

MEMORANDUM



TO: Robert Martin, West Virginia State Resiliency Officer
FROM: Mathew Sanders, The Pew Charitable Trusts
CC: Edwin Martin, Deputy State Resiliency Officer
DATE: September 11, 2022
RE: Synthesis of Participant Feedback from the West Virginia Flood Symposium

Executive Summary

The Pew Charitable Trusts, SBP, and the West Virginia State Resiliency Office cohosted a two-day Flood Symposium to take stock of lessons learned from West Virginia’s catastrophic June 2016 flood and develop a vision for future flood mitigation. Attended by flood preparedness and response experts from academia, nongovernmental organizations, and state and local governments, the Symposium took place on May 18 and 19, 2022, just a week after devastating flooding occurred in Huntington, WV.

West Virginia first developed a Flood Protection Plan in 2004. Many of the overarching priorities of the 2004 plan remain relevant today, though the flood risk landscape has changed. Moreover, as was acknowledged during the Symposium, only a fraction of the recommendations within the 2004 plan have been carried out. That said, Symposium participants noted significant progress in boosting flood resilience since 2004, fulfilling some of the objectives of the original plan. Symposium feedback on the status and continued relevance of the 2004 plan is captured in tabular and narrative format in *Appendix A – 2004 Plan Review Data* (Appendix A) and *Appendix B – 2004 Plan Review Notated* (Appendix B).

The remainder of this document is organized in several sections developed to inform two primary functions of the West Virginia State Resiliency Office (SRO): 1) Coordinate an annual review of the state Flood Protection Plan, starting with the 2004 original iteration and 2) Update the state Flood Protection Plan on a biannual basis.

Section 1: Feedback on the Status and Relevance of the 2004 Flood Protection Plan

West Virginia’s 2004 Flood Protection Plan included a series of 12 recommendations, six goals, and 34 objectives. As Deputy State Resiliency Officer Ed Martin noted in his Symposium presentation, the 2004 plan included approximately 140 specific components, of which roughly 20—or 14 percent—had been addressed or completed. After hearing this observation, on Day 2 of the Symposium, participants were asked to provide direct feedback on the recommendations, goals, and objectives included in the 2004 plan through a facilitated group breakout discussion exercise, ‘2004 Policy Recommendations: Keep, Toss, Add.’ During this exercise, participants provided feedback on whether 2004 plan elements have been addressed and whether elements should be prioritized for near-term action and emphasized

within future Flood Protection Plan updates. A complete tabular and narrative accounting of this feedback is captured in Appendix A and Appendix B.

Based on participant feedback, several elements from the 2004 plan were specifically highlighted as priorities for the state to address, including:

- **Floodplain Management:** Participants broadly noted the need for the state to invest in local floodplain management capacity and provide for enhanced training for local floodplain managers. Participants additionally noted training should include offerings through the Association of State Floodplain Managers Certified Floodplain Manager Program (ASFPM CFM) and West Virginia-specific floodplain management training reflecting the state's unique mountainous terrain and intricate network of rivers and tributaries. Specifically, participants clearly stated that local floodplain managers need both state support and need to be held accountable by the state to ensure existing regulations are enforced at the local level. Finally, participants recommended the state identifies a single state agency to coordinate floodplain management efforts, including data-sharing, across local jurisdictional boundaries.
- **Education and Public Awareness:** Feedback indicated a need to focus on statewide education and public awareness efforts oriented around the root causes of flooding, the impacts of development activities on flood risk, and flood mitigation and resilience best practices. Participants additionally noted the need to provide education opportunities through public outreach and engagement events in locations where residents congregate, including churches, festivals, and regularly occurring public meetings. Further, participants noted that state and local elected officials should be targeted for enhanced education on flood risk, mitigation, and resilience.
- **Mitigating Flood-Prone Structures and Facilities:** Symposium participants emphasized the need for the state to identify critical facilities exposed to a high degree of flood risk and prioritize these facilities for individual mitigation measures. Additionally, participant feedback included the need to expand buyouts and acquisitions of property in particularly flood prone areas. Pursuant to acquisitions, participants suggested targeting tax delinquent property as a priority. Finally, participants encouraged the state to assess availability of flood insurance, mitigation, and recovery funds and revisit how those funding sources may be used to mitigate and acquire flood prone structures and properties.
- **Roles and Responsibilities:** Participants noted the state needs to clearly define flood mitigation and resilience roles and responsibilities across the whole of state government, including the SRO, the SRO's Board, and the Joint Legislative Committee on Flooding. Additionally, participants indicated meeting minutes and outcomes from board and committee meetings are often difficult to locate and inadequately publicized. Further, the state needs to outline how funding sources and responsibilities will be divvied up across several agencies and offices within West Virginia state government. In addition to roles and responsibilities, participants noted the need to assign specific plan implementation tasks to various agencies and offices and establish systems of accountability ensuring tasks are completed in a timely fashion.

- **Legislative Action and Funding:** Participant feedback noted the need for the state to allocate budgetary resources on a consistent, recurring basis. Specifically, participants noted state resources may be allocated for activities including, but not limited to: local capacity building and technical assistance—particularly to assist local communities develop federal grant applications, cover cost share and match requirements associated with federal grant programs, recover from non-declared disasters, and proactive direct investments in resilient infrastructure and individual mitigation activities (e.g. floodproofing and buyouts of structures). Additionally, participants noted that the legislative and executive branches of government need to clarify which state agencies and offices are responsible for applying for federal funding sources (e.g. FEMA Flood Mitigation Assistance) and how those applications contribute to and align with an overarching Flood Protection Plan.

In addition to these priority areas, participants also noted elements of the 2004 plan that may no longer be relevant or have been addressed and should not be prioritized for immediate attention. These elements include:

- Dredging¹
- Resource Extraction
- County Evacuation Plans (accomplished).

In general, participants noted the need to simultaneously review the 2004 plan while beginning to develop a new and updated iteration. Within this process, feedback indicated the need for clear recommendations and actions organized along a specific timeline and clearly defined metrics for completion and success.

Section 2: Feedback on the Process to Update the Flood Protection Plan

As the state bridges the gap between reviewing the 2004 plan and developing an initial plan update, Symposium participants outlined several priorities for the SRO to consider:

1. **Capacity building at the state and local level.** Participants roundly voiced the need to support state and local offices, agencies, and governments who share responsibility to manage and reduce flood risk in West Virginia and those who will be tasked to implement an updated Flood Protection Plan. These agencies and offices will need to be staffed and supported appropriately to carry out the tasks prescribed in the new Flood Protection Plan. Moreover, local governments need appropriate support to both assist in implementation of aspects of the plan specific to their jurisdictions, but also to lead efforts applying for available federal flood mitigation funding. Pursuant to plan development, participants indicated the need to act on capacity building prior to the finalization of an updated plan, specifically so those localities can inform and directly participate in the planning process.
2. **Expanded data collection efforts and information delivery.** Through the West Virginia Flood Tool, the state has already taken vital steps to collect and visualize flood data on a public platform. However, the Symposium illustrated the need to incorporate additional data sources into both the Flood Tool and the plan, particularly those that address social and economic

¹ Participants noted the need for “targeted capacity restoration” as opposed to large-scale, widespread dredging

vulnerability and future flood risk. Participants specifically emphasized the need to develop data sources through spatial geographic information systems (GIS) to inform public outreach and engagement efforts commensurate with updating the Flood Protection Plan. Moreover, once the plan is finalized, projects and recommendations should be embedded into the portal so the public can easily identify any interventions slated for their communities and develop a clear understanding of how those interventions will impact flood risk in their area.

3. **Partnerships to inform and implement the plan.** Symposium participants indicated both the need and desire for the state to take a ‘big tent’ approach toward updating the Flood Protection Plan. Specifically, the state may appoint an outside advisory committee including local officials (including local floodplain managers) and stakeholders from regional planning organizations, universities (including extension services), and nonprofit/nongovernmental organizations.
4. **Specific funding sources to implement the plan.** Participants emphasized the need to identify funding sources, at least in part, prior to and during the process to update the Flood Protection Plan. Participants expressed disappointment in reflecting on the 2004 plan and the various elements within that plan that were unaddressed, specifically because of a lack of available funding to address those elements. Participants noted that the state is likely to receive public support for and participation in the planning process if it is tied to funding for implementation of the plan’s provisions when it is finalized. Ideally, sustained funding to implement projects will be identified as part of the planning effort.

Section 3: Proposed Recommendations for an Updated Flood Protection Plan

Over the course of the two-day event, participants brainstormed and offered ideas to be considered as part of the state’s effort to update the Flood Protection Plan. The below themes reflect those participant recommendations, along with potential pathways the state may pursue in its plan update.

Recommendation #1: Inventory existing data, assess gaps in data and mapping, and improve public communication of data products and findings.

Symposium participants noted the need to expand on Recommendation C (Floodplain Mapping) within the 2004 plan. Specifically, the state needs more detailed information pinpointing which areas are flood prone and should investigate models illustrating how the severity and geographic scope of that risk may be impacted by future changing weather patterns and future land use conversion, including through development and resource extraction activities.

The 2004 plan’s Recommendation C highlights the challenge that existing floodplain maps are insufficient to make accurate determinations of flood hazard for new floodplain construction or to enforce floodplain management ordinances. Participants in the Symposium echoed this sentiment that West Virginia cannot rely solely on FEMA flood maps, which use historic data and fail to account for flash flood risk, for planning purposes.

Participants cited the West Virginia Flood Tool as a useful resource and indicated it be leveraged to store and communicate geographic flood risk factors. Participants called on the state to incorporate additional data sources within the Tool, including estimates of future frequency, severity, and geographic extent of

rainfall. Modeling, mapping, and risk assessment must consider changes in topography and changes in land use. The state should also poll flood survivors to identify high-water marks to approximate base flood elevations and ground truth flood conditions predicted in new maps, incorporating residents' experiences and observations.

Participants expressed that the 2004 plan's objective to update modeling on the local and county level is unlikely to be at a scale at which to effectively evaluate flooding challenges. Hydrologic and hydraulic modeling on the watershed scale provides a better picture of how water moves in these systems, and how a flood risk mitigation project or proposed development project can hurt or help communities downstream. The state could first conduct a high-level screening of flood risk across the state to determine which watersheds are exposed to the greatest degree of flood risk, and those localized areas could then be prioritized for further study, analysis, and investment.

Relevant Examples in Other States

Texas

To launch its [Regional Flood Planning](#) initiative, the Texas Water Development Board (TWDB) developed and updated flood risk maps using existing data and technology. The TWDB described this approach as a "Floodplain Quilt" that compiled existing state, federal, and private data in an online data tool. Texas' approach is highly regionalized, which may not be directly relevant for West Virginia; however, West Virginia may benefit from employing a similar approach of first compiling data, assessing gaps, and partnering with regional planning entities to carry out more geographically focused modeling and mapping, as needed. Additionally, the TWDB's [Technical Guidelines for Regional Flood Planning](#) may be a useful reference.

New Jersey

New Jersey Department of Environmental Protection (NJ DEP) leveraged Rutgers' New Jersey Science and [Technical Advisory Panel](#) on Sea-Level Rise and Coastal Storms to develop its statewide plan. The panel issued [multiple reports](#) on the science of flooding and other hazards that can be used to guide state and local planning and decision making. The study team drew on experts from across New Jersey's universities, federal agencies, and nonprofit education and science centers. The Technical Advisory Panel's reports formed the foundation for the NJ DEP's scientific report that directly informed the state's Resilience Strategy and Coastal Resilience Plan.

Recommendation #2: Develop a clear organizational structure for state-led flood resilience and floodplain management activities

Across several goals and objectives in the 2004 plan, participants cited lack of coordination and clearly identified leadership on flood preparedness issues as a barrier to progress. This theme carried across the panel discussions with stakeholders and state officials, all emphasizing that unclear roles and responsibilities are a serious challenge to stormwater and flood management. In an updated Flood Protection Plan, participants noted the need to outline an organizational chart outlining who is responsible and accountable for different aspects of flood mitigation and resilience, and who will lead public-facing flooding discussions and legislative strategy.

More specifically, feedback suggested the need for one centralized office or agency to assist with identifying federal sources for flooding, hazard mitigation, and disaster funding and cost shares for communities. The plan could identify a potential agency or agencies responsible for oversight of a

statewide stormwater management program and define explicit roles for enforcement, oversight at regional and state scale. Finally, a long-term advisory committee could be formed to support the development, implementation, and periodic update of the plan. The updated Flood Protection Plan should consider if specific working groups are needed that can provide geographically- or sector-specific flood resilience guidance.

Relevant Examples in Other States

Both North Carolina and Rhode Island established interagency resilience teams with representation from relevant state agencies to regularly coordinate on resilience activities and ensure other agency activities considered local flood resilience.

Rhode Island

Volunteer resilience coordinators have been appointed in each state agency. These coordinators help develop and implement resilience-related initiatives in their respective agencies and align agency efforts toward implementing the [statewide plan](#).

North Carolina

Similarly, the North Carolina Office of Recovery and Resiliency coordinates the Interagency Resiliency Team with representatives from state agencies. The team meets quarterly and collaborates on development of [agency resilience strategies](#) that are updated annually.

Recommendation #3: Update, apply and enforce floodplain management ordinances, stormwater management, and zoning codes to reflect regional, complex factors that contribute to flood risk

Participants indicated a broad disconnect between state policy and local implementation with respect to floodplain management, stormwater management, and building codes. In response, participants suggested that West Virginia develop and apply stronger floodplain management codes. The state's model floodplain ordinance could exceed FEMA's requirements, reflecting West Virginia's relatively high flashflood risk and increased precipitation trends. Utilizing a model ordinance, communities could then customize and adopt more proactive floodplain regulations with the support of well-resourced local floodplain managers. Participants noted that in some areas of the state, the focus in floodplain management has been structural design. Floods are caused by regional, environmental, and land-use factors calling for cost-effective solutions to be on this scale as well. Pursuant to land-use factors, several participants cited the need for the state to take a more proactive role in working with local communities to curtail new development activities in flood prone areas through conservation easements and restrictions on development activities exacerbating flood risk.

Several participants expressed the need for expanded and updated stormwater management. This relies on greater education to communities and the private sector (especially big box stores and parking lot development) about the increased stormwater runoff from paved and other impervious surfaces. Stormwater management must account for increased extreme precipitation in the future, limiting impervious surfaces in development and enhancing stormwater capture where possible. Several attendees highlighted the opportunity to use green infrastructure and natural solutions to capture, slow and filter precipitation and runoff. West Virginia should consider a no-adverse-impact rule similar to that in [Brevard, NC](#) that limits the runoff and downstream consequences of development in a floodplain or watershed that can increase flooding elsewhere.

Relevant Examples in Other States

New Jersey

The state's [Resilient Environments and Landscapes](#) process is modernizing New Jersey's environmental land use rules to respond to hazards like chronic flooding, and to facilitate resilience by supporting green infrastructure. The "REAL" process defined flood hazard areas beyond the FEMA-mapped floodplain and provided guidance on how to build resilient facilities, particularly critical infrastructure. While the results of this process are yet to be made public, NJ DEP has updated the state's [Stormwater Management Rule](#) to take increased precipitation projections into account, and to require consideration of the use of green infrastructure in projects to mitigate stormwater runoff.

North Carolina

The North Carolina Department of Administration is currently leading an update of the state's 1990 Uniform Floodplain Management Policy, as [directed by a 2022 Executive Order](#). Through this process, the state will determine how it should measure flood risk to proposed properties, avoid construction in flood prone areas, develop flood resilience standards for new state construction and create standards for including nature-based designs. The state will also explore how to apply these standards beyond state-owned properties to all state-funded construction activities.

Section 4: Proposed Projects and Programs to Consider for an Updated Flood Protection Plan

In addition to broad, policy-oriented recommendations, Symposium participants offered an array of program and project ideas that may be incorporated into the updated plan. The below represents these recommendations, with incorporated additional context the state may consider should it pursue these proposals.

[Proposal #1: Launch a state-led technical assistance program to assist vulnerable communities understand the risk of, plan for, and mitigate flooding](#)

Participants called for the updated plan to include a state program supporting community capacity building and direct support for local planning and flood mitigation project development. As one participant explained: "If [smaller communities] do not have the capacity to reach up, the state needs to reach down." Several participants felt that additional support for local floodplain managers provided an immediate opportunity to increase local capacity. Floodplain managers need to be supported by other local and state officials as they administer and enforce local permits. Floodplain managers also should be better compensated to attract more experts to these positions and support a longer tenure to build community trust. Participants noted floodplain managers are important conduits to provide consistent floodplain management information to the public and to avoid high-risk development.

In the long-term, the SRO could work with other state and local agencies to build out a network of flood resilience technical assistance for communities. Field teams that are located near the communities they serve, either housed in or partnered with regional planning and development councils, could support local planning and grant writing efforts. These regional experts could act as a main point of communication between grant authorities, state officials, and locals and remain engaged outside of grant application periods to help matchmake potential projects with potential funding sources. Where possible, resources, planning and flood mitigation grant proposals should be combined within

watersheds. Communities can pool multiple small grants to develop larger projects with a greater watershed impact compared to smaller-scaled proposals.

Relevant Examples in Other States

There are a number of states that West Virginia can look to as potential models. [Maine](#), [Massachusetts](#), [Rhode Island](#), [Virginia](#) and [North Carolina](#) all have current programs intended to provide technical assistance to localities. Maine and Virginia are highlighted below:

Maine

The [Community Resilience Partnership](#) provides support for individual communities and regional cooperatives. The enrollment process is designed to help communities take stock of existing resilience activities and identify who should coordinate further action. Once a community has joined, they are able to apply for [community action grants](#) to undertake additional planning efforts or flood mitigation projects, and have access to a Regional Coordinator to support project ideas and identify potential funding sources. Participating communities also have access to training sessions and peer-learning and networking with other leaders from neighboring localities.

North Carolina

The [Regions Innovating for Strong Economies and Environment Program](#) (RISE) is co-organized by the North Carolina Office of Recovery and Resiliency and the NC Rural Center. The program provides coaching and technical assistance to councils of government and other regional entities to support vulnerability assessments and the development of a “Regional Resilience Portfolio,” which includes a list of flood mitigation projects to be prioritized for funding. The program also provides trainings for local leaders to learn about resilience and economic development.

Proposal #2: Update infrastructure systems to account for future flooding, incorporating nature-based solutions

Participants cited numerous infrastructure issues in West Virginia contributing to flood risk, including undersized culverts and inadequate mechanisms accounting for stormwater runoff. Aging and poorly maintained storm drains should be updated with grate designs to prevent debris buildup in flood conditions. The state and localities should also invest in maintenance to monitor and prevent clogs that can cause flooding. This is not confined to infrastructure that specifically protects against flooding, but should also include water and wastewater, energy, transportation (including stream crossings), and other systems at risk to floods. Finally, infrastructure upgrades should incorporate safety factors exceeding anticipated future flood risk.

Several participants emphasized the role of West Virginia’s natural landscapes, and nature-based or green infrastructure to make a project more resilient to extreme weather, and limit adverse flooding impacts to surrounding areas. To advance this effort, grant applications for green infrastructure projects could be scored higher, state assistance to communities could advocate for nature-based flood solutions, and the state could explore other incentives to deploy these practices more broadly.

Specifically, numerous participants cited natural stream restoration as an opportunity to mitigate flood risk, prioritizing streams in particularly flood prone areas for regular monitoring and upkeep. Data collected from stream monitoring could additionally be shared across agencies and used to inform permitting decisions or be used to target incentives for riparian buffers. Finally, some participants noted a lack of understanding on who to work with at the state or local level to undertake a stream restoration

project and cited the need for Memorandums of Agreement (MOAs) and Standard Operating Procedures (SOPs) for disaster/emergency flood recovery for stream management.

Relevant Examples in Other States

Rhode Island

The Rhode Island Infrastructure Bank is the main implementing agency for the state's resilience plan, and requires projects funded through the Bank incorporate changing flood risk over the anticipated lifetime of a project. The Bank does this through several pathways, including the Rhode Island Critical Infrastructure Program which coordinates between governmental, non-governmental and private actors to identify and manage vulnerabilities to critical infrastructure while developing Infrastructure Protection Plans. Rhode Island's updated [Road-Stream Crossing Design Manual](#) and its hydraulic design requirements may also be a helpful specific demonstration of how the state is updating design and siting standards for infrastructure.

Proposal #3: Develop a robust property acquisition program targeting areas that can be used for natural detention and retention of floodwaters

Many participants noted that West Virginia has long promoted voluntary buyouts of individual flood prone residential properties, indicating a degree of success in utilizing buyouts to help residents move away from flood risk. These participants suggested these activities could be expanded using tax sales in which localities, or the state, would conserve delinquent properties in flood prone areas, preventing their future redevelopment. Moreover, participants suggested buyout activities be expanded to the block or community scale, incorporating planning and incentives for relocation to higher, drier, and safer locations.

Participants additionally noted the potential to convert previously acquired property into natural floodwater detention and retention areas, as many of these acquired parcels are located along bodies of water known to flood on a recurring basis. Utilizing similar logic, future property acquisitions could be strategically targeted in areas that offer similar natural detention and retention benefits.

Relevant Examples in Other States

Milwaukee, Wisconsin

Though it has been developed at a regional scale, Milwaukee's [Greenseams](#) program models an approach that West Virginia could replicate to acquire property for floodwater retention and detention. Milwaukee conserves undeveloped, privately-owned properties in areas in which growth is anticipated and adapts these properties with water-absorbing soils. On the over 4,500 acres of land conserved, the Metropolitan Sewerage District has planted trees, restored habitat, and created recreational opportunities—all promoting increased flood resilience.

Iowa

The [Iowa Watershed Approach](#) (IWA) has resulted in [800 new flood retention projects](#) including farm ponds, wetlands, reconnected floodplains, and water and sediment control basins. The IWA engages stakeholders throughout targeted flood prone watersheds to enhance natural, landscape-scale resilience to floods. The IWA is coordinated by the Iowa Flood Center at the University of Iowa and leveraged \$97 million in funding from the U.S. Department of Housing and Urban Development to support local flood resilience projects.

Section 5: Additional Cited Considerations

The following considerations were cited individually by Symposium participants but did not fit within the broader themes outlined above. These are noted below:

- The state needs to prepare for an influx of federal funds and for future competitive funding opportunities by prioritizing the projects and programs that will have the greatest impact on the most vulnerable communities.
- Encourage participation in the U.S. Census as a mechanism to attract funding to the state.
- Pool funding to help homeowners afford flood insurance and to buyout properties when insurance is too expensive.
- Focus on community-scale benefits instead of individual benefits (e.g., residential elevations may not be cost effective or scalable).
- State funding should be used to support the West Virginia Conservation Agency as part of its natural stream restoration and debris removal activities.
- Promote flood insurance beyond the Special Flood Hazard Area (SFHA) by educating people outside of SFHAs that they are also at risk of flooding.
- Send mailers to residents in areas that are at risk based on updated modeling and mapping.
- Provide education for real estate agents about flood risk and contemplate flood risk disclosure regulations.
- Conduct specific outreach on stream protection.
- Convene a resilience task force at least once per year.
- The primary goal of the first Flood Protection Plan update should be to build out process, expertise, and roles and responsibilities to ease future plan updates.
- Conduct a feasibility study for a dam removal program.
- Study potential impacts of timber industry activities and potential wildfire risks on flooding.
- Conduct coordinated infrastructure checks and monitor stream damage after flood events.
- Beyond rails to trails – floodplains to trails!
- Calculate accurate actuarial rates for flood insurance and provide state-offered subsidies for low-income communities to discourage residents from dropping policies due to affordability concerns.
- Mandate local adoption of state building codes.

Appendix A: Participant Responses to Objectives and Recommendations to the 2004 West Virginia Flood Protection Plan

The table below summarizes the discussion, comments on post-it notes, and scoring of status using color-coded stickers, during the “Keep Toss Add” exercise at the West Virginia Flood Symposium.

Recommendation or Goal-Objective	Status <i>(Sticker responses)</i>	Inclusion in new plan? <i>(post-it notes and discussion)</i>	How should this change in the new plan? <i>Post-its and discussion</i>	Level of Participant Interaction
<i>Number and brief goal/objective identification</i>	<i>a. accomplished</i> <i>b. in progress</i> <i>c. not addressed</i> <i>d. not relevant</i>	<i>a. Priority</i> <i>b. Update</i> <i>c. Maintain</i> <i>d. Omit</i> <i>e. No consensus</i>	<i>1-2 sentence summary of any relevant notes related to if the goal/recommendation should be a priority, included, adapted, or omitted</i>	<i>High: 17 or more stickers/notes</i> <i>Medium: 10 – 16 stickers/notes</i> <i>Low: 9 or fewer stickers/notes</i>
A: Floodplain Management	Not Addressed	Priority	Invest in greater local floodplain management staffing and bolster local community floodplain policy.	High
B: Flood Warning System	In Progress	Maintain		Medium
C: Floodplain Mapping	Accomplished	Update	Continue data collection and analysis, estimate future rainfall projections and areas likely to flood.	Medium
D: Flood Damage Assessment	In Progress	Maintain	Build funding and data assessment capacity to empower floodplain managers (FPM) and State Resilience Office (SRO) to fulfill their duties.	Medium
E: Building Codes, Permitting and Enforcement	In Progress	Update	Standardize holistic floodplain management and NFIP education for building code officials.	Medium
F: Environmental Impacts of Flooding	In Progress	Update	Incentivize preparation and increase access to training on adaptation and mitigation best practices for state leaders. Dam removal feasibility study program.	Low
G: Stream Crossings and Access Roads	Not Addressed	Update	Replace and update flood infrastructure through	Medium

			stream restoration and stabilization	
H: Dredging	Not Addressed	Omit	N/A	Low
I: Resource Extraction	In Progress	No Consensus	N/A	Low
J: Stormwater Management	In Progress	Update	Establish prioritized list of infrastructure and incorporate green infrastructure within stormwater management. Improve storm drain grate design to decrease danger to humans and clog risk.	Medium
K: Education	In Progress	Priority	Systematize and promote flood mitigation and flood protection education for the general public and industry through in-person outreach at places they frequent (church, festivals, and planning councils etc.).	High
L: Existing Flood-Prone Structures and Facilities	Not Addressed	Priority	Acquire flooded property, including community buyouts, and revisit how flood insurance and mitigation/recovery funds can be used to support those in need.	Medium
Goal 1: Reduce unnecessary loss of lives due to flooding				
Objective 1.1: Flood warning system	In Progress	Update	Assess and address disparity in warning system efficacy for high-capacity vs. low-capacity communities.	Medium
Objective 1.2: Education for floodplain occupants	In Progress	Maintain	Invest in modeling, gauges and data/warning systems. Gather and respond to local knowledge and lived experience with flooding.	Low
Objective 1.3: Flood warning training/equipment	In Progress	Update	Systematize flood warnings and training across counties and for people in local areas through State EMD.	Medium

Objective 1.4: County evacuation plans	Accomplished	Maintain	N/A	Low
Objective 1.5: Education for floodplain occupants	In Progress	Update	Educate residents, including those outside the floodplain, through targeted outreach and monitor real estate licensing to include flood history and risk disclosure. Ordinance enforcement.	Medium
Objective 1.6: Project prioritization	In Progress	Update	Consider prioritization criteria, specifically for FEMA, CDBG-MIT, other federal funding and large infrastructure projects.	Low
Goal 2: Reduce private and public property damages				
Objective 2.1: Floodplain mapping gaps	In Progress	Update	Address root causes of flooding, poll flood survivors to identify high-water marks and approximate BFEs.	High
Objective 2.2: Financial technical gaps floodplain mapping	In Progress	No consensus	N/A	Medium
Objective 2.3: Information for permitting	In Progress	No Consensus	N/A	High
Objective 2.4: Avoid state construction in floodplain	In Progress	Update	Property buyouts in flood prone locations.	Medium
Objective 2.5: State certification of floodplain managers	In Progress	Priority	Build FPM expertise and workforce, implement WV-specific certifications, not standard ASFPM.	Medium
Objective 2.6: Identify funding for flood damage mitigation	In Progress	Update	Fund the acquisition of flood prone tax delinquent properties. List and amplify available mitigation programs and financial assistance.	Medium
Objective 2.7:	Not Addressed	No Consensus	Look to NFIP.	High

Flood insurance subsidies				
Goal 3: Develop tools that will facilitate implementation of flood mitigation program				Low
Objective 3.1: County and local flood modeling	In Progress/Not Relevant	No consensus	Improve state/local coordination efforts through watershed approach, statewide data and run flood projections using 1) HEC-RAS, 2) HEC-HMS, and 3) Flow models.	High
Objective 3.2: continued hydrologic data collection	In Progress	Update	Prioritize watersheds based on risk and fund centralized data warehouse.	Medium
Objective 3.3: Roles and responsibilities	Not Addressed	Priority	Define SRO role more clearly, leverage flood committee, publicize meeting results and minutes.	High
Objective 3.4: flood resilience legislative opportunities	Not Addressed/In Progress	Priority	Need consistent FP legislation and funding sources. Identify agency eligible to apply for FEMA FMA program.	High
Objective 3.5: county and local training package	In Progress	Priority	Programming needed for elected officials, field teams to bring assistance (grant writing) directly to impacted communities.	High
Objective 3.6: leverage watershed associations	Not Addressed	Maintain (should be combined with broader partnership goals)	Being written into Region 3 Hazard Plan. Use Clean Waters Act to implement green infrastructure projects to improve water quality and promote the adoption of projects by watershed associations.	High
Goal 4: Promote tools that will reduce excessive runoff from land-conversion activity				

Objective 4.1: identify ways to improve stormwater mgmt	In Progress/Not Addressed	Update	Currently lacking necessary permitting tools, political will and development regulation. Need carrots, not sticks.	High
Objective 4.2: stormwater oversight roles	Accomplished/Not Addressed	Update	Explicit state agency needed for proper coordination around stormwater enforcement and oversight.	High
Objective 4.3: state subsidies for stormwater ordinances and enforcement	Not Addressed	Update	Funding, data, development guidelines and ordinance enforcement capacities are inconsistent across localities.	High
Objective 4.4: identify land conversation activities that increase flood risk	In Progress/Not Addressed	Update	Build understanding and awareness about development impact on flood risk and design for future risk.	High
Objective 4.5: study runoff from resource extraction	Not Addressed	Update	Prepare for possibility of O&G boom, determine extraction activity impacts, and share best practices for innovative flood mitigation projects annually.	High
Goal 5: Reduce personal and economic flood losses while supporting the state's economy				
Objective 5.1: identify strategy	In Progress	Update	Incentivize buyouts and connect communities to WV Flood Tool and Protection Plan/State Hazard Mitigation Plan. Prioritize flood projects for federal funding.	Medium
Objective 5.2: property damage reduction funding	In Progress	Update	Prioritize projects that are holistically beneficial to communities for HMGP funds. Consider nature- based solutions and buyout programs.	Medium

Objective 5.3: Identify federal funding sources	In Progress	Update	SRO or centralized agency to identify flood sources. Look to HMGP buyout program.	Low
Objective 5.4: Identify state funding sources	Not Addressed	Maintain	Create a dedicated mitigation funding source during “blue sky” periods.	Low
Objective 5.5: alternative development processes	Not Addressed	Maintain	Tourism project.	Low
Goal 6: Protect the State’s waterway and floodplain environments				
Objective 6.1: streams to protect from dredging	Not Relevant	Omit	Limit dredging, check ecological health of priority streams after storms.	Medium
Objective 6.2: Identify protected aquatic/terrestrial resources	Accomplished	Maintain	Monitor health and prioritize streams with resilience benefits. Educate FPMs and use to inform permitting.	Medium
Objective 6.3: MOA on protected streams	Accomplished	Update	State to local education/coordination to designate authority on management. Treat MOAs as living documents.	Medium
Objective 6.4: identify streams for restoration projects	In Progress	Maintain	Consider restoration and long-term maintenance mechanisms for critical ecosystems within the floodplain.	Low
Objective 6.5: stream/floodplain education	In Progress	Update	Engage broader educations system and local officials/legislators through communication and engagement.	Medium

Appendix B: Input from All Participants related to 2004 Flood Preparedness Plan

Recommendation A: Floodplain Management

Increase resources in the West Virginia Office of Emergency Services to support local floodplain managers statewide. Require owners of all new structures to obtain a permit certifying whether or not the structures are in the floodplain. Improve enforcement of floodplain management ordinances.

Status: Most participants felt this goal had not been addressed.

- Turnover and frustration at the state level has set back local technical assistance
- Give floodplain managers backing on enforcing existing ordinances
- Need to implement the existing plan (x2)

Recommendations:

- Statewide funding for local/regional floodplain managers
- Hold politicians and state leaders accountable for supporting floodplain managers as they administer permits – HAVE THEIR BACKS
- Build capacity and get general buy-in from all, particularly politicians
- Acknowledge changing role of NFIP coordinator; what are the new objectives?
- Create and oversee a state floodplain code similar to the state fire code
- Restructure who floodplain managers are accountable to
- Start working toward long-term management as opposed to reacting to current crisis
- Hire a team to educate the local city and counties
- Ensure local capacity by funding local floodplain managers, first thing
- Regulations including provisions to re-establish connections of the floodplain where it has been separated and requirements to re-establish riparian buffers
- Fund the WV Conservation Agency for natural stream clean-up and debris removal
- Hire a team, write plan, work to educate local communities
- Meet communities in their community

Recommendation B: Flood Warning System

Improve and expand the network of existing rain and stream gages in the State and connect those instruments to a proposed statewide flood warning system. This system would enable the National Weather Service to issue credible and reliable flood warnings. Provide markers along roads and at stream crossings subject to frequent inundation warning motorists of possible hazards at these locations.

Status: All respondents considered the goal to be partially met or in progress.

Recommendations:

- N/A

Recommendation C: Floodplain Mapping

Update floodplain mapping to more precisely delineate floodplain areas and create more detailed hydrographic networks to improve flow models and flood risk assessment.

Status: Most participants considered the goal to be met.

Recommendations:

- Include future rainfall projections
- Need to know the areas in which it is most likely to flood
- Continue data collection and analysis

Recommendation D: Flood Damage Assessment

Designate a single agency or point of contact where flood damage data from Federal and State resources could be stored. Develop a system that integrates the capability of Geographic Information Systems (GIS) with flood damage data so that damage information could be used as the basis for flood protection planning.

Status: Nearly all participants believed that this objective has been partially met or is in progress.

Recommendations:

- Enable data tracking for future loss avoidance studies following flood events
- WV Flood Tool? Should it be public or private?
- FIRST THING: Identify specific role for who is responsible/will lead flooding discussion/future legislative steps (e.g., SRO/EMD?)
- Build upon WV EMD program and get more agencies in support
- Provide the funding for floodplain managers/SRO needed to do their jobs
- Define who is in charge/who will champion mitigation for all state programs

Recommendation E: Building Codes, Permitting and Enforcement

Continue to support and adopt updates of International Building Code, which covers residential building, plumbing, mechanical, fuelgas and private sewage disposal requirements and meets minimal flood-resistant design standards. Provide education and technical assistance to the public on the regulatory permit process.

Status: Most participants believed that this objective has been partially met or is in progress.

- Some code officials are not focused on holistic floodplain management, only structures

Recommendations:

- Provide education on NFIP beyond SFHA
- State building code should be mandated statewide

Recommendation F: Environmental Impacts of Flooding

Enact legislation that recognizes the attributes and hazards of the State's floodplains and the needs for stricter enforcement of floodplain ordinances. The legislation should declare floodway zones to be off-limits to new development (with some exceptions) and encourage Federal agencies to evaluate all proposed projects for effects on the State's floodplains. Legislate stricter enforcement of regulations for anchoring floatable materials and structures in the floodway and flood fringe. Convene a "Stream Summit" to formulate a standard classification of stream quality in the State. Enact legislation that supports local regulation of stormwater runoff volume. Enact guidelines for the emergency removal of stream debris to avoid long-term environmental damage. Fund studies for identification of stable stream reaches that require protection from development.

Status: Most respondents indicated that this objective has been partially met or is in progress.

- Make green infrastructure a priority in the new plan. Score it higher, push for it, explain the benefits. DO IT.

Recommendations:

- Program for feasibility study for dam removal
- Implement climate change adaptation and mitigation best practices and train state leaders on these practices
- Develop incentives for the preservation of riparian buffers in floodplains

Recommendation G: Stream Crossings and Access Roads

Establish guidelines for the sizing, installation and maintenance of culverts, drainage structures and stream or river crossings. Identify ownership of abandoned stream crossings and move to demolish unused crossings.

Status: Most participants believe that this has not been addressed.

- WV VOAD Guidelines for private water crossings; guidelines developed and updated with WV DOT input

Recommendations:

- Update future rainfall data for use in infrastructure sizing
- Fund water crossing replacements and updates while doing stream restoration and stabilization
- Upgrade all culverts in the state on a priority watershed basis

Recommendation H: Dredging

The practice of local stream dredging to reduce the damages associated with large regional floods should be terminated. Channel modifications projects (which includes some dredging) where economically justified and environmentally sound should be supported to reduce flood damages. Allocate funds for stream restoration projects that can reduce flood damages and return the natural functions of damaged streams and ecosystems.

Status: All participants indicated that this has not been addressed.

Recommendations:

- N/A

Recommendation I: Resource Extraction

The Task Force supports the recommendations of the study conducted by WVDEP regarding mining. In addition, the Task Force recommends the WV Division of Forestry accelerate revisions to Best Management Practices to reduce the impacts of forestry operations on flooding and develop BMPs on areas severely burned by wildfire.

Status: All respondents indicated that this has been partially met or is in progress.

Recommendations:

- N/A

Recommendation J: Stormwater Management

The Task Force recommends that all counties implement a stormwater ordinance to control the quantity and quality of stormwater and to guide the development and implementation of a stormwater management plan. It is recommended that a state agency inspect stormwater facilities and serve as a backup for local inspection and enforcement of regulations on design, installation, operation and maintenance of these facilities. It is also recommended that special stormwater regulations be prepared for karst areas in West Virginia.

Status: All participants believe that this has been partially met or is in progress.

Recommendations:

- Culvert and stormwater sizing
- Establish a master list of infrastructure projects, prioritized by county
- Include green infrastructure as part of stormwater maintenance
- Incentives for using green infrastructure to address stormwater management
- Address aging/poorly maintained storm drains with grate designs to prevent debris buildup and to protect humans from risk to be pinned to grate in flash flood. Angled grates and investments in maintenance schedule to prevent clogs and reduce risk.

Recommendation K: Education

Encourage State, county and local officials to take the Federal Emergency Management Agency independent study course related to flooding, flood mitigation and floodplain management. Encourage education outlets to develop classes and curriculums that address floodplain and flood issues. Provide visible markers to identify for the public the Base Flood Elevation level.

Status: All participants believe that this has been partially met or is in progress.

- Educate populace about flood issue

Recommendations:

- Promote census completion
- Targeted in-person outreach to local communities to educate about funding opportunities
- Fund regional development and planning councils and use them as the main point of communication between grant authorities and locals
- Water festivals countywide and communitywide that include educational opportunities and experts on hand
- Dam safety and WVCA outreach incorporated into festivals and events statewide
- Identify and prioritize flood protection needs
- Provide flood mitigation education on the individual level where people gather (places of worship, etc) in partnership with NGOs
- I flood, I vote
- Education for general public and industry on floodplain and flooding issues

Recommendation L: Existing Flood-Prone Structures and Facilities

Update floodplain mapping to more precisely delineate floodplain areas and create more detailed hydrographic networks to improve flow models and flood risk assessment.

Status: All participants indicated that this had not been addressed.

- Use tax sale process to assist purchases of flooded properties

Recommendations:

- Acquire delinquent housing and property for floodplain restoration
- Watershed-based grant selection (pooling multiple small grants for larger projects/opportunities)
- Use existing mitigation plans to prioritize funding and projects
- Community-scaled buyouts (entire communities)
- Ensure availability of affordable insurance for those most in need or move them out of harm's way
- Look at new ways to approach flood insurance
- Create a dedicated mitigation/recovery fund to support local communities for federal match and non-declared events

Feedback on 2004 Flood Preparedness Plan Goals and Objectives

Goal 1: Reduce unnecessary loss of lives due to flooding

Objective 1: Develop and maintain an effective and reliable flood warning system for West Virginia that includes recommendations for needed gages (new and upgraded), software, and hardware needs, and coordination between Federal and State agencies.

Status: This is in progress.

- Mitigation projects are addressing this goal partially, but there isn't enough federal funding to address it all
- On a scale of 1 (bad) to 10 (perfect) the state would rate at 4/5 on this objective with reference to 2004 plan – C+ letter grade

Recommendations

- Is proper info going to the public?
- Need more gauges
- Flash flood warnings
- Crowdsourcing additional data
- Wide variance between high capacity/low capacity communities
- Cell reception impacts reliability of early-warning system

Objective 2: Identify available education, information, and equipment necessary for floodplain occupants to receive and comprehend flood warnings.

Status: This goal is in progress.

- So many people outside of the floodplain get flooded and they should be educated as well

Recommendations

- Need more modeling
- Need more gauges
- Need crowdsourced data/warning system

- Tap into lived experiences of those who have survived flooding

Objective 3: Identify needed equipment and training for public officials in each county so that flood warnings are received and disseminated in an effective and timely manner.

Status: This objective is in progress.

- Flood warnings are disseminated in different ways and vary significantly by county

Recommendation

- Low-capacity v high capacity
- State EMD
- Push training towards local areas, “meet people where they are”
- Significant disparities in equipment by location, leading to differing results

Objective 4: Develop a framework for creation of emergency evacuation plans for each county that identifies emergency service resources, escape routes, and temporary evacuation centers and establishes a communications network between emergency service organizations.

Status: This goal has been met.

Recommendation

- High-capacity urban counties
- Urban issue

Objective 5: Identify education and information resources to be disseminated to floodplain residents on the hazards of the floodplain and potential for loss of life due to flooding.

Status: This goal is in progress.

- More dedicated and consistent floodplain management information needs to be disseminated to the public

Recommendation

- All residents need education, not just those in the floodplain
- Increase vigilance in real estate licensing; need education and disclosure of flood history and risk per property
- “Requires” targeted outreach, including mailers and electronic information distribution
- Ordinance enforcement needs to be enhanced locally; state also needs to be involved in enforcement
- Focus on habitable structures

Objective 6: Prioritize proposed flood damage reduction projects and programs such that structures located within the regulated floodway are expeditiously evacuated.

Status: This goal is in progress.

- Need larger scale infrastructure projects
- Need to address how and when citizens can access information

Recommendation

- Consider prioritization criteria, specifically for FEMA, CDBG-MIT, other federal funding

Goal 2: Reduce private and public property damages

Objective 1: Identify floodplain mapping needs for previously unmapped areas and areas with outdated mapping.

Status: This goal is in progress.

- Approximate A zones still need HEC-RAZ
- Poll flood survivors to identify high-water marks and approximate BFEs

Recommendation

- Need to address the root causes of flooding, not the effects
- Add flash flood history outside of the Special Flood Hazard Area

Objective 2: Identify financial and technical resources to acquire needed floodplain mapping.

Status: This goal is in progress.

- x

Recommendation

- N/A

Objective 3: Identify educational data and information that can be disseminated to county and municipal floodplain managers to enable more informed permit decisions.

Status: This goal is in progress.

- x

Recommendation

- N/A

Objective 4: Promote avoidance of floodplain development (structures and facilities) by public (Federal, State, county and municipal) agencies.

Status: This goal is in progress.

- x

Recommendation

- Don't just promote avoidance, take it one step further and address property buyouts in flood prone locations

Objective 5: Identify needs for county and municipal floodplain managers and legislative action to require State certification of floodplain managers.

Status: This goal is in progress.

- Need funding to support floodplain managers

Recommendation

- WV-specific floodplain certifications, not standard ASFPM
- Pay an affordable living wage to floodplain managers to attract talent and prevent turnover

Objective 6: Promote and identify financial support for both structural and non-structural flood damage reduction measures through Federal and State agencies.

Status: This goal is in progress.

- Need funds for acquisition of flood prone tax delinquent properties

- USACE-proposed projects to identify and publicize list of available mitigation projects

Recommendation

- Reducefloodrisk.org financial assistance

Objective 7: Identify the need for and sources of funding for flood insurance subsidies.

Status: This goal has not been addressed.

- Actuarial rates should apply to NFIP-covered properties
- Consider subsidizing NFIP rather than starting separate entity for West Virginia

Recommendation

- N/A

Goal 3: Develop tools that will facilitate implementation of flood mitigation program

Objective 1: Identify effective hydrologic / hydraulic models that can be implemented at the county and municipal level to predict and plan for future flooding.

Status: More than half of participants believed that this goal is no longer relevant for the 2022 plan. The remainder believed that this was in progress.

- Need to preference a watershed approach as opposed to planning/implementing by jurisdiction
- Statewide data is most important
- Need to ensure tools do not duplicate state mitigation plan
- Need an improved plan to coordinate various state/local plans and need trainings on the various available tools

Recommendation

- USACE, NWS, WVU models-dam and inundation mapping initiative
- Via consultants: 1) HEC-RAS2) HEC-HMS 3)Flow models. Run scenarios for projected flood and map accordingly.

Objective 2: Promote continued collection and analysis of watershed level hydrologic and hydraulic data to better define flood frequencies, runoff characteristics, and flooding risks.

Status: This is in progress.

- Develop priority watersheds based on risk

Recommendation

- Create a centralized data warehouse where all H&H studies/models & analysis can be housed and shared with the public; government needs to fund
- Need to look at mitigation from watershed perspective

Objective 3: Formalize the roles, tasks, and responsibilities of the Task Force and execute a partnership agreement among the members that will ensure its continuation and effectiveness.

Status: This has not been addressed.

- Resiliency Office?
- SRO role needs to be better defined and formalized

Recommendation

- Max time between meetings is one year. Document and make public results and minutes of meetings so that everyone knows what is happening.

Objective 4: Identify legislative proposals (either new legislation or modification of existing law) that will facilitate needed infrastructure protection, establish flood damage reduction funding sources, and enable more effective enforcement of existing programs.

Status: Two thirds of participants believed that this had not been addressed while the remaining third believed that this was in progress.

- x

Recommendation

- Need comprehensive floodplain legislation and funding on a consistent basis
- Create legislative required funding sources; it's evident flooding is the #1 issue, and should be funded accordingly
- Add funding for: conservation agency, debris removal, natural stream restoration fund
- Identify agency that is legally eligible to apply for FEMA FMA program

Objective 5: Develop and deploy an education and training package for county and municipal floodplain managers, county commissioners, and city councils based upon existing FEMA data and information.

Status: This is in progress.

- Programs for elected officials are especially needed
- Develop field teams (grant writing) that are centrally located to communities in need; meet them where they are
- The state needs to meet our smaller communities "where they are" if they do not have the capacity to reach up, the state needs to reach down

Recommendation

- Require mandatory training at a level below CFM-required training. Retrieve CRS-required documentation as a starting place for training.
- Tag team with other organizations (i.e., water festival, DEP watershed improvement branch)

Objective 6: Recognize and legitimize the role of Watershed Associations in the planning and implementation of flood damage reduction and floodplain management activities through State legislation.

Status: This has not been addressed.

- Being written into Region 3 Hazard Plan

Recommendation

- Clean Waters Act implement green infrastructure projects to improve water quality, adoption of projects by watershed associations

Goal 4: Promote tools that will reduce excessive runoff from land-conversion activity

Objective 1: Identify needs for stormwater management and deployment (legislation, program enforcement, and State subsidies) of technical, administrative and legislative components.

Status: Two thirds believed that this was in progress while the remaining third believed that this had not been addressed.

- No statewide permitting or zoning codes
- MS4 criteria county level and statewide – small town capacity?
- Unregulated development
- Lack of permitting tools

- Development on hilltops/runoff diversion
- Need carrots, not sticks
- Have source point control/rivers
- Lack of political will

Recommendation

- N/A

Objective 2: Identify potential agency or agencies responsible for oversight of statewide stormwater management program.

Status: Participants were nearly evenly split between believing that this goal had been met and that it has not been addressed.

- State agency enforcement and oversight
- Need for it to be someone's job
- Potential state/regional construct
- Half the panel discussion entailed the fact no one is in charge or knows who is doing what

Recommendation

- N/A

Objective 3: Identify needs for State subsidies to assist counties and municipalities in establishing stormwater ordinances and enforcement administration.

Status: Nearly all participants believed that this had not been met.

- Need runoff tracking tools
- Mismatched local enforcement capacity
- General lack of permit/development enforcement capacity
- Need dynamic future risk data
- Assess/downstream development impacts
- Need low-impact development guidelines
- Funding for enforcement of timber industry/also potential for incentives for timber industry compliance

Recommendation

- Identify and name current floodplain managers

Objective 4: Identify land-conversion activities that generate excessive runoff leading to property damages from flooding.

Status: Broad disagreement - most participants believed that this was in progress, some believe that it had been met and some do not believe this has been met.

- Education
- NFIP Office Staffing – 16 FTEs?
- Lack of watershed awareness
- New highway systems/hydrology
- Regs on no adverse impact/no net runoff
- Design and develop for future risk
- Historical analysis of past impacts
- Awareness of development impacts

- Culverts need proper regulation, permitting, sizing
- Impervious parking lots
- Big box stores – want the stores, but want them to be designed and constructed to reduce runoff, pervious surfaces

Recommendation

- N/A

Objective 5: Use appropriate available data and information existing or being developed to determine the potential effects of runoff from resource extraction activities on streams and floodplain development.

Status: Most believed that this has not been met.

- Need to be better prepared for when O&G booms again
- Do we have good data?
- WV is 78% forest –timber industry?
- Maintain timber –wildfire considerations?
- What are the available data sources?
- Extraction activities shifted from coal to natural gas –what are the impacts?
- Extraction activities –less of an impact in 2022 due to loss of coal activity
- What about old coal extraction sites? What are the runoff implications?
- How has topo changed since 2004?

Recommendation

- Annual aware for innovative flood mitigation project to share examples and best practices

Goal 5: Reduce personal and economic flood losses while supporting the state’s economy

Objective 1: Identify a long-range strategy for reducing personal and economic losses due to flooding.

Status: This is in progress.

- x
- x

Recommendation

- Statewide menu of prioritized flood projects for federal funding
- Targeted community assistance to matchmake between dollars and projects, support project design phase; RPDs?
- Offer incentives for buyouts
- Community buyouts and subsidies
- WV Flood Tool –learn to use it!
- WV Flood Protection Plan/State Hazard Mitigation Plan

Objective 2: Identify property damage reduction solutions that are economically efficient and leverage Federal matching funds.

Status: This is in progress.

- Use HMGP funds for more economically efficient projects that address the needs of the whole community and not just individuals; are elevations cost effective?
- Needs a lot more work; leveraging is huge

Recommendation

- Consider nature-based solutions
- Buyout/acquisition program

Objective 3: Identify sources of Federal funds to support implementation of the Plan's goals.

Status: This is in progress.

- x
- x

Recommendation

- SRO – One specific place for all flooding, hazard mitigation, and disaster grants
- Need one centralized place/agency to assist with identifying federal sources of funds for communities
- HMGP buyout program
- Buyout program --incentives

Objective 4: Identify potential State revenue sources for property damage reduction projects and floodplain management activities.

Status: This has not been addressed.

- State needs to create a dedicated mitigation funding source during “blue sky” periods

Recommendation

- ARPA, Emergency Management, CDBG-MIT

Objective 5: Identify alternative development processes that facilitate economic growth (jobs and revenues) while avoiding unnecessary impacts to the State's floodplains.

Status: This has not been addressed.

- x
- x

Recommendation

- Tourism project

Goal 6: Protect the State's waterway and floodplain environments

Objective 1: Identify stable reaches of streams to be protected from dredging, modification, restoration, or inundation.

Status: This is no longer relevant for the 2022 plan.

- x

Recommendation

- Rethink floodplain management delineation
- Infrastructure checks after flooding
- Monitor
- Education about when dredging et. al. is allowed
- Dredging limited by regulation
- Continued monitoring

Objective 2: Identify streams or stream reaches with aquatic or terrestrial resources protected by laws or regulations.

Status: This goal has been met.

- x
- x

Recommendation

- Prioritize streams with resilience benefits
- This changes with the ecosystem and requires constant monitoring
- Interagency coordination on mapping
- Accessible data needed
- Use information to inform and improve permitting
- Education for floodplain managers

Objective 3: Prepare and execute a Memorandum of Agreement between Federal and State agencies on protected streams.

Status: This goal has been met.

- x
- x

Recommendation

- State to local education
- State to local coordination
- No who to call before doing a project
- Proactive periodic outreach to locals
- MOAs or SOPs for disaster/emergency flood recovery
- Treat MOAs as living documents

Objective 4: Identify streams or reaches of streams requiring restoration of aquatic resources that can be addressed by available State and Federal restoration programs.

Status: This goal is in progress.

- x
- x

Recommendation

- Long-term maintenance/care of projects
- Mechanisms for local project maintenance
- Implement programs for climate adaptation and mitigation best practices to protect critical ecosystems within the floodplain
- Clarify restoration, particularly for resilience projects
- Issue needs to be considered for the long-term

Objective 5: Promote wise use of the State's streams and floodplains through the State's education system.

Status: This goal is in progress.

- x

- x

Recommendation

- Broader than education system
- Local officials
- Legislators
- COMMUNICATION
- Rails-to-trails... flood areas to greenways/trails. "Resilience & recreation"
- Engage with project WET @ DEP