chance and to move toward a structure-based analysis of risk. He added that FEMA and the National Academy of Sciences (NAS) performed a study on riskier structures that called for refinements to rating to better reflect risk.

Mr. Neal provided participants with an overview of FEMA's multi-year customer experience (CX) transformation effort that began last September. He noted that most of his presentation has to do with the impact the CX process has had on NFIP rating redesign. The general concept the CX process evaluated was whether the customers find value in the NFIP products, focusing primarily on flood insurance. The study looked at whether an individual sees flood insurance as a valuable way to be resilient to floods and if they will buy flood insurance. CX considers four primary areas that drive customer experience: value, product, service and brand. The CX study found that value is the most important customer experience driver to address given its importance to overall customer experience and low baseline satisfaction. He added that brand is not the most important factor and people often do not even realize that their flood insurance is from the Government. Mr. Neal added that people were generally unsatisfied with their price. FEMA approached the CX process by looking at several journeys that a customer goes through from shopping and sign up through the cancelation process. Program and map changes is the highest priority journey to address, followed by shopping and sign-up, claims and renewals. Mr. Neal said that FEMA's goal is to make sure that the flood insurance product will help individuals be resilient.

Discussing value in more detail, Mr. Neal explained that FEMA wants to determine how to improve the value proposition for all customers. Homeowners do not understand their flood risk or their coverage and

FIMA's approach to flood hazard mapping is very complicated. He added that the coverage-to-premium value of flood insurance varies by individual. A major issue lies in the variance of flood insurance for the individual due to the in versus out problem with zone lines. Also, as prices have increased to more accurately reflect risk, the program has become less attractive to customers. Even in cases where the map changes due to a Letter of Map Amendment (LOMA), and individual premiums go down, the people that find out that they have been paying the wrong price are more dissatisfied than those who find out they are not eligible for a premium reduction. Mr. Neal said that there are several ways to improve the value proposition for all customers, including: experiment and innovate to continuously improve our understanding of risk; and communicate flood risk through a simple, integrated flood score. He added that some changes may require regulatory change.

Mr. Edelman asked if FEMA was moving towards structure-based insurance. Mr. Neal replied that FEMA already has a version of structure-based insurance; however it is complex. FEMA wants to make its flood insurance rating and the foundation of the rating accurately reflect the flood risk. Currently, there are instances where FEMA is overly precise with elevation and there are instances where FEMA lacks accuracy. FEMA wants to underscore the uncertainty and not overstate it. A more understandable structure-based risk assessment needs to be part of the transformation.

Mr. Kunreuther asked if FEMA had accurate estimates regarding risk in order to best determine low, moderate, and high risk. Mr. Neal said that FEMA is lacking in accuracy with regards to how it is communicating risk/hazard communications. He said that the current granularity makes it hard to distinguish between low, moderate, and high. Mr. Kunreuther said that people may have different perceptions of the terms "low", "moderate", and "high" and it might be different than FEMA's perception. He suggested that FEMA look at pilot areas where there are more accurate estimates in order to provide additional background information to customers. Mr. Neal responded that FEMA intends to take that approach with pilot studies. FEMA wants to not only look at the base flood elevation, but different ways the frequency and severity of flooding can be reflected. FEMA wants to ensure it has the best approach and that it is not blind to other disciplines that might offer a different way of thinking about the problem. Mr. Kunreuther noted that in providing information to homeowners, there is a whole set of other stakeholders that could benefit from this information (e.g. real estate, banks and financial institutions, Write Your Own (WYO) companies and that the TMAC is considering this as a risk communications issue. Mr. Neal said that FEMA wants to ensure that stakeholder groups have the ability to speak and participate in the process to help FEMA understand the landscape. Mr. Neal will provide the TMAC with some findings related to FEMA's conversation with stakeholder groups, including the National Association of Realtors (NAR).

Ms. Durham said that there is only currently structure-based risk rating in CRS communities where elevation certificates (EC) are required. She asked Mr. Neal to discuss the level of customer satisfaction after the LOMA process, as he mentioned earlier. To her point about CRS communities, Mr. Neal responded that ECs are required throughout AE and V zones, and there are other zones that require something similar as well. Mr. Neal said that there may be different ways to obtain elevation data rather than the extensive process of an EC. For example, 3DEP LiDAR combined with Google satellite imagery could generate as much information that is available on an EC. People would be able to know their flood risk information on an individual structure level using that method and then they would not have to wait until they are buying a policy to know their risk.

Mr. Mallory asked what data would be required for a structure-specific rating with a gradation across the Special Flood Hazard Area (SFHA) as well as other zones. Mr. Neal replied that based on current work, there are certain characteristics of flooding that may be important, and pilot studies will help determine which characteristics are important. For coastal, this may include wave action, velocity, and duration of flooding. He added that there are qualities related to flood hazards and explained that looking at loss data there can be a wide range of loss damages and some of it may be explained by hazard variation or structure distinction. There are also structure-specific factors that may not be collected at the building level because existing datasets may contain the information. Mr. Neal said that there is always the opportunity for greater accuracy, but one must provide the most relevant and salient criteria so that the price can be understood and appreciated.

Mr. Mallory said that if a resident has a foot of water in the basement they will pay a high premium because of it; however, the basement has low coverage. Mr. Neal said that FEMA's current basement ratings reflect the lower coverage. He added that those individuals are able to quickly move from a subsidized rate into a full risk rate.

Mr. Jones asked how FEMA utilizes the Pel curve and if frequency information exists that is not used in the rating. Mr. Neal said that FEMA meets to determine where policy holders are among the bell curves; however it is hard to apply to individuals because FEMA would need to know which bell cure applies to certain structures. This cannot be performed without regulator products.

Mr. Neal noted that mandatory purchase requirements play a large role in the satisfaction; however, understanding relative risk is not very helpful. He suggested that customer satisfaction could improve if the risk pricing were more transparent.

Ms. McConkey asked if FEMA needs multi-frequency hazard information across the country to help identify hazards. Mr. Neal said that having a full probabilistic view helps to understand risk and that risk involves both frequency and severity. Mr. Dorman said that North Carolina is collecting five different frequency intervals and asked if this was enough to be able to support irk-rated insurance. Mr. Neal replied that having five intervals goes a long way. It is important to look at that intervals that are needed and what means there are to get to other return periods. He added that there will also be additional information that could be incorporated into a model in order to illustrate the full risk. Mr. Dorman asked what factors make it so that FEMA cannot do full risk rating. Mr. Neal responded that FEMA is doing a version of full risk rating, but it does not have certain frequency views on the individual structure level. There is a challenge on the structure side and a question of what underwriting criteria FEMA needs to use. Mr. Mason said that most of the five frequencies involve the 100 year one-percent chance flood and asked if it is better to provide detail on this or more important to go 200-500 years outside of the 1 percent chance? Mr. Neal replied that both are important and the higher return areas become more important the closer one gets to the SFHA line. Mr. Dorman thanked Mr. Neal for his remarks.

**Public Comment Period**

Ms. Boyer announced that, per FACA, members of the public are provided the opportunity to provide oral and written comments on the issues to be considered by the TMAC. Ms. Boyer requested that speakers limit their public comments to no more than three minutes and said that the public comment period will not exceed 20 minutes. Mr. Chad Berginnis, Association of State Floodplain Managers (ASFPM), provided the following comment:

> *Good morning. I wanted to brief the Council and make a recommendation in terms of a subsequent meeting and getting some SMEs involved. As the Council works on the Review Report and Annual Report one of the elements of the National Flood Mapping Program is the requirement to map residual risk areas. Those largely include the dam failure inundation mapping. I had the privilege of attending the North Carolina Chapter meeting and in that there is a track dedicated to dam inundation failure area because of the large October 2015 flooding. The count stands now stands at 47 dams that have failed including seven high hazard times. It appears that this is one of those things where Congress has gotten it right in having that requirements because these are large risk zones. I wanted to pass that information along because that story is not getting told. Also, South Carolina may have some unique insights that might help inform the Council as it makes recommendations and monitors this whole aspect of the National Flood Mapping Program dealing with dam failure and inundation mapping.*

**FEMA Metrics**

Mr. Rick Sacbibit, FEMA, discussed the Risk MAP performance metrics. He provided an overview of his presentation and then discussed the Risk MAP program measures for FY15. He discussed four metrics including:

- Deployment: The percentage of population where Risk MAP is being deployed. FY15 performance: 59.6 percent.
- NVUE: Number of mapped miles that meet engineering standards. FY15 performance: 48.7 percent.
- Awareness: Percentage of local officials in Risk MAP communities who are aware of the flood risk affecting their community after engagement with Risk MAP. FY15 performance: 62 percent.
- Action: The total number of communities where Risk MAP processes have helped advance one or more mitigation action. FY15 performance: 209.

Mr. Sacbibit discussed the performance targets and explained that the FY16 goal is to map 90,000 miles and that FEMA has currently mapped 76,000 miles under development. He explained the Risk MAP vision, noting that through collaboration with State, local, and tribal entities, Risk MAP will deliver quality data that increases public awareness and leads to action that reduces risk to life and property.

Next, Mr. Sacbibit reviewed the metrics in more detail. He explained that Risk MAP deployment is where FEMA will deliver the complete discovery process; flood risk database, including applicable datasets; Flood Risk MAP; and the Flood Risk Report. Mr. Sacbibit added that Risk MAP is deployed at a hydrologic unit code (HUC)-8 watershed level but may also be performed on other scales such as in coastal and levee-impacted areas.

Discussing NVUE, Mr. Sacbibit said that there are more than 1.1 million riverine stream miles in the United States that have been mapped onto a FIRM (paper and digital). There are currently approximately 474,000 miles that meet the NVUE standard (NVUE-Attained) and 76,000 miles under development (NVUE-initiated), totaling approximately 49 percent of the entire flood map inventory as of the end of FY15.

Mr. Sacbibit also discussed the promoting awareness metric, noting that this topic was covered on day one of this TMAC meeting by Ms. Ice and reiterated that community engagement in the mapping process is a critical element to ensure that flood maps are adopted. Next, Mr. Sacbibit discussed several other measures that FEMA uses to track the quality, timeliness, efficiency, and effectiveness of flood hazard data, including:

- The percentage of the U.S. population covered by planed mitigation strategies;
- Number of Planed Local Levee Partnership Teams executed for LAMP projects;
- Number of coastal counties that have received updated risk data (either preliminary FIRMs or non-regulatory products);
- MT-1 (LOMA, LOMR-F) and MT-2 (LOMR) cases that are completed within regulatory timeframes;
- Percentage of DFIRMs available to the public 90 days prior to effective date; and
- Risk MAP program is within the DHS tolerance limits of +/1 8 percent for schedule and cost performance.

According to Mr. Sacbibit, the Risk MAP program has numerous measures and milestones in place today to measure the effectiveness and efficiency of mapping flood risk areas. Additional measures have been implemented to measure the program's overall effectiveness and lead communities and citizens to take mitigation action to reduce the risk to life and property.

Mr. Jones asked if Mr. Sacbibit has a definition of "quality". Mr. Sacbibit responded that quality information that is represented in the FIRM adhere to FEMA's guidance and standards. He added that FEMA plans to send a survey to communities regarding how the process is working. He said that they have heard feedback regarding effectiveness and the unitization of products and the ability to have

flexibility in generating non-regulatory products. FEMA hopes to gain insight into future production through this survey.

Ms. McConkey asked what an action measures is, noting that in her region they will fund CTPs or contractors to provide technical assistance to a community in order to advance mitigation action. Mr. Sacbibit said that this is an approach seen in many regions. He said that through technical assistance, FEMA can work with State and local agencies to identify data and mitigation opportunities. Additionally, it is important for FEMA to simplify its messages because many products are very technical in nature.

Mr. Murphy said that the TMAC has had a lot of discussion regarding unmapped miles. Mr. Sacbibit said that unmapped miles are riverine and stream miles that do not exist within the CMNS inventory and not just miles within the broader FIRM panel. He explained that better resolution of flood-prone areas may still exist in geographies that have FIRM coverage. As FEMA gains better resolution and fidelity of topography through LiDAR, it can pick up the unmapped miles. Regional offices can find the geographies and miles that do not exist within the inventory; however, FEMA has not set a priority level to those cases. Mr. Sacbibit said that FEMA can determine missing data in a geographic area and ensure that it gets properly logged and documented within FEMA's system.

Mr. Murphy said that there is confusion between what is counted in NVUE and what is not. He asked if there was any value to counting and recording more than one action. Mr. Sacbibit said that FEMA has discussed this issue; however it has not been resolved. He added that if FEMA establishes a metric as a performance metric it will shift the actions and tasks within the NFIP program accordingly.

Mr. Jon Janowicz, SME, said that CNMS and the public viewer contain limited detail and asked if FEMA plans to put more information on the public website. Mr. Sacbibit replied that FEMA is discussing it, and considering: (1) including results of the validation or assessment work so that people can see why a mile is unverified or if there are issues associated with the hydrology or physical change; (2) working on adding components for coastal; (3) considering when FEMA needs to look at riverine miles impacted by levees. Mr. Sacbibit said that FEMA knows that there is interest in putting some of this information on the public viewer and that they are trying to determine how to do it.

Mr. Berginnis discussed deployment and questioned what deployment is measuring in terms of tangible output or progress. He said that sometimes the term deployment is used to imply a quality level and questioned why it was considered a deployment metric. Mr. Sacbibit said that deployment is a delivery mechanism and does not equate to quality. He explained that it is intended to represent that FEMA has completed a process where it has engaged the community. Mr. Ferryman said that it is critical to engage CTPs and other regional offices. Mr. Sacbibit responded that communications are important and that the same approach does not work for all components. FEMA conducts its annual survey so that it can determine what works and what does not work with the regional office and CTPs.

Discussing coastal inventory, Mr. Sacbibit said that the timeline associated with the preliminary maps for complex coastal studies includes a lot of lag time that extends the completion time for coastal studies quite a bit. He also explained that through the NVUE assessment and evaluation process, FEMA determined that there are some maps that are still meeting and reflect the existing conditions.

Ms. McConkey said that regarding CNMS, people are receiving conflicting guidance. She noted that when a stream study is funded, it does not mean that the maps will be update. Items are not studied until funds for final maps are allocated. She said that people need to understand what is actually being studied.

Mr. Dorman asked when the five year reassessment started. Mr. Sacbibit responded that the assessment will restart when the map is complete, therefore it is possible that many of the models are significantly older than five years. Mr. Dorman also asked if studies are including multi-frequency events. Mr. Sacbibit said that regional offices are expected to include five year intervals in any purchased flood study.

Mr. Story said that the NVUE metric has increased to around 90,000 miles for FY16. Mr. Sacbibit said that FEMA has received a significant increase in funding for FY16. Also, regional offices determine which

geographies they are planning to map in any given year; the less complex the map the more miles can be covered at a lower cost.

**2016 TMAC Annual Report Discussion**

Mr. Ferryman said that the TMAC has struggled with the communications piece and questioned the status of potential SMEs being appointed to the TMAC. Ms. Boyer said that the TMAC is welcome to invite briefers in to provide a presentation on a given topic without appointing them as SMEs. She noted that Mr. Murphy and Ms. Suzanne Juwani, were not appointed as SMEs because their appointment to the TMAC is imminent.

**2016 TMAC Review Report**

TMAC members continued discussing section 6. With regards to section 6.2 regarding residual risk, participants agreed that Mr. Berginnis' comments during the public comment period would be a good reference. Mr. Edelman asked what finding or recommendation would come out of this section. Ms. Small said that the she is still determining the finding or recommendation and noted that communicating adequate risk can be misleading. Mr. Edelman suggested that a finding could be that residual risk should be shown on the map with a zone designation in order to have a technical credible product. Ms. Durham said that this section is not about the areas behind levees, rather it is about the desire to map residual risk and the time and money involved. Levee failure inundation area might be a non-regulatory product that is maintained by communities faster and easier than a full Risk MAP project.

Mr. Jones questioned what would happen if a structure failed. He said that it is complicated when there are multiple dam levees in an area and it is important to do a better job of illustrating areas that will flood during a levee failure. Mr. Jones also questioned the probability of a failure and asked how to communicate that to the public. Finally, he mentioned insurance and said that insurance requirements have largely driven the levee requirement discussions over the last few years.

Mr. Mallory asked if the TMAC should follow up on the NAS' recommendation regarding moving to a risk based environment. He also said that many people behind levees have paid to be protected (e.g., tax, fee) and they may get upset when they have to also buy flood insurance. Ms. Small said that damages are more severe in these areas despite a lower probability of a flood. Mr. Jones commented that in the American Society of Civil Engineers 24 the definition of levee was revised to remove the word "protection" and move to reduced probability language. Ms. Durham questioned if the TMAC should discuss insurance. Mr. Dorman said that credibility will always involve insurance and, therefore, it should be part of the discussion. Participants agreed that this discussion could be mentioned in the *2016 TMAC Review Report* with a more detailed discussion in the *2016 TMAC Annual Report*. Participants also recommended inviting a Limited Map Maintenance Project (LMMP) SME to brief the Council.

Participants discussed section 6.3, *Users*. Ms. Lathrop asked if this section includes surveyors and engineers. She also said that the section has a lot of crossover with the *2016 TMAC Annual Report* and should be shortened in the *2016 TMAC Review Report*. Participants agreed that this section references the fact that different users have different uses.

Discussing section 6.4, *TMAC Analysis of Outputs/Products*, Mr. Edelman said that the Code of Federal Regulations (CFR) was modified to allow 500-year or future conditions boundaries to be shown. Ms. Small said that the political boundaries must be updated, to which Mr. Edelman questioned how it can be quantified. Mr. DeMulder said that the United States Census Bureau maintains all political boundaries and he recommended that the TMAC engage with them to discuss the boundaries.

Next, participants discussed section 6.5, *Findings*. Mr. Kunreuther suggested that the TMAC connect the discussions from the *2016 TMAC Annual Report* with section 6.5.1, *Communication.* Participants discussed if the TMAC should encourage FEMA to support the development of depth grids in areas with existing LiDAR and detailed studies. Ms. Durham said that this was about how depth grids are only one newly-studied area; therefore only a small group of people actually get them. She suggested that the question is, "should FEMA perform depth grids in all areas with the data?"

TMAC members discussed the idea of encouraging FEMA to partner with other Federal agencies and local communities for the funding of non-regulatory products and encourage the development of new products, such as two foot and three foot delineations in areas where critical facilities are being considered in support of Federal Flood Risk Management Standard (FFRMS). Mr. Edelman said that the two and three foot delineations may be different for coastal versus mountainous areas and asked if the TMAC is recommending that communities adopt this for floodplain management (FPM). Ms. Durham said that this is a best practice; however, FFRMS involves a horizontal delineation of the free board. She mentioned that a pilot study was performed in a watershed area and delineated in one, two, and three board. She noted that it is an easily developed a non-regulatory product. Mr. Jones said that even if maps showed the flood extents at a certain base flood elevation (BFE), it communicates risk.

Next, the TMAC discussed if all Federal agencies should have an accuracy standard that they adhere to and what level of accuracy would this be for the different products/purposes. Ms. Shirley said that it appears as though agencies are making maps for their own purpose, therefore this may not be feasible; however, the accuracy should still be reported. Mr. Mason said that the USGS and the weather service have a common set of standards for mapping flood inundation products and that this information is in the process of being publically released. He added that FEMA was involved but that the group has not yet engaged them. Additionally, Mr. Mason noted that flood inundation maps are tied to real-time forecast and water levels.

Mr. Edelman commented that 3DEP will take 50 years and new LiDAR in North Carolina will cost less and be better. He asked if the recommendation should be about how to bring in private funding so that it will not take 50 years to obtain a better product. Mr. DeMulder agreed and said that 3DEP is a leveraged program and the new LiDAR is cheaper. He explained that the challenge is that the program will have to be funded across multiple agencies and that the budget requests will have to be synchronized.
Mr. Dorman stated that in order to collect the information, FEMA and other Federal agencies will utilize the private sector. The 3DEP program has the assumption that the local governments will provide money. He said that the TMAC could recommend that FEMA utilize the private sector and determine the necessary collaboration in order to obtain funding and data acquisition.

Participants discussed if the TMAC should consider a requirement for communities to review the base map and the work maps and/or preliminary maps when provided with the opportunity. Additionally, the TMAC should consider how to encourage these reviews and should FEMA encourage communities to develop local partnerships of engineers, surveyors, and others to review the changes to the flood maps. Mr. Edelman said that he has participated in discovery meetings where the community is shown the roadmap of what is planned early in the process. He explained that when a study begins and when it is delivered is not always communicated to the community. Mr. Edelman questioned who pays to add data to the maps and suggested that the recommendation may be that if the community requests data be added then they pay to fix the maps. Mr. Kunreuther said that it is important for people to understand the risk they face. Ms. Grassi said that New York City wanted to understand what went into maps. Therefore, the city hired a firm to analyze the maps so that they could educate themselves. She added that while this was beneficial, many communities do not have these resources. Ms. Grassi commented that empowering communities to understand what goes into maps will help the process.

Next, participants discussed section 8, *Review of FEMA's National Flood Mapping Program Metrics*. Participants agreed to define a credible product/program. TMAC members suggested that the subcommittee endorse and elaborate on the description of metrics, evaluation, and recommendations outlined in the *2015 TMAC Annual Report*. Mr. Berginnis said that the TMAC should also look at existing metrics, including congressional mandates, and evaluate against those areas. He added that the Council should also address components of each metric. Mr. Dorman reminded participants that the TMAC thought about proposing new metrics in the *2015 TMAC Annual Report*; however, the Council ended up not doing that. He suggested that the TMAC look at the defined goals and recommendations in the report if and/or when the Council proposes new metrics. Mr. Dorman said that the metrics are what FEMA will put its resources towards. He added that trying to identify areas that will have an influence or impact is difficult. Mr. Berginnis said that metrics should not be tied to resource constraints.

Mr. Murphy asked for clarity regarding how deployment is measured and tracked. Mr. Kunreuther asked if the census information contained income information and commented that it would be useful to have insight into the distribution of income. Mr. Murphy responded that the information may be available; however, it may be difficult to tie this information back to a specific goal. Mr. Kunreuther said that flood insurance rates and affordability are related to mapping and the NFIP as a whole. Mr. Murphy noted that for deployment, it should be more about where Risk MAP projects have been performed.

Mr. Janowicz explained that deployment may have had good intentions at the beginning when Risk MAP was going to be on the HUC-8 level. However, FEMA must look at where the funding is being spent. and those projects that are not true Risk MAP projects and not on a HUC-8. Therefore, deployment may not be as useful as it was initially intended to be and it might be beneficial to reevaluate deployment measures and find a better way to express how the program is influencing communities. Mr. Dorman said that there is also concern with the timeliness of the studies being deployed and suggested that FEMA focus on that issue. Mr. Berginnis said that according to the National Academy of Sciences', metrics must change over time and be adaptable. Additionally, deployment can be categorized as a process metric.

Mr. Murphy said that the TMAC often discusses the length of time it takes FEMA to complete things, however there is no relevant metric. Participants agreed that it would be useful to have a timeliness metric related to the overall process. Mr. Dorman said that it would be useful to survey Council members in order to obtain their input on metrics.

Mr. Edelman said that FEMA can control the time from the discovery phase through preliminary issuance. Mr. Dorman added that Congress has also set goals for FEMA and these goals may provide additional insight. Ms. Grassi commented that FEMA could also control delays after preliminary issuance. She noted that these delays could be caused by contracting issues. Ms. Grassi also remarked that FEMA's review and vetting process could be consolidated or further anticipated.

**Next Steps**

Mr. Dorman encouraged TMAC members to assist with the *2016 TMAC Review Report* if needed. In addition, Mr. Dorman will work with the DFOs to revise the meeting schedule.

**Adjournment**

Ms. Boyer thanked members for their participation and adjourned the meeting.

**Action Items**

- Mr. Dorman will:
    - Distribute a doodle poll regarding the June 2016 TMAC meeting dates;
    - Work with Ms. Bethune to revise *2016 TMAC Annual Report* schedule;
    - Poll the TMAC about what metrics would be valuable; and
    - Work with Mr. Crowell and Ms. Boyer to modify the remaining 2016 TMAC meeting dates.
- Mr. Edelman will:
    - Identify *2016 TMAC Annual Report* authors with "paused" topics to help support *2016 TMAC Review Report* sections; and
    - Find an expert to provide a WebX regarding the pros and cons of 9001.
- Ms. McConkey will send the QA/QC checklist to Ms. Grassi.
- Ms. Ice will provide the TMAC will additional information regarding redefining metrics – specifically related to the actions being counted, additional information regarding the rebate programs and information on what metrics are included that make up a community's score.
- Ms. Friedman will share the tenets that FEMA views as being the most applicable and how FEMA wants to deliberately incorporate those tenets info FEMA's decision-making process.

- Mr. Neal will provide the TMAC with findings related to FEMA's conversation with stakeholder groups.
- Mr. Sacbibit will provide additional information regarding statistics related to the start of a study to effective stages and preliminary to effective stages.

**Certification**

*I hereby certify that, to the best of my knowledge, the foregoing minutes are accurate and complete.*

*John Dorman*
*TMAC Chair*