

Federal Program and Policy Changes Needed to Advance Integrated, Functional Mapping of Floodplains and Wetlands for Nature-Based Solutions



Feb. 10, 2021

A Natural Floodplain Functions Alliance
and Wetland Mapping Consortium
Workshop

This paper presents the topics, key findings and next steps from a half-day virtual workshop held as part of a multi-year initiative exploring innovative ways to integrate geospatial data and functional assessment of riparian and coastal wetlands and floodplains into federal policies and to inform local decision-making.

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BACKGROUND:

In 2017, ASWM began facilitating a discussion between the Natural Floodplain Functions Alliance (NFFA) and the Wetland Mapping Consortium (WMC) about the possibility of creating a multi-year initiative to improve floodplain mapping programs by integrating geospatial data being developed and used by the wetland mapping community to identify wetland and floodplain functions and use that data in support of nature-based solutions for reducing flood risk. The two groups identified individuals from each organization to participate in a Planning Committee. The Planning Committee began holding monthly conference calls and decided to hold three annual workshops with a final long-term goal of developing a baseline national classification standard for functional assessment of wetland and floodplain functions that could be built based on regional environmental variations as well as different project goals and/or state/local policies to better inform land-use decisions and provide greater project outcomes with multiple co-benefits.

Workshop #1:

On Tuesday, April 10, 2018, the NFFA and the WMC hosted the first of the three planned workshops at the Tommy Douglas Conference Center in Silver Spring, Maryland entitled, “Exploring Opportunities for Integrated Mapping and Functional Assessment of Riverine and Coastal Floodplains and Wetlands.” The

overall goal of the initial workshop was to discuss current and potential opportunities to integrate geospatial mapping and functional assessments of coastal and riparian wetlands and floodplains, to improve land use decisions and resource management and to reduce risk from the impacts of flooding, sea level rise and other extreme weather events.



2018 NFFA-WMC Workshop in Silver Spring, MD

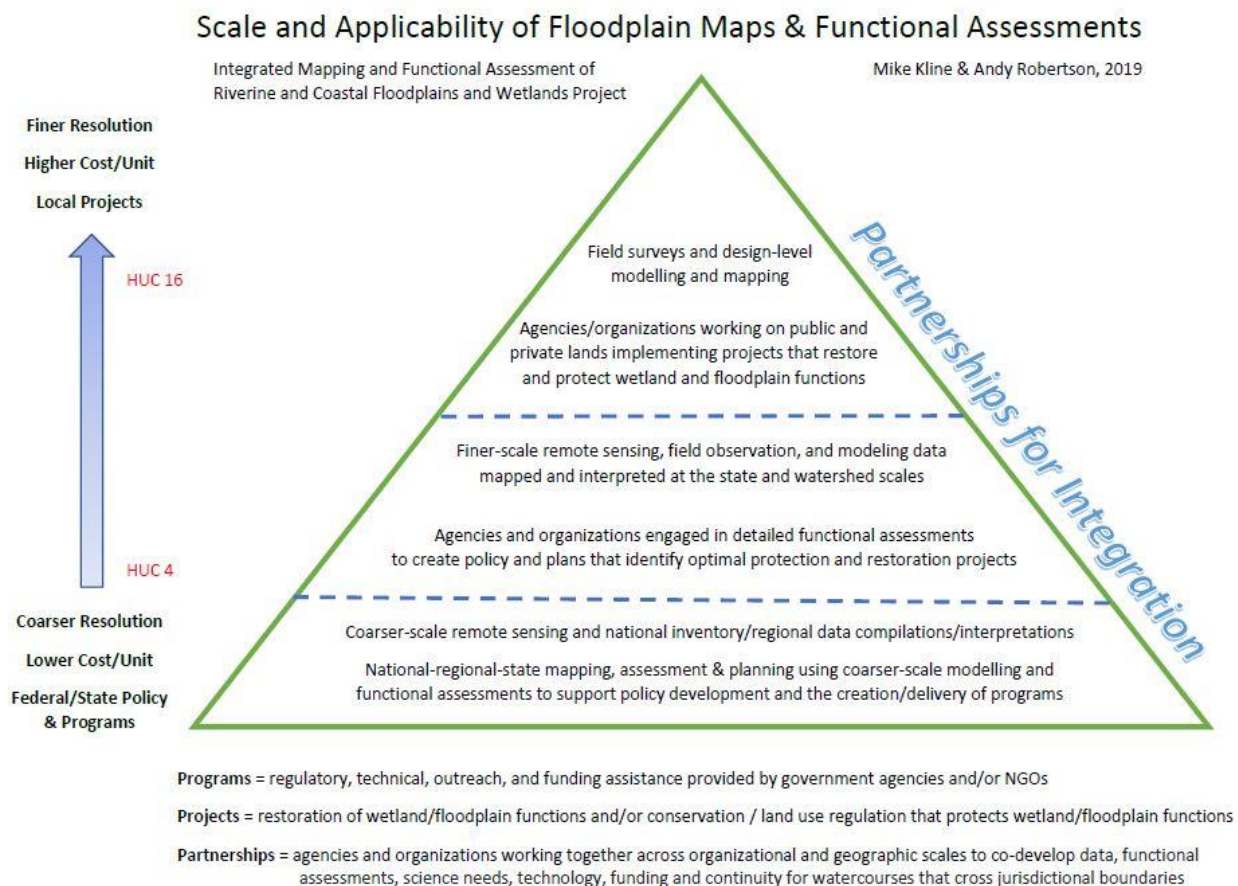
Some of the common recurring themes expressed during the workshop included:

- There is a need for improved communication among professionals, knowledge sharing, tools, and models.
- Partnerships, likely and unlikely, are critical to provide technical assistance, combine funding, expertise, etc.
- Digital data availability is important (identify who has it, where it is, and how to obtain it).
- Continuity of knowledge is key (stop reinventing tools and/or data that is already out there).
- Existing mandates and legislative tools need to be leveraged.

- We need to clearly articulate use cases to demonstrate success and generate fiscal support.
- We need to innovate and embrace technology while bridging the gap.
- Mapping efforts need to be tied to societal needs, hazards and costs.
- Social science needs to be embraced in order to tell the story of social significance.
- Avoidance should be a priority.
- Tools can be complex, but results should be easy to explain.
- We need to provide clear, consistent, accessible, and consumable messaging about the benefits and enhanced decision-making tools provided by integrating maps and providing site specific information about natural floodplain functions and services.

Workshop #2:

On September 30, 2019, the second workshop in this series was held at The Nature Conservancy headquarters in Arlington, VA. Thirty-four people participated in the workshop, including 11 federal agency staff, 3 university staff, 4 state agency staff, 15 non-profit staff and/or representatives and 1 private consultant. The day began with an introduction to the conceptual scale and applicability diagram framework that Mike Kline (Fluvial Matters, Inc.) and Andy Robertson (Saint Mary’s University of Minnesota) developed to guide the development of the day’s agenda as shown below.



Kline and Robertson discussed the need to develop a stronger community of practice that will work at all levels of the pyramid. Each level of the pyramid represents different scales of sensing and assessment – from coarser scale to a more granular local scale. The pyramid framework was used to show a hierarchical strategy for gathering information and providing decision support, yet also supporting the idea that feedback among each scale is necessary to inform efforts at each level of the pyramid and ensure that the right tools are developed and/or used at the right scale. Data information and scale will help drive policy and implementation. Based on this framework, the workshop focused on four different case studies at different scales to derive lessons learned and inform future efforts.

Afterward, presentations were given (abstracts are included below) that focused on different sections of the pyramid, including:

- An Interactive GIS-Based Tool to Guide Floodplain Protection and Restoration in the Mississippi River Basin (Eugene Yacobson, The Nature Conservancy)
- Vermont’s Partnership for Functioning Floodplains (Mike Kline, Fluvial Matters, Inc. – formerly Vermont Department of Environmental Conservation)
- Building Capacity for Watershed and Community Resiliency in Wisconsin’s Lake Superior Basin (Andy Robertson, Saint Mary’s University of Minnesota and Kyle Magyera, Wisconsin Wetlands Association)
- The Iowa Watershed Approach: A Vision for a More Resilient Iowa (Larry Weber, Iowa Flood Center)

Group discussions unpacked some of the information shared in the presentations and provided the participants a chance to identify gaps, needs and next steps. Three discussion topics were included: 1) identifying datasets, databases, models, and approaches that are applicable to each level of the pyramid and levels of agency/organizational involvement; 2) identifying priority functions for assessment and methods for quantifying/scoring function provision; 3) identifying key agencies/organizations and others for implementation and useful resources, publications, and projects.



2019 NFFA-WMC Workshop in Arlington, VA

Data gaps and needs identified:

- We need to invest in maintaining and updating the NWI dataset to be able to show land cover change over time. However, we also need to improve existing data. Ideally, we would improve the NWI by including forested and headwater wetlands. The technology is there, just not the resources.
- There is a lack of hydrologic data – in Iowa they increased the number of stream gauges but there is still a lack of water quality data.
- We need better data on percentage of land in different floodplains – 5-year, 10-year, 25-year, 100-year and 500-year. Data and assessment methods to document stream and floodplain connectivity at these recurrence intervals are also critical in the functional assessment that support the identification of restoration priorities. This could be done by state or by watershed.
- We need to create an inundation map that can be made available to everyone. FEMA maps are regulatory, they are not up to-date or comprehensive – 40% of FEMA maps are in hard copy only and many streams are not mapped at all. We need to know where in the floodplain the functions are occurring – this is where we need to focus, not on regulatory.
- Parallel to inundation functions, floodplains moderate natural erosion and deposition processes that provide for water quality, erosion hazard mitigation, and habitat mosaics. Mapping and assessment methods to incorporate this science into our decision support tools are needed.
- We need better data on wetland and floodplain functional lift that is quantifiable so functional lift can be monetized.

Workshop #3:

The third and final workshop was originally scheduled to take place at Pew Charitable Trusts headquarters in Washington D.C. over 2 days in the fall of 2020. However, due to the COVID-19 pandemic, the in-person event had to be cancelled. The planning committee felt strongly that the final 2-day workshop needed to be an in-person event, however there were concerns about losing momentum by postponing it, therefore, the committee decided to hold a half-day virtual event in February of 2021 to keep discussions ongoing. The workshop provided an opportunity to focus on federal policy barriers and opportunities to advancing an integrated mapping approach to floodplain and wetland management. The information collected from stakeholders will be used to develop a robust agenda and set the stage for the next opportunity to hold the 2-day in-person workshop (tentatively scheduled for the fall of 2021). The following summary reflects the discussions and information shared during the half-day virtual workshop.

HALF-DAY VIRTUAL WORKSHOP SUMMARY

On February 10, 2021, the intermediary half-day virtual workshop was hosted and facilitated by the Association of State Wetland Managers (ASWM). Thirty-five people participated, including 9 federal agency staff (USFS, EPA, FWS, NOAA, FEMA, USGS), 6 state agency staff, 1 local agency staff, 5 private sector staff, 12 non-profit staff, and 2 university staff.

David Fowler (ASFPM) opened the workshop with a welcome from the Association of State Floodplain Managers Foundation and a tribute to Jon A. Kusler, PhD, Esq. who passed way in October of 2020. Jon was the founder of the Natural Floodplain Functions Alliance (NFFA) and the Association of State Wetland Managers. Jon wanted the NFFA to promote natural floodplain protection and restoration within federal agencies and the Federal Interagency Flood Management Task Force (FIFM-TF). He wanted the NFFA to help shape federal policy to provide consistent protection of natural floodplains and their functions. He was instrumental in promoting the first NFFA workshop back in 2011 in Washington, D.C. This more recent series of workshops is a tribute to his passion and his legacy. After Dave's opening remarks, Marla Stelk (ASWM) and Andy Robertson (Saint Mary's University of Minnesota) gave an overview of the goals for the day, the agenda, and reviewed findings from the previous two workshops.

Eileen Shader (American Rivers) and Sarah Murdock (The Nature Conservancy) gave a comprehensive presentation on "Federal Policies and Funding Programs Influencing Nature-Based Solutions in Floodplains and Wetlands." They defined "nature-based solutions" broadly as approaches that "use natural systems, mimic natural processes, or work in tandem with traditional approaches to address specific hazards or address water resources challenges." They discussed Executive Orders 11988 and 13690 in the context of the goals of this project and highlighted a few barriers to their successful implementation such as: the vulnerability of E.O.s to changes in Administration and the lack of implementation guidance for them from federal agencies; the Unified National Program for Floodplain Management (UNPFM) which sets goals for the preservation and restoration of the natural resources and functions of floodplains is very outdated, and; the Federal Interagency Floodplain Management Task Force (FIFM-TF) lacks any formal commitment (dedicated staff, funding, etc.) from the U.S. Army Corps of Engineers (USACE), the Federal Emergency Management Agency (FEMA), or the Council on Environmental Quality (CEQ).

Eileen and Sarah provided a timeline review of interagency water policies affecting nature-based solutions. Then they took a deeper dive into policies, barriers, and funding opportunities within the USACE, FEMA, Natural Resources Conservation Service (NRCS), National Oceanic and Atmospheric Administration (NOAA), Federal Highway Administration (FHWA), and an overview of funding programs available within the

Department of the Interior, the U.S. Department of Housing and Urban Development, and the U.S. Environmental Protection Agency. A list of the policies, barriers, and funding opportunities presented is in Appendix A.

During the Q&A period, questions about the UNPFM surfaced such as why did the UNPFM never become a “program”, but instead remained only a “guide.” A participant responded that execution of the UNPFM is a shared unfunded responsibility which makes it difficult to push forward, even with people in the lead agencies wanting to make something happen. E.O. 13956 (“Modernizing America’s Water Resource Management and Water Infrastructure”) was identified by a participant as a possible opportunity to advance nature-based solutions. The potential role of FIFM-TF was also discussed as it was noted in E.O. 13956 in the context of community-level flood resilience.

It was noted by a participant that in Section 5 of E.O. 13956 it states “Federal agencies engage in a wide range of activities relation to water resource management. Within 120 days of the date of this order, the Water Subcabinet shall submit to the Chairman of the CEQ, the Director of OMB, and the Director of OSTP, a report that recommends actions to address the issues described below, and for each recommendation identifies a lead agency, other relevant agencies, and agency milestones for fiscal years 2021 through 2025: (d) Actions to improve water data management, research, modeling, and forecasting, including through: (iii) developing state-of-the-art geospatial data tools, including maps, through Federal, State, tribal, and territorial partnerships to depict the scope of waters regulated under the Federal Water Pollution control Act Amendments of 1972 (Public Law 92-500).” It was suggested by a participant that the Water Subcabinet established under E.O. 13956 could be the proper venue for discussing the issue of better integration across federal agencies as it is intended to coordinate across the federal agencies about issues that crosscut the different agencies.

After a brief break, Tim Trautman from the Charlotte-Mecklenburg Stormwater Services (CMSS), gave a presentation, entitled “Mecklenburg County: From Maps to Mitigation & Natural Infrastructure.” He gave an overview of the Charlotte-Mecklenburg Project that had two primary goals: 1) protect life and property, and 2) restore natural floodplain functions. The Charlotte-Mecklenburg area was experiencing significant flooding events due to impervious surface run-off. An increase in storm water volumes and velocities was causing significant water quality degradation and property damage. Degradation of creeks and wooded stream buffer losses were compounding the problem by increasing volume and velocity of run-off.

To improve flood resiliency, CMSS established a floodplain buy-out program in 1999 that was funded through a Major System Storm Water Fee that provided them with “rainy day funding” for a “quick-buy” program and enabled them to buy and demolish 10-20+ homes per year. In 2004, they created new regulations and floodplain maps that include

consideration of “future conditions” to reflect climate forecasts for increasing precipitation rates. The fund also provided them with \$3 million/year to restore streams and floodplains, expand parks and greenways, and improve stormwater management.

Tim discussed the important role of local government in land use plans and decisions, local ordinance and regulations, and capital improvement plans. However, he pointed out that rarely do they also take on the responsibility for hazard mapping. He discussed some of the digital tools that are available for mapping floodplains and then gave a review of CMSS’s Flood Risk Assessment and Risk Reduction (RARR) Plan’s stepwise decision-making process: 1) assess individualized flood risk based on 17 risk criteria; 2) evaluate 19 risk reduction techniques to determine their potential effectiveness; 3) prioritize mitigation actions by calculating priority scores; and 4) implementation. The RARR data is displayed in an online geospatial format, allowing easy access for users and the general public.

The CMSS also developed a Stream Restoration Ranking System (SRRS) Tool that focuses on major system reaches (FEMA regulated) currently ranked as having the poorest channel stability and instream habitat. It employs two evaluation methodologies: desktop scoring and field scoring. Floodplain mapping is the backbone of the scoring systems.

Considerations include channel stability (100 potential points), habitat (200 potential points), and geomorphic conditions such as how many reaches are within each stream segment. Since 1999, CMSS’s efforts have removed 400 buildings/homes and over 700 families from harm’s way, restored 170 acres, avoided damages to hundreds of buildings, and saved approximately \$27 million in avoided property damage costs. Charlotte has not had to rely on any disaster funding as a result. Buy-out and restoration benefits that have been realized already include:

- Less tax money spent on emergency rescues.
- Less tax money spent on disaster relief.
- Less tax money spent to replenish the National Flood Insurance Program
- Restoring natural floodplains to enhance water quality and the ecosystem.
- Safer housing stock.
- Increased opportunities for recreation and interacting with nature, such as creek-side greenways.

Comments regarding the CMSS initiative included recommendations that federal agencies and policies should support efforts that are proactive in creating local funding support and utilize GIS-based data delivery to support decision-making based on risk evaluation.

Break Out Room Discussions

After Tim Trautman’s presentation and another brief break, the participants were split up into four break-out rooms. Each break-out room had a designated facilitator to guide

participants through six (6) questions. A compiled summary of all discussions is provided below:

- 1) Are there any other relevant federal policies, programs, or regulations that we have not identified today?
 - FEMA Disaster recovery funds and other sources of disaster funds (make sure nature-based solutions are included in those funds)
 - FEMA's CRS – issue of planting trees and no rise a negative with CRS program
 - USFS flood mitigation and fish passage programs
 - USACE Silver Jackets – FY22 scoring based on actual functions.
 - DOI programs
 - FWS – grants for habitat but also support NBS for water quality and flooding.
 - Refuges - NAWCA
 - USGS Water Mission Area Program – good info and funding support
 - HUD – CDBG - Mitigation
 - NOAA (with Federal programmatic guidance and appropriations):
 - (1) Coastal Zone Management Programs (<https://coast.noaa.gov/czm/>), including its Coastal Nonpoint Pollution Control Program – Fed partnership w/ State/Territorial governments. Federal consistency is a powerful tool.
 - (2) Sea Grant programs (<https://seagrant.noaa.gov/>) – hosted by and in partnership with academic institutions
 - (3) National Estuarine Research Reserves (<https://coast.noaa.gov/nerrs/>) - place-based partnerships with universities. In addition to conservation on the NERR sites themselves, they are often regional hubs for technical assistance, training, and other capacity building for use of NBS for multiple societal outcomes (water quality, habitat, flood mgmt.).
 - US Forest Service - Good Neighbor authority
 - NASA Applied Science Program
 - Clean Water Act
 - Section 404: Touches most on natural systems like wetlands.
 - Section 319
 - MS4/TMDL: Impaired waterways due to disconnection from floodplain
 - WOTUS – National Science Board & EPA studies under Obama Administration on connectivity
 - Environmental Mitigation funding
 - EO 13956 Modernizing America's Water Resource Management and Water Infrastructure
 - Dam and levee safety tied to big infrastructure bill
 - Data to aid consideration of natural functions.

- How hydroelectric will play into the move away from fossil fuels.
- Natural Disaster Safety Board – did not pass last congress but will probably be reintroduced. Post disaster analysis could show connecting natural functions to disaster recovery could be very beneficial.
- Geospatial Data Act of 2018
 - FGDC Water and NHD infrastructure
- Atlas 14 takes the array of data that the weather service has to identify the extreme events in various frequencies.
 - Ideally, the way FEMA has set up their floodplain mapping, they would start with Atlas 14 data. How much precipitation can be expected to fall in a watershed and water kind of floods would result. The data behind the Atlas project is at least 10 years old across the country and as much as 50 years old.
- Interior data 3D Elevation program/Lidar program to identify where healthy and unhealthy floodplains exist. Already using this in the wetland world to derive function. Lots of measures you can derive from there to infer flood frequency, etc.
- USGS 3DEP program
- FHWA and other infrastructure development programs where impacts may happen.

2) What kinds of functional assessment data do federal agencies typically require or expect in support of projects that use federal funding?

- Huge variability – NRCS relies on its own toolsets as most agencies do. They may accept other tools but prefer the easiest path forward.
- Not a lot of guidance out there from any federal agency
- Federal agencies contradict each other in what they are asking for.
 - Also depends on the type of project.
- Right now, the upfront costs end up on project proponents vs federal agencies.
- How do you come up with data that results in a quantity of flood volume retained? That is a really challenging thing to do.
- NFWF developed a library for functional assessment data but it is somewhat ad hoc and siloed.
- FEMA requires H&H modelling to get at inundation functions, but it is at the site scale and does not look at cumulative effects over larger spatial and temporal scales that would explain values -- other functions.
- FEMA coastal modeling - storm-induced dune erosion requires a specific volume (540 sf in cross section above 1% stillwater elevation) to be considered sufficient to survive a base flood and provide protection in landward direction. Also, vegetation must be “well established” to be considered a Primary Frontal Dune (also part of flood zone mapping - VE Zone criterion).

- The NFIP CFR does not include any performance requirements for the broader suite of floodplain functions - so there is no need to include data.
 - Erosion zones are in the statute, but because there is no performance standard there is no incentive to bring in other functions into the modeling efforts.
 - This could possibly be addressed by strengthening minimum standards.
 - Small projects
 - NEPA and EIS assessments are especially costly for small projects.
 - Small communities/Green infrastructure projects – no change to BFE is sometimes a big portion of project cost.
 - Benefit-cost analysis
 - With FEMA, the BCA tool only accounts for a small select set of natural functions, missing the wider full suite like coastal erosion. Buy-out programs do not work well in coastal and riverine areas for this reason. On buyouts, stream restoration, and other nature-based projects, BCA is costly and misses benefits, e.g., loss of life, health.
 - FEMA Benefit-Cost Analysis – started out with a generic request for functional assessment data and is really vague still.
 - Natural conditions have been added to BCA under FEMA. But not added much to other green infrastructure projects.
 - The Corps has a different BCA framework. This is itself a barrier/obstacle to implementation. The Corps methodology is less clear. If you cannot quantify it directly then it doesn't get accounted.
 - There are real equity issues with the BCA. If it is tied to existing infrastructure, then areas with higher value or more affluent areas get greater attention.
- 3) How do data requirements differ between funding/regulatory programs and project implementation? How granular does the data need to be?
- Depends on what you are trying to measure or quantify
 - Big division between habitat restoration programs and flood programs – habitat programs have larger overarching plans and generally don't require as high resolution as flood programs.
 - Monitoring requirements for different programs are focused on specific outcomes- water quality monitoring won't capture useful flood data.
 - Depends on the location of project and how close it is to the built environment to show no adverse impacts.
 - Can vary widely depending on the program.
 - Different agencies have different priorities so when dealing with multiple agencies you have multiple requirements to meet.

- For CWA Section 404, more granular data is needed. So differing levels of data needed.
 - FEMA – very NIFP driven with need for data to prove trees do not increase flood impact. Risk Rating 2.0 might change this dynamic.
- Permitting requirements are different than funding requirements – a different level of granularity is needed for regulators and funding but when the project gets to implementation much more granularity is needed.
 - Length of time needed for project review is a deterrent.
 - State stormwater requirements are different than FEMA requirements, so you must do two different ways.
 - USGS is always looking for the highest resolution they can get to measure stream channel, floodplain width, erosion, etc.
 - USFS do not need as high of resolution for their conservation and restoration work.
- Ecological and nature-based solutions are trying to achieve dynamic systems, that allow changes over time. Regulatory programs are established around static systems. They base regulatory decisions over snapshots in time of static systems.
 - Need to align regulatory and project implementation in a way that supports change and a recognition of non-stationarity as a desired principle.
 - Need to decide if this recommendation should be articulated in federal policy and/or as part of collaborative, multi-stakeholder document like an updated UNP or as a Congressional directive.
 - Need to be ok with short-term impacts in order to achieve long term benefits.
 - Agencies need to be ok with uncertainty and calibration of models from in field data collection.
- Watershed scale review is important for coordination. Watershed modeling should drive and support technical analysis needed to drive the project work.
- The same type of benefit-cost analysis on buyouts and stream restoration that FEMA would require is not a requirement under the NFWF Coastal Resilience Fund. The USACE analyzes regional economic impacts, but they are limited in how they are counted (e.g., if jobs are lost in one area and moved to another it won't count).
- There is an issue regarding the FEMA requirement to have a full set of H&H modeling to get a project implemented in floodplain.
 - Must be an acknowledgment that H&H model is only as good as the point in time that they were done.
 - Many people interpret that “no rise” only applies to built infrastructure.

- It is challenging to process high resolution data if you don't have the resources.
 - NEPA and EIS especially costly for small projects (those are not required under NFWF's National Coastal Resilience Fund. Usually only the data that the project needed to plan and justify the project. There are monitoring requirements/provided with the RFP and reviewed and negotiated. 1-1 nonfederal match)

- 4) How can maps of floodplain and wetland functions provide the data that federal agencies currently require in a cost-effective manner?
 - By leveraging and consolidating data that already exists and knowing where it is (local, state, or federal level) – some states have more robust GIS communities than others.
 - There is a lot of duplication of effort – need better coordination. For example, NOAA is the “house” for their types of data– we need to stop recreating the wheel.
 - Need to develop state or regional level functional assessment data repositories.
 - State Hazard Mitigation Plans and Climate Action Plans – opportunity to foster central data repositories and coordinate project data.
 - State Universities or other academic institutions are another potential place for a repository, however, there is not a great connection between academic output and agency or municipal project needs.
 - Fundamental interoperable maps of wetlands (NWI), streams (NHD) and floodplains to a common baseline would greatly support cost effective functional mapping. The USGS's internet of water concept could be helpful in terms of data consolidation and access.
 - The big challenge is standardization, so everyone submits data in a common format, e.g., sea level rise modeling – different assumptions make it difficult to share data or combine datasets.
 - Could be consolidated through the GeoPlatform.
 - Also needs to be fine scale enough to support modeling functions and values.
 - National level scale is too large to effectively model.
 - Model smaller events - stormwater projects especially need data from smaller events than are typically done for NFIP mapping.
 - States/watersheds could be an intermediate level of functional assessment. State regions have different scales of data and shouldn't map to the “larger-scale” denominator found in federal datasets.
 - Need to identify what the base data layers are that states need help developing.

- Have all floodplain maps be backed by models, even if it is less granular than AE zones (flood zones are areas that present a 1% annual chance of flooding and a 26% chance over the life of a 30-year mortgage, according to FEMA.
 - There are mass modeling techniques available now that are less costly to use and add specific location data.
- DOI data 3D Elevation program/Lidar program could potentially identify where healthy and unhealthy floodplains exist. Available to the public and might be a place to look. Already using this in the wetland world to derive function. Lots of measures you can derive from there to infer flood frequency, etc.
- Studies that show how coastal marshes have reduced infrastructure and risk is helpful to federal agencies in this sense.
- Use functional assessment data to show how unhealthy ecosystems (e.g., harmful algae blooms) create economic and ecosystem damages. TNC has done science work around nutrient loading in Mississippi to target work with the agricultural community.
- Vermont is looking at floodplain connectivity, geomorphic processes, and function instead of something like conveyance, using data to look at floodplain connectivity and the steps that can be taken to increase connection to achieve the natural erosion, deposition, and storage processes that support function. Project-based socio-economic values derived from assessments of wetland and floodplain functional life are being quantified to support funding programs. The question isn't what the federal agencies can accept but how can they support efforts like mapping functions and tying functions and values into insurance maps. Not being so tied to potentially outdated flood insurance maps and getting FEMA to be open to how mapping functions can inform decisions in these areas.
- Decoupling - if agencies are all focused on regulatory responsibilities and require Congressional action to move beyond that, is there a role for state or regional action to step in.
 - CBDG for example decouples funding from federal requirements.
 - Decouple the CRS from insurance.
 - NRCS has the floodplain easement program. Pays for 100% of the restoration and a significant amount of the buyout. NRCS money isn't as tied to specific zones. Are there ways to do this in other agencies, to untie federal funding from outdated maps/data? NRCS EQUIP also offers that kind.
- Need a single agency with a clear mandate to provide seed money at the federal level to help state to state based modeling. But who would administer it? Cross cuts so many agencies. There are so many agencies and so many products.

- 5) What is needed for federal agencies to accept new forms of functional assessment data or adjust data expectations?
- There needs to be a lot of pushing and patience to shift views/mindset from ecosystem type to function.
 - Need to get new legislation through – can be difficult to do.
 - In the meantime, guidance documents are needed (e.g., FEMA technical bulletins)
 - Training, outreach, education – workshops like this one to break down siloes.
 - Examples, case studies, tools
 - Do a crosswalk between federal agency missions and the use of functional assessment data and determine if their requirements regulatory (or is it just how it has always been done?).
 - Gather stakeholder feedback and learn from unsuccessful efforts (i.e., was it the application process that created a barrier or the application itself?)
 - Policy/regulatory drivers calling for use of such data in achieving mission requirements (at least for flood loss reduction).
 - Facilitate the exchange and use of wetland delineation reports (which is a valuable source of data that isn't always exchanged by consultants and regulators, or across different programs).
 - Develop a common database and methodology for all federal agencies for data collection on water/hydrology.
 - Wetland delineation reports can be a valuable source of data, but that data isn't always exchanged by consultants and regulators, or across different programs.
 - Develop standardized data collection forms (Survey123) that state agencies can adopt and share with local communities.
 - Understand what statutory, regulatory, guidance constraints limit data requirements/considerations then adjust when necessary.
 - Data to support project success - predetermine what data needs to be provided to measure success (e.g., fish, wildlife, aquatic, sediment, economic, etc.).
 - Regulatory action is needed to move beyond barriers.
 - National guidance or regional guidance to waive barriers to enacting natural infrastructure.
 - When one program promotes natural infrastructure, and another puts up regulatory barriers, see if there a way to provide exemptions.
 - It would be helpful to identify where these barriers exist.
 - The annual timing of federal program funding is also a challenge – budgets can change from one fiscal year to the next. When funding comes there is urgency to execute which can make coordination on data collection and development even more difficult.

- There is FEMA discussion around Endangered Species Act crafted regional rules. Treading water but could still advance the work.
 - On the scientific side, we need to invest in additional validation of functional assessments. This could be partially done by making efforts to integrate functional assessment at multiple spatial and effort scales.
- 6) What opportunities to advance integrated mapping approaches resonate with federal partners moving forward?
- On the federal level, a considerable amount of geospatial data coordination happens within the Federal Geographic Data Committee and associated themes and workgroups.
 - Create damage assessment processes/methods for gathering data about floodplains and wetlands during disaster recovery (e.g., location of avulsions, floodplain disconnection, etc.) to include information about floodplain disconnections, etc. after major changes like floods.
 - The NAS Urban flood study might be helpful. One relevant finding was that “stronger coordination is needed across agencies that have a role in managing small or large urban floods”.
 - Use a climate informed science approach in the Federal Flood Risk Management Standard - have agencies to look at all the things that could affect flood risk. Look in the guidance documents – there is a large variety of things to look at. There is a hook for the agencies to support non-stationarity.
 - Coordinate data needs and available funding to maximize output/availability (i.e., between FEMA, USACE, NOAA, USGS, state, etc.).
 - Decoupling is the key issue and gives a clear mandate to a single agency to take the lead on a program to provide funding to states but chances of an agency taking this on does not seem likely. There are so many agencies and so many products, but you need a single agency with a clear mandate.
 - Find ways to coordinate between state and federal programs so data collection and funding can be maxed to the greatest benefit.
 - The Water Subcabinet, which was formed under the previous administration and formalized in E.O. 13956 “Modernizing America’s Water Resource Management and Water Infrastructure”, could be the proper venue for discussing the issue of better integration across the federal agencies.

KEY TAKE-AWAYS

The workshop highlighted federal programs and initiatives that either act as barriers or opportunities for the integration of wetland and floodplain functional assessment data in the development of local land-use decisions for minimizing flood risk and increasing the use of nature-based solutions. Nature-based solutions are often overlooked even if included as a

consideration in federal programs. More funding is needed for federal and state mapping programs and local governments need to invest in their own mapping programs and decision-support tools to better protect their communities. Leadership is needed as well as more training, education, and outreach. Simpler and smaller projects need more funding and regulatory flexibility. This community of practice needs to find ways to break down barriers between differing federal agency missions and the annual budgetary funding cycle. Because of the focus on damages to the built environment, we lose site of the watershed and the importance of watershed-scale planning and restoration. Decoupling regulatory programs from funding is an important concept to carry over. There is a need for a separate agency mandate that is not as focused on insurance, damages, and regulations than it is on being creative about solutions. We need to remove the public burden of maintaining historically altered hydrology at the expense of future benefits of improved flood resiliency, water quality, and habitat. We would all benefit from a national floodplain restoration policy (beyond what has been started with E.O.s.).

FINAL WORKSHOP RECOMMENDATIONS

The common thread in the first three workshops in the series was developing federal support for integrated wetland/floodplain functional assessment. The final workshop will be focused on developing clear policy recommendations and near-term actionable items within and among federal agencies. Given the emphasis in the current Biden Administration on climate change and resilience, the final recommendations from the workshop series will help connect the dots for federal agencies to highlight where there are gaps in data, funding and enabling policies, based on case studies and needs-based discussions shared during this multi-year project. The goal is to come away from this project and be able to clearly articulate to federal agencies: 1) the current baseline regarding data, funding, and policy opportunities; 2) what communities need within those areas; and 3) based on the collective expertise and feedback received from the steering committee and workshop participants, an actionable list of recommendations for filling the gaps.

ADDENDUM A: Federal Policies and Programs Supporting Nature Based Solutions: Resource and Reference Guide (DRAFT)

Prepared for “Federal Program and Policy Changes Needed to Advance Integrated, Functional Mapping of Floodplains and Wetlands for Nature Based Solution” Workshop

February 11, 2021

A. Executive Orders

- a. [E.O. 11988](#), Floodplain Management, 1977
 - i. “Section 1. Each agency shall provide leadership and shall take action to reduce the risk of flood loss, to minimize the impact of floods on human safety, health and welfare, and to restore and preserve the natural and beneficial values served by floodplains”
- b. [E. O. 11990](#), Protection of Wetlands, 1977
 - i. “Section 1. (a) Each agency shall provide leadership and shall take action to minimize the destruction, loss or degradation of wetlands, and to preserve and enhance the natural and beneficial values of wetlands”
- c. [E.O. 13690](#), Federal Flood Risk Management Standard, 2015
 - i. “...the Federal Flood Risk Management Standard (Standard), a flexible framework to increase resilience against flooding and help preserve the natural values of floodplains.”...“Where possible, an agency shall use natural systems, ecosystem processes, and nature-based approaches when developing alternatives for consideration.”.
 - ii. [E.O. 13807](#), Establishing Discipline and Accountability in the Environmental Review and Permitting Process for Infrastructure Projects, 2017
 1. Section 6 revoked E.O 13690
 - iii. [E.O. on Protecting Public Health and the Environment and Restoring Science to Tackle the Climate Crisis](#), Jan 20, 2021,
 1. Section 7(b) revokes E.O. 13807, reinstating E.O 13690.

B. Unified National Program for Floodplain Management

- a. [Federal Interagency Floodplain Management Task Force](#)
- b. [A Unified National Program for Floodplain Management](#), 1994
- c. [Protecting Floodplain Resources: A Guidebook for Communities](#), 1996
- d. [The Natural & Beneficial Functions of Floodplains: Reducing Flood Losses By Protecting And Restoring The Floodplain Environment](#), 2002 (Task Force on Natural and Beneficial Functions of Floodplains, Sec. 562 of [NFIP Reform Act of 1994](#))

- C. Principles and Guidelines for Land and Water Resources Projects
 - a. [Economic and Environmental Principles and Guidelines for Water and Related Land Resources Implementation Studies](#), 1983
 - i. “The Federal objective of water and related land resources project planning is to contribute to national economic development consistent with protecting the Nation's environment, pursuant to national environmental statutes, applicable executive orders, and other Federal planning requirements”
 - b. [WRDA 2007](#), Section 2031
 - i. “(a) NATIONAL WATER RESOURCES PLANNING POLICY.—It is the policy of the United States that all water resources projects should reflect national priorities, encourage economic development, and protect the environment by—
 - (1) seeking to maximize sustainable economic development;
 - (2) seeking to avoid the unwise use of floodplains and flood-prone areas and minimizing adverse impacts and vulnerabilities in any case in which a floodplain or flood-prone area must be used; and
 - (3) protecting and restoring the functions of natural systems and mitigating any unavoidable damage to natural systems.”
 - c. [Updated Principles, Requirements and Guidelines for Water and Land Related Resources Implementation Studies](#), Obama Administration CEQ
 - i. [DOI Agency Specific Procedures](#)
 - ii. [USDA/NRCS Agency Specific Guidance](#)
 - d. [WRDA 2020](#), Division AA, Section 110
 - i. “Not later than 180 days after the date of enactment of this Act, the Secretary shall issue final agency-specific procedures necessary to implement the principles and requirements and the interagency guidelines”
- D. USACE: [CRS Report summarizing NBS related authorities](#), 2020
 - a. Flood Risk Management Projects must consider NBS
 - i. WRDA 2016, Section 1184:
 - 1. “(b) In studying the feasibility of projects for flood risk management, hurricane and storm damage reduction, and ecosystem restoration the Secretary shall, with the consent of the non-Federal sponsor of the feasibility study, consider, as appropriate
 - (1) natural features;
 - (2) nature-based features;
 - (3) nonstructural measures; and
 - (4) structural measures”
 - 2. [Implementation Guidance](#)
 - ii. WRDA 2018, Section 1149 (c):
 - 1. “In carrying out a feasibility report developed under Section 905 of the Water Resources Development Act of 1986 (33 U.S.C. 2282) for a project for flood risk management or hurricane and

storm damage risk reduction, the Secretary shall consider the use of both traditional and natural infrastructure alternatives, alone or in conjunction with each other, if those alternatives are practicable.

2. [Implementation Guidance](#)

- iii. [WRDA 2020](#): Aligned NBS requirements with nonstructural alternatives requirements, including cost-share; Allowed NBS to be funded from Sec 206 Small Flood Risk Management CAP Program; Strengthened documentation requirements in feasibility reports; Added NBS language to numerous regional and pilot programs.
 - b. PL 84-99
 - i. WRDA 2016: “In this subsection, the term “nonstructural alternatives” includes efforts to restore or protect natural resources, including streams, rivers, floodplains, wetlands, or coasts, if those efforts will reduce flood risk.”; attempted to re
 - ii. WRDA 2018, Section 1160. Specified that “realigning” flood control works is eligible under PL. 84-99. [Implementation Guidance](#) (April 17, 2019).
 - iii. USACE reports supporting levee setbacks:
 - 1. [Levee Setbacks: An Innovative, Cost-Effective and Sustainable Solution for Improved Flood Risk Management](#). ERDC, 2017.
 - c. [Engineering With Nature](#), ERDC
 - d. [Systems Approach to Geomorphic Engineering](#) (SAGE), IWR
- E. FEMA
- a. BRIC
 - i. [Notice of Funding Opportunity](#): “For FY2020, the priorities for the program are to incentivize public infrastructure projects; incentivize projects that mitigate risk to one or more lifelines; incentivize projects that incorporate nature-based solutions; and increase funding to Applicants that facilitate the adoption and enforcement of the latest published editions of building codes. National Competition rewards incorporation of NBS
 - ii. [Building Community Resilience With Nature-Based Solutions](#)
 - b. Endangered Species lawsuits driving attention to wildlife considerations
 - i. <https://www.fema.gov/floodplain-management/wildlife-conservation>
 - ii. Flood Risk and Endangered Species Habitat Mapping Tool (FRESH)
 - c. CRS
 - i. [CRS Green Guide](#)
- F. USDA
- a. NRCS
 - i. Easements:
 - 1. [Agricultural Conservation Easement Program](#)
 - 2. [Healthy Forests Reserve Program](#)
 - ii. Landscape Planning:
 - 1. [Emergency Watershed Protection Program](#)

- a. [Floodplain Easements](#)
 - 2. [Watershed and Flood Prevention Operations Program](#)
 - 3. [Watershed Surveys and Planning](#)
 - iii. Financial Assistance
 - 1. [Conservation Innovation Grants](#)
 - 2. [Conservation Stewardship Program](#)
 - 3. [Environmental Quality Incentives Program](#)
 - 4. [Regional Conservation Partnership Program](#)
 - b. U.S. Forest Service
 - i. [Water Condition Framework](#)
 - ii. [Water, Climate Change and Forests](#)
 - iii. [Open Space Conservation](#)
- G. NOAA
 - a. [NOAA Digital Coast](#)
Data, resources, trainings, technical assistance.
 - b. [National Fish and Wildlife Foundation Coastal Resilience Grant program.](#)
- H. Department of Transportation
 - a. [Resilience and adaptation planning](#)
- I. EPA
 - a. [Clean Water State Revolving Loan Fund- Green Project Reserve](#)
 - b. [Healthy Watersheds Program](#)
 - c. [National Aquatic Resource Surveys](#)
 - d. [Wetland Program Development Grants](#)
 - e. [5 Star Grants](#)
 - f. [Urban Waters Program](#)
 - g. [National Estuary Program](#)
 - h. [CWA Section 319 Grant Program](#)
- J. Department of Interior
 - a. [Land and Water Conservation Fund](#)
 - b. [National Wildlife Refuges](#)
 - c. [National Parks Service](#)
 - d. [Wild and Scenic Rivers](#)
 - e. [USGS](#)
- K. HUD
 - a. [Community Development Block Grants](#)

ADDENDUM B: AGENDA

Federal Program and Policy Changes Needed to Advance Integrated, Functional Mapping of Floodplains and Wetlands for Nature Based Solutions

A Natural Floodplain Functions Alliance and Wetland Mapping Consortium Virtual Workshop*

February 10, 2021

- 12:30pm – 12:40pm** Welcome by the ASFPM Foundation (Dave Fowler, ASFPM)
- 12:40pm – 1:00pm** Introductions and Review of Agenda, Workshop Goals, and Findings from Prior Workshops (Marla Stelk, ASWM; Andy Robertson, Saint Mary's Univ. of Minnesota)
- 1:00pm – 1:30pm** Federal Policies and Funding Programs Influencing Nature-Based Solutions in Floodplains and Wetlands (Eileen Shader, American Rivers; Sarah Murdock, The Nature Conservancy)
- 1:30pm – 1:45pm** Q&A
- 1:45pm – 2:00pm** BREAK
- 2:00pm – 2:30pm** From Maps to Mitigation & Natural Infrastructure (Tim Trautman, Charlotte-Mecklenburg Stormwater Services)
- 2:30pm – 2:45pm** Q&A
- 2:45pm – 3:45pm** Breakout Group Discussions: Identifying Federal Policy and Program Barriers to Implementation of Integrated Floodplain/Wetland Mapping Data
- 3:45pm – 4:00pm** BREAK
- 4:00pm – 5:00pm** Breakout Group Report Outs, Workshop Summary Findings and Next Steps (Marla Stelk, ASWM; Andy Robertson, SMUM)

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*The [Natural Floodplains Function Alliance](#) (NFFA) is an affiliation of nonprofit and private organizations, government agencies and individuals dedicated to the protection and preservation of the natural functions of floodplains, including coastal areas. The [Wetland Mapping Consortium](#) (WMC), founded in 2008, is an interdisciplinary group of wetland scientists and managers interested in mapping and monitoring wetlands with remotely sensed images and/or using the resultant products to best manage wetland resources.

ADDENDUM C: PARTICIPANT LIST

Last Name	First Name	Affiliation
Abood	Sinan	U.S. Department of Agriculture Forest Service
Beik	Siavash	ASFPM/Christopher B. Burke Engineering, LLC
Bellomo	Doug	AECOM/Technical Mapping Advisory Council
Biddle	Mark	Delaware Department of Natural Resources and Environmental Control
Campbell	Elliot	Maryland Department of Natural Resources
Christensen	Jay	U.S. Environmental Protection Agency
Conrad	David	Association of State Floodplain Managers
Dooley	Bill	Association of State Wetland Managers
Fowler	Dave	Association of State Floodplain Managers
Galloway	Meg	Association of State Floodplain Managers
Goldsmith	Kaitlin	National Fish and Wildlife Foundation
Herbert	Ellen	Ducks Unlimited
Honeycutt	Maria	NOAA Office for Coastal Management
Hychka	Kristen	Cornell University
Kline	Mike	Fluvial Matters, LLC/ VT DEC (former)
Knipe	David	Indiana Department of Natural Resources
Kwok	Rose	U.S. Environmental Protection Agency
Lang	Megan	U.S. Fish and Wildlife Service
Larson	Larry	Association of State Floodplain Managers
Linn	Jennifer	U.S. Environmental Protection Agency
Lulloff	Alan	Association of State Floodplain Managers
Magyera	Kyle	Wisconsin Wetlands Association
Montgomery	Rhonda	Federal Emergency Management Agency
Murdock	Sarah	The Nature Conservancy
Nelson	Frank	Missouri Department of Conservation
Pfeiffer	Rebecca	Vermont Department of Environmental Conservation
Posten	Margo	Mississippi Department of Marine Resources
Price	Myra	U.S. Environmental Protection Agency
Robertson	Andy	Saint Mary's University of Minnesota
Schwalls	Del	Florida Floodplain Managers Association/Schwalls Consulting LLC
Shader	Eileen	American Rivers
Sparrow	Jeff	Moffatt & Nichol
Stelk	Marla	Association of State Wetland Managers
Trautman	Tim	Charlotte-Mecklenburg Stormwater Services
Xian	George	U.S. Geological Survey