

Association of Montana Floodplain Managers 24th Annual Conference

Delta Helena Colonial Hotel in Helena, MT, February 27 - March 1, 2023

HIGH AND DRY IN HELENA

AGENDA

Tuesday, February 27

2:00 PM - 5:00 PM Registration - Lobby

5:00 PM - 6:00 PM AMFM Board Meeting – Meadowlark Room

Tuesday, February 27

8:00 AM - 12:00 PM **MT DNRC Preconference Workshop, "Floodplain Basics"**
Please email Traci Sears (tsears@mt.gov) or Shylea Wingard (Shylea.wingard@mt.gov) to register for this event.

Traci Sears
Shylea Wingard
MT DNRC

12:30 PM 4:30 PM **MT DNRC Preconference Workshop, "Intermediate Permitting"**
Please email Traci Sears (tsears@mt.gov) or Shylea Wingard (Shylea.wingard@mt.gov) to register for this event.

Traci Sears
Shylea Wingard
MT DNRC

Wednesday, February 28 Conference Sessions – Ballroom

8:00 AM - 5:00 PM Registration - Lobby

9:00 AM - 9:30 AM **Upper Yellowstone River Basin Flood History and Frequency**

Seth Siefken
U.S. Geological Survey

In June 2022, a major flood event affected the Yellowstone River and many of its tributaries within the upper Yellowstone River Basin (upstream of Billings, Montana). Following the flood, the U.S. Geological Survey (USGS), in cooperation with the Montana Department of Natural Resources and Conservation, updated flood frequency estimates for streamgages in the upper Yellowstone River Basin. With streamgage records dating back as far as 1890 and written accounts of floods dating back even earlier, the Yellowstone River has a relatively well-documented flood history, which can be used to inform flood frequency analyses. This presentation will examine the results of those flood frequency updates and discuss how the USGS incorporated historical flood information with streamgage data to improve upon previous flood frequency estimates. The flood of June 2022 was the greatest flood since at least the late 1800s on many streams in the upper Yellowstone River Basin and had an estimated annual exceedance probability of one percent or less at 16 streamgages in the study.

9:30 AM - 10:00 AM **Use of Indirect Discharge Measurements to Characterize Spring 2023 Flooding in Montana**

Nicholas Taylor
U.S. Geological Survey

April snowmelt and subsequent heavy rains in June produced substantial flooding in central and northeastern Montana in spring 2023. Discharge from such large flood events is often computed indirectly, using theoretical relationships for open channel flow. Indirect methods such as the slope-area, contracted opening, and flow over dams and weirs methods use field surveys of high-water marks and channel geometry to calculate the peak flood discharge. In response to the spring 2023 flood events in Montana, U.S. Geological Survey hydrologists conducted indirect discharge measurements at eight sites where previous streamgages were operated on streams in Fergus, Roosevelt, Rosebud, and Valley Counties. The resulting measurements will be made publicly available on the U.S. Geological Survey's Web-accessible National Water Information System. The data and subsequent analyses will be used to extend the annual peak flow records at the respective streamgages, and ultimately better inform flood frequency analyses used for flood risk planning.

10:00 AM - 10:30 AM Carbon County – Unique Hydrologic Conditions and How Large Flood Events Affect Hydrology and Flood Risk **Jared Cooper**
Remy Georgetown
Pioneer Technical Services, Inc.

As part of the Carbon County Physical Map Revision (PMR) Project (2020), Montana Department of Natural Resources and Conservation (DNRC) contracted Pioneer to perform Hydrologic Analysis on select reaches within Carbon County. Prior to the PMR project becoming effective, a June 2022 flood event occurred in southwest Montana, including Carbon County. This flood event sent flows exceeding 500-year estimated flow values through many of the study reaches included in the Carbon County PMR. To better estimate flood risk DNRC has decided to re-study Carbon County as part of the Upper Yellowstone Phase 1 – Hydrology. Pioneer along with USGS has updated hydrologic peak flow estimates within Carbon County to include the effects of the 2022 event.

10:30 AM - 10:50 AM Morning Break **Courtesy of Great West**

10:50 AM - 11:20 AM Carbon County Post-Flood Assessment **Drew Vance, PE, CFM**
DOWL

The Carbon County PMR floodplain mapping was completed and ready for public outreach when the June 2022 flood of record struck, impacting communities along Rock Creek and Clark Fork Yellowstone River. This presentation delves into the aftermath of the flood, exploring DOWL’s Post-Flood Assessment of the physical changes to the streams in Carbon County and their impacts on the previously completed flood elevations and boundaries.

11:20 AM - 11:50 AM What is Risk? Flood Risk Assessments – A Tool to Communicate Risk to Communities and Stakeholders **Heather Nold**
Josh Robbins, PE, CFM
HDR

A brief memorandum can go long way when communicating with communities and stakeholders. This presentation will highlight a process that Washington Department of Transportation uses to communicate risk for proposed projects. During the preliminary design phase, the discussion of the floodplain impacts includes stakeholders such as communities, floodplain administrators, consultants, and FEMA. At this stage, understanding local and federal codes can be a challenge for all parties involved. This process summarizes hydraulic results and regulatory requirements in a way that is easy to grasp for communities, engineers, and regulators.

11:50 AM - 1:20 PM Lunch on Your Own

1:20 PM - 1:25 PM Welcome and Opening Comments **Ben Fennelly, PE, CFM**
AMFM Vice Chair

1:25 PM 1:30 PM Message from Senator John Tester **Caitlin Avery**
Regional Director

1:30 PM 1:35 PM Message from Senator Steve Daines **Liz Dellwo**
Legislative Assistant

1:35 PM 1:40 PM Message from Congressman Matt Rosendale **Jason Hoffman**
Legislative Director

1:40 PM 1:45 PM Message from Congressman Ryan Zinke **Representative for**
Congressman Zinke

1:45 PM - 2:05 PM Reintroduction and Overview of Water Operations and Floodplain Programs John Connors, P.E.

MT DNRC

John Connors dove headfirst into the Water Operation Bureau Chief roll this past August. Having worked with the floodplain programs before, he thought that his experience would be enough so he could easily incorporate into the team. But, like a niece or nephew you haven't seen for years, it was no longer the cute little program that he remembered. Instead, it had doubled in size and was doing all of these complicated things that he had never seen before.

John would like to relay his experience of returning to the Water Operations Bureau and learning about all the amazing things they have been doing. He would also like to give some thoughts on the programs and some ideas on what the future may hold. Overall, he wants to share how excited he is to be working with everyone in the floodplain community.

2:05 PM - 2:25 PM What Can DNRC Regional Engineers Do For You

Brent Zundel

MT DNRC

DNRC's regional engineers have long provided technical support to Montana communities in their floodplain management obligations. Our team has grown and undergone several changes, and we are experiencing increased workloads and requests from communities. Our communities also have new floodplain administrators and increasing workloads, especially as a result of the June 2022 flooding. This brief talk will introduce new staff, discuss general workflow considerations, and touch on permitting application issues. We will also discuss a couple of big upcoming projects..

2:25 PM - 2:40 PM Afternoon Break

Courtesy of WET, WGM

2:40 PM - 3:25 PM DNRC's Floodplain Mapping Updates: The When, Where, and How To

Doug Brugger

MT DNRC

This presentation will give an update on DNRC's active mapping projects, with tips on how a community can best manage their existing program while a mapping update is in-progress. These tips will be based on several example communities from around the state that are at various stages of the update process. In particular, we will cover mapping updates in Park, Stillwater, and Carbon counties that were initiated in response to the 2022 flooding, giving a timeline for when new floodplain study information will be available and how to use that information for the many post-flood needs in these communities.

3:25 PM - 3:55 PM Floodplain Permitting: A Jeopardy! Game

Peri Turk and Ryan Murphy

MT DNRC

This presentation will provide information related to floodplain permitting and how to effectively get through the process. With the influx of new floodplain administrators, we wanted to provide some insight into the floodplain permitting process such as resources available, what to expect, and roles and responsibilities. The presentation will be structured as a Jeopardy game with three contestants (floodplain administrators). The topics that will be included are what should be in a floodplain permit (i.e. floodplain permit checklist), what to expect during the technical review process, timelines for permits, practical application, and lastly CLOMR/LOMR. The goal for this presentation is for floodplain administrators to go home with a bit more knowledge about things to look for in a permit, what to expect, and what resources are available to them.

3:55 PM - 4:35 PM NFIP Letter of Map Change Program Overview

Ben Rood, PE, CFM

WSP

The Letter of Map Change (LOMC) Program allows floodplain managers and communities to update their flood insurance studies and rate maps using LOMAs, LOMRs, and CLOMRs. The presentation will provide an overview of the LOMC program and discuss specifics for each type of LOMA, LOMR, and CLOMR to help attendees understand when each should be used and what should be provided as part of the application. We will discuss the different requirements of 44 CFR 60.3 a, b, c, and d to better understand the need for the LOMR, CLOMR, or No-Rise Certification. Finally, the presentation will discuss specific examples of approved LOMAs, LOMRs, and CLOMRs to demonstrate the application of these different change types and how they have been successfully implemented.

6:00 PM - 9:00 PM Evening Social

Courtesy of DOWL

Thursday, February 29 Conference Sessions – Ballroom

9:00 AM - 9:20 AM Load Posted Bridges

**Ryan Dahlke
MT Dept. of Transportation**

MDT through our Bridge Maintenance Program has load posted over 500 bridges within the state. These bridges are both on and off system bridges and they have the potential to affect people’s daily lives, emergency services, and commerce within the state. The Governor has requested us to establish a 5-year plan that could repair, rehabilitate, or replace the bridges in a manner that would remove the load posting. To deliver on this challenge, MDT will have to work with our permitting, contracting and consultant partners to expedite and streamline our processes.

9:20 AM - 10:05 AM MDT Bridge Scour Overview

**Kurt Marcoux, PE
Annette Compton, PE
Gabe Walsh
MT Dept. of Transportation**

Montana’s public bridges are critical for moving goods and people. MDT evaluates the scour potential for both state and locally owned bridges. This presentation will describe scour, why it occurs, and define a scour critical bridge. We will describe an GIS map that MDT has developed for MDT and county forces to use to view scour critical bridge locations and their critical information. We will also discuss examples of bridges being replaced due to scour and a scour mitigation project, both of which will require floodplain permits.

10:05 AM - 10:20 AM Morning Break Courtesy of Quantum Spatial and AMFM

10:20 AM - 10:50 AM West Billings Flooding Risks and Mitigation Measures

**Greg Gabel, PE, CFM
DOWL**

The continued urban sprawl into West Billings has heightened the need for more flood mitigation solutions to be planned and implemented. Cove Creek, Little Cove Creek, and Hogan Slough drainages all flow through West Billings mostly through irrigation drains constructed in the early 1900s. These limited capacities drains are not sized to handle large storm events from these drainages as was evident during the June 3rd 2023 storm event. This presentation will discuss the challenges facing West Billings, highlight the flooding that occurred on June 3rd, and discuss the mitigation solutions to prevent flooding like the June 3rd storm.

10:50 AM - 11:10 AM Assessing Climate Risk and Resiliency to Inform Road Reconstruction Design in Yellowstone National Park

**Marika Nawrocki
Jacob Lacy
RESPEC**

This presentation will explore efforts to enhance climate resilience in Yellowstone National Park, focusing on the aftermath of the 2022 flood event. The climate resiliency work focuses on the Northeast Entrance Road, which runs parallel to much of Soda Butte Creek and the Lamar River. At the time of the floods, the Northeast Entrance Road was already undergoing initial investigations to assist in the planning of road construction aimed at bringing the road up to current design standards. During the 2022 floods, the road experienced extensive damage, causing road closures for several months. The flood event itself and the damages from the event have inspired the incorporation of “climate resiliency” in design. The aim of this is to have future designs accommodate and provide better responses to potential changes in flood magnitude and frequency in the future. This presentation will focus primarily on fluvial hazards, or interactions between the riverine environment and infrastructure, to the Northeast Entrance Road and highlight the process of incorporating climate resiliency goals into design. This process involves the integration of climate change models into hydrologic and hydraulic studies, and utilizing a range of potential results to assign risk and inform design decisions.

11:10 AM - 11:40 AM Floodplain Modeling and Design for the Clark Fork River Operable Unit

**Matt Barnes, PE, CFM
TetraTech**

The Clark Fork River Operable Unit (CFROU) is a 120-mile stretch of river that flows from Warm Springs to Missoula and is contaminated with mine wastes from upstream Butte and Anaconda sources. A Record of Decision signed in 2004 authorized removal of contaminated tailings from slickens areas, removal, or treatment in place of impacted areas, streambank reconstruction, land management planning, and institutional controls.

Reach A of the CFROU begins at the confluence of Silver Bow Creek and Warm Springs Creek and extends to the Garrison area and is the site of a multi-year cleanup and restoration effort. Cleanup in Reach A is being completed by Montana Department of Environmental Quality (DEQ) and Montana Natural Resource Damage Program (NRDP) with DEQ funding the remediation cleanup and NRDP funding the restoration of the floodplain and riparian habitat. This presentation will focus on the approaches and tools used for floodplain modeling and reclamation design for Phase 7 of Reach A.

Design of previous phases was completed solely with 1-dimensional modeling. In Phase 7, a combined approach is being implemented to leverage the improved details from 2-dimensional modeling for design and the efficiency of 1-dimensional modeling for discrete tasks. Notably, 2-dimensional modeling is being used to design the restored floodplain, size alluvium materials, and evaluate potential sediment transports effects. One-dimensional models are being used to confirm no-rise in the base flood elevations and to size bank stabilization in key areas.

While mine waste removal is the main objective of the Reach A cleanup, increased attention is being given to natural functioning fluvial systems and habitat restoration following the contamination removal. The use of 2-dimensional modeling adds another tool to support these goals; goals derived through collaboration amongst multiple agencies, and consultants to achieve restoration while reducing implementation costs.

11:40 AM - 1:15 PM	General AMFM Membership Luncheon Meeting (<i>Lunch on your own for non-members</i>)	Courtesy of HDR and RESPEC
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1:15 PM - 1:45 PM	Two analyses, one model: modeling coincident frequency riverine and interior drainage flooding for levees using HEC-RAS 2D	John Loranger, PE, CFM Elizabeth Jefferson, PE, CFM WSP
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The West's rapidly growing population centers are primarily centered around rivers. To mitigate the flood risk that comes with these rivers, communities have often constructed levees. According to the National Levee Database, Montana has 75 recognized levee systems that span approximately 77 miles with an average levee age of 66 years. As FEMA flood mapping is updated, these systems need to be analyzed and potentially certified and accredited under 44 CFR 65.10. One requirement for the levee certification process is to analyze the interior drainage system and map the resulting ponded water. This requires statistically examining both the riverine and interior flooding events in what is called a coincident frequency analysis (CFA). This looks at the statistical likelihood of a given storm event occurring at a specific river elevation, resulting in 1% annual chance ponding elevations that are ultimately mapped on a FEMA Flood Insurance Rate Map. Typically, such analyses are completed using HEC-HMS or SWMM in combination with a 1D HEC-RAS model for the exterior flood source. With recent advances in 2D hydraulic modeling WSP has been working on developing a CFA process for levees using 2D HEC-RAS. This methodology allows for the riverine and interior drainage flooding to be analyzed in one combined hydraulic model and provides detailed information for scour and overland flow, along with other 2D modeling benefits.

This presentation sheds light on how 2D HEC-RAS could be used for CFAs for levees along with associated potential benefits and challenges. We will look at a case study that was performed by WSP within an arid region of Colorado and describe scenarios and lessons learned in which this 2D HEC-RAS methodology might or might not be appropriate.

1:45 PM - 2:05 PM Methods for calibrating a 2D hydraulic model for indirect discharge estimation and applications in stream gauging **David Saba**
MT DNRC

Obtaining stream flow measurements during peak flood flows remain difficult due to temporal and equipment constraints as well as hazardous conditions. Typically, water surface elevations of high-water indicators are collected post-flood and used with open-channel hydraulic equations as a way of indirectly measuring peak-flood flows. While these methods are well established, advancements and increasing accessibility in computing and survey technologies continually improve the accuracy and confidence of these models. The MT DNRC Stream Gauge Program consists of over 40 stream gauging sites throughout the state of Montana and is rapidly expanding. While stream ratings for baseflow and small flood events are well established at these sites, discharge for larger flood events is generally poorly calibrated. By creating a 2D hydraulic model of gauge sites from newly surveyed channel bathymetry, surrounding floodplain, and historical high-water indicators, stream discharge during high stage may be estimated with a high degree of confidence. Using the June 2022 historic flood event on the West Fork of Rock Creek near Red Lodge, MT (43D 01900), we aim to test methods for efficiently calibrating a 2D model for gauge sites. We compared different approaches for surveying the target stream reach and assessed the efficiency of each in terms of field and post-processing time, as well as the survey error's impact on the resulting discharge estimate. We present a calibration approach that produces both model parameter probability distributions and a probabilistic final indirect discharge based on multiple model runs initiated through a Python based interface. This approach was able to indirectly reconstruct the post-flood rating curve for the site to within 5% error. Both the survey and modeling methods refined during this case study have been applied at several additional gauging locations to improve the accuracy of our gauging program and expand our ability to quantify flood events.

2:05 PM - 2:35 PM Hydraulic Model Calibration in a Regulated Watershed **John C. Heine, PE, CFM**
Morrison-Maierle

The Bighorn River in Bighorn County, MT is regulated by three large dams within the Bighorn River basin. The Buffalo Bill Dam near Cody, WY was built in 1910, the Boysen Dam near Thermopolis, WY was built in 1952, and Yellowtail Dam near Fort Smith, MT was built in 1966. These dams regulate flow from 86% of Bighorn River Basin and have significantly altered the natural hydrology of the basin. Because of the changes in hydrology, the floodplain of the river has changed over time, especially below the historic ordinary high water mark of the river. As part of the 2021 Bighorn, Treasure, and Rosebud Countywide Floodplain Study completed for the Montana Department of Natural Resources and Conservation, Morrison-Maierle developed a 2D HEC-RAS model for approximately 20-miles of the Bighorn River downstream of Hardin, MT. This reach of the river has no river gages and limited calibration data from historic flooding events. Morrison-Maierle will present a case study of the 2D model calibration and discuss how changes in the floodplain due to altered hydrology will affect future floods.

2:35 PM - 2:55 PM Afternoon Break **Courtesy of Dewberry and Allied Engineering**

2:55 PM - 3:25 PM WHAT DID YOU SAY? Crucial Verbal and Written Communications **Shylea Wingard**
MT DNRC

Being able to communicate both verbally and inwriting with tact and diplomacy is essential to being a well-respected leader in the workplace. This workshop goes beyond grammar to suggest successful tools to write more effective messaging including letters, emails, and articles. It will also offer proven ways to improve interpersonal skills like active listening, building trust, and using emotional intelligence to improve community meetings, client or co-worker discussions, and project summaries.

3:25 PM - 3:55 PM The Dam Will Hold Back All the Water, Right? **Josh Robbins, PE, CFM**
HDR

Although dams store a significant amount of water, there is still a risk of flooding downstream properties. While a dam failure is unlikely, the flooding risk associated with a dam failure can be catastrophic. This presentation will provide a high level overview of the process used to quantify risk downstream dams. The process and workflow for evaluating risk will include: data requirements, two methods of evaluating risk, and how the level of risk is used to guide decisions. Two methods of estimating risk will be described including the Reclamation Consequence Estimating Methodology (RCEM) and LifeSIM, a computer program used to simulate flood hazards.

3:55 PM - 4:15 PM BLE Data for Floodplain Management

**Jerri Daniels, CFM
Dewberry**

What is BLE data and how does it differ from Best Available Data? Are they the same? Which data do I refer to for permitting? When is it not prudent to use BLE data? This presentation will help to guide the audience in understanding how BLE data are developed and how it fits into the regulatory world of the NFIP. Brief discussion is included on 1D vs 2D BLE and how BLE data is now contracted and scoped to become updated FIRM data. Suggested uses of the BLE Data will be provided with practical examples of when to use BLE data for floodplain management and when to use your FIRM. Can BLE data be regulatory? Yes, but only in certain circumstances. This presentation will be your guide.

4:15 PM - 4:40 PM Incorporating Habitat and Species Considerations into Floodplain Management

**Harry Katz, CFM
FEMA Region 8**

The goals of floodplain management historically focused almost exclusively on reducing flood risk to property to reduce flood damages and protect personal health and safety. Considerations for habitat and species have often been missing, minimized, or not fully embraced by floodplain managers. Development in the floodplain may result in adverse effects to the floodplain that can lead to the degradation and loss of natural functions and habitat. This degradation and loss can occur through clearing vegetation, placing fill, covering floodplains with impervious surfaces, rerouting stormwater, increasing pollution sources, and channelizing rivers. These development actions could have direct and indirect detrimental effects on the quantity and quality of floodplain habitat. By integrating floodplain management and wildlife conservation, such as the protection of habitat essential for threatened and endangered species, communities have the opportunity to reduce flood risk and protect species and their habitat while enjoying the benefits of naturally functioning floodplains. This presentation will detail current FEMA efforts to incorporate conservation measures into floodplain management, including the development of a National Flood Insurance Program (NFIP) Endangered Species Act (ESA) Section 7(a)(1) Conservation Action Program. This program promotes the conservation of threatened and endangered species and their habitat through three key components: building awareness, helping with identification, and the creation and promotion of existing incentives through the Community Rating System (CRS).

6:00 PM - 9:00 PM Evening Social

Courtesy of Pioneer
Technical, Morrison-
Maierle, and KLJ

Friday, March 1 Conference Sessions – Ballroom

9:00 AM - 9:20 AM Culvert Reliability Analysis Presentation

**Andrew Graham, PE, CFM
Lucio Stagnitti, EI
Allied Engineering**

- General Overview of our approach to evaluating the reliability of projects with a high number of aging culverts.
- Over view of the Stochastic Analysis used to evaluate many variables at once and generate a reliability score for each one.
- The overall goal is to create a process that would allow owners and managers to make decisions on replacement of aging culverts or other hydraulic structures.
- Review of project on the Idaho-Montana border called Route of the Olympian that is a historic railroad that is proposed to become a public trail that connects to the Hiawatha Tunnel and proposed Great America Rail-Trail.
- Conclusion on review of 30 culverts within project that contains hundreds of culverts.

9:20 AM - 10:05 AM Montana Resiliency Fund

**Sara Hartley
MT Disaster & Emergency Services**

Authorized by the Montana Legislature June 2023, the Montana Resiliency Fund was established to Montana Disaster and Emergency Services. This allocated 16 million dollars, 8 per biennium, for years to offset the local match requirement for grants awarded in the Hazard Mitigation Assistance program under FEMA. Historically large mitigation projects remain in jeopardy because of the required 25% non-federal/local match. The resilience fund will review and prioritize offset funding based from an approved review criteria and a Mitigation Advisory Committee comprised of multiple state agency partners.

10:05 AM - 10:35 AM Migratory Streams, Regulatory Maps, and Interpretation

**Mike Day, P.E.
Bruce Anderson
WGM Group, Inc.**

Have you ever played where's Waldo growing up? In Montana many of our waters are highly dynamic and can substantially change location from year to year. With dynamic rivers and static maps how and who gets to decide where Waldo is at? Waldo in this case is the floodplain inundation limits and the floodway limits. This presentation will discuss the complexities of answering where Waldo is at. From FEMA, State, and Local guidance to potential Floodplain Administrator interpretations. Debate who is right and who is wrong, and how to find Waldo when the river doesn't match the Regulatory Maps

10:35 AM - 11:00 AM "Working Together" – 2024 Update on Joint Stream Restoration Committee (JSRC)

**Shylea Wingard
MT DNRC**

Regulatory permitting of stream projects can be a confusing and daunting experience. The Stream Restoration Committee is a multi-agency committee formed to investigate potential avenues to improve the permitting process of stream restoration projects in rural Montana areas. Shylea will provide and update as what the committee goals, objectives, and projects JSRC will be working on in 2024.

11:00 AM - 11:20 AM Data-driven Resident Flood Communication & Outreach

**Miles Green
Forerunner**

Resident communication and outreach are fundamental aspects of floodplain management. If done successfully, they can have cascading positive effects. Providing the community with actionable flood risk information can empower them to take individual action to mitigate and adapt, resulting in fewer compliance issues over time. More-informed residents can also mean a safer community overall, with open lines of communication helping to strengthen government trust. While effective communication is crucial, making it a priority can be difficult in communities where floodplain managers have competing important tasks and not enough time. It has also become increasingly complex with map changes and shifts in insurance. Compounding this is the need for clarity and specificity – with more and more residents seeking detailed information about individual properties. It can be hard to provide nuanced data to a large public and even harder to keep track of that communication for internal recordkeeping, relationship building, and programs like the CRS.

Adjourn