



2. Issues Identification and Assessment

The problems of flooding and flood damages in the State are numerous and complex. Through a series of workshops conducted between January and July 2001, the Task Force collected information from citizens and officials throughout the State. The following discussions highlight the primary issues raised both during those workshops and by members of the Task Force. The specific recommendations relating to these issues and findings can be found in Chapter VI. An extensive discussion of each topic with alternative recommendations can be found in this Plan and in the appendices.

a. Flooding

Issue: The public perceives nature as something that can be controlled and natural disasters as something that can be prevented.

Findings:

- Flooding is a natural disaster. Mankind is not and never will be able to prevent floods.
- Damage from flooding can be reduced by taking several common sense steps that will divert flood waters away from existing communities, remove man and his creations from the path of the flood water, eliminate new structures in the path of future floods and/or reduce the elevation of the flood water.
- Many things, such as land use conversion, inappropriate construction, inadequately designed stream crossings, and placing fill material in stream channels and floodways exacerbate flooding.

b. Floodplain Management (Appendix A)

Issue: The quality and consistency of the administration and enforcement of the National Flood Insurance Program have been sporadic in West Virginia. This condition has

resulted in unwise development within the State's floodplains in spite of officially enacted floodplain management ordinances.

Findings:

- In the years between 1996 and 2004 all 55 counties in West Virginia have been impacted by flooding.
- County and municipal governments in West Virginia do not adequately manage development in the floodplain.
- In some instances, local officials are aware of the floodplain ordinances, but either have ignored them or have subverted the variance process due to political and economic development pressures.
- The State Administration has not publicly endorsed the need for or the importance of strict enforcement of the floodplain management ordinances enacted by county and municipal governments under the National Flood Insurance Program.
- County and municipal departments responsible for regulating development in floodplains need additional funding, staffing, training, and certification.
- Enforcement of floodplain-management ordinances is inconsistent and inadequate. The State needs to improve oversight of floodplain management to ensure consistent enforcement statewide.
- Increasing amounts of floatable structures and materials are being placed and stored in the State's floodways. These structures and materials are transformed, during a flood event, into floatable debris that can cause extensive damages downstream. Currently, there is little control or regulation of the placement of these floatable hazards in the floodway.

c. Flood Warning System (Appendix B)

Issue: Flood warnings are not always received and understood by the public in a timely manner.

Findings:

- The existing system of rain and stream gages within West Virginia has some geographical gaps in coverage and does not provide the National Weather Service the information needed in a timely manner. These gaps increase the risk to lives and property of West Virginia residents. Appendix B shows the distribution of rain and stream gages throughout the region.
- The data obtained from rain and stream gages are not archived in one system that is accessible to the public.
- Communication software for the warning system needs to be improved.

- Current funding levels to support annual operations and maintenance costs associated with the existing system of rainfall and stream flow gages are insufficient to adequately maintain the system.
- Some jurisdictions and individuals don't receive flood warnings in a timely manner.
- The rural nature of West Virginia prevents some individuals from receiving flood warnings via the normal communication network.
- Some rain gages are vandalized on a regular basis, resulting in unforeseen gaps in data.
- Motorists are unaware of the dangers that inundated roadways and stream crossings can pose.
- The existing municipal and county evacuation plans are not consistent statewide and do not always follow the framework provided by the WV Office of Emergency Services.

d. Floodplain Mapping (Appendix C)

Issue: Existing floodplain maps are insufficient to make accurate determinations of flood hazard for new floodplain construction or to effectively manage or enforce the floodplain management ordinances.

Findings:

- West Virginia's floodplain mapping was initiated in 1970. The determination of floodplain areas to be mapped during this time period was based upon the population density of the floodplain area and not development potential. Therefore numerous floodplain areas (especially tributary streams) were not mapped in detail leaving many gaps in the floodplain mapping.
- Due to the age of the current floodplain mapping, many modifications to the river corridors have not been accounted for on the mapping. These mapping "gaps" and "outdated" maps further complicate management and enforcement by county and municipal floodplain managers.
- Existing floodplain maps don't provide sufficient detail to easily and accurately locate property in all cases. Through FEMA's Map Modernization Initiative, many maps in West Virginia will be improved and converted to electronic format.
- Floodplain maps aren't available electronically as "layers" useful in digital mapping applications, enforcement, or planning. Watersheds of less than 1 square mile haven't been mapped.
- Digital floodplain maps compatible with Geographic Information System (GIS) layers are needed to facilitate planning and enforcement.
- Several agencies are spending scarce State and Federal funding to develop digital maps of the same regions.

- There's no current approved program for systematically studying and identifying flood-hazard areas.
- Existing floodplain maps (Flood Insurance Rate Maps) don't delineate potential flooding caused by failure of existing dams under sunny day or heavy rainfall failure conditions.
- Dam-failure inundation maps do exist for some Federal structures and selected State-regulated dams, but all of that data is not available in an electronic format suitable for public use.

e. Flood Damage Assessment (Appendix D)

Issue: Information on potential flooding problems and flood damages within the State isn't easily accessible to Federal, State, or local agencies or to the public.

Findings:

- Each agency defines flood damages in a different manner based on the mission of that particular agency. It's difficult to access or compare the variety of data maintained by the Federal, State, and non-governmental organizations involved in flooding and floodplain management.
- Information on flooding and flood damage is held by several different agencies in several different formats. Since no one agency is responsible for keeping all flood-damage data current, available data is typically outdated and unreliable for predicting future damages.
- Flood and flood damage data is either kept on a county-by-county basis or on a watershed basis. It's difficult to reconcile the two collection systems using the available data.
- It's unclear which Federal or State agency or organization maintains what flood and flood damage data or whom to contact for flood information.

f. Building Codes, Permitting, and Enforcement (Appendix E)

Issue: The current building codes being used in the State do not adequately address floodplain construction and drainage issues. Inadequate floodplain construction can result in increased structural damages and increased downstream flooding and flood damages.

Findings:

- Section 29-3-5b of the West Virginia Code specifies that the State Fire Commission shall adopt a building code for use by local entities throughout the State.
- **The current State Building Code does not address manufactured housing.** Manufactured housing is regulated by a separate agency (The Manufactured Housing Construction and Safety Board). This agency is located in the WV Division of Labor and is charged with enforcing Federal (HUD Manufactured Housing Code) standards. Although enforcement has recently improved, historically these codes have not been adequately enforced. During recent floods, extensive damage has been generated by floating manufactured housing that was installed in violation of code standards.

- Many structures are built in the floodplain to an elevation that is unlikely to reduce or prevent flood damages.
- Many local officials and the general public are not aware of the regulatory permitting requirements of the Federal Clean Water Act, the State permitting requirements under West Virginia Division of Environmental Protection or the Public Lands Corporation (WVDNR).

g. Environmental Impacts of Flooding (Appendix F)

Issue: Mankind’s intrusion into the floodways and floodplains creates significant positive and negative environmental impacts. Some of these intrusions place peoples’ lives and property in the area of greatest flooding potential.

Findings:

- Floodplains are natural landforms that must remain functional so water flows can be discharged without causing excessive damage to human lives and property.
- Man-made structures and impediments can negatively impact the water flow and impair the natural functions of the floodplain.
- Wetlands are important because of their wildlife habitat value, ability to store stormwater runoff, ability to facilitate aquifer recharge and infiltration of groundwater, and for their ability to take up and attenuate water-borne pollutants.
- Stable streams have a dimension, pattern, and profile that convey the range of flows and effectively transports the sediment produced within the watershed such that the stream neither aggrades (fills in) nor degrades (scours). Stable streams may or may not also be defined as high-quality streams.
- The accumulation of solid waste, hazardous materials, and floatable debris in the floodplains may cause stream-crossing blockages, impede the discharge of flood flows, and create significant hazards during flood events.
- There are a number of activities occurring within the State’s watersheds that can negatively affect our streams. Those activities include:
 1. Resource extraction,
 2. Road construction,
 3. Commercial, industrial and residential development,
 4. Recreation (water based, in-stream and along stream)
 5. Increased erosion and sedimentation from land development and agricultural practices.
 6. Loss of riparian buffers
 7. Deforestation through fires or development.
- Agencies do not always consider the long-range effects of their in-stream activities during removal of debris blockages immediately after a flood event.

h. Stream Crossings and Access Roads (Appendix G)

Issue: Incorrectly designed, installed or constructed corrugated metal and concrete box culverts, bridges, and other stream crossings may be easily blocked by debris and therefore contribute to local flooding. Regulation of the design, installation, and maintenance of culverts and other stream crossings is often inadequate or non-existent.

Findings:

- Some public and private stream-crossing culverts have not been properly sized or constructed and many of those stream crossings have not been properly maintained.
- The effects of potential development in watersheds located upstream of stream crossings haven't been given adequate consideration when designing the initial crossing. The Division of Highways (WVDOH) has recently requested that site development within watersheds upstream of their constructed stream crossings include stormwater detention structures before issuing permits for access to public highways.
- Local floodplain management ordinances are often overlooked or ignored during design, construction, and maintenance of stream crossings.
- Debris blockages at stream crossings often result in increased flooding levels in the vicinity of the stream crossing that are greater than that predicted on Flood Insurance Rate Maps (FIRM's).

i. Dredging (Appendix H)

Issue: The public has long perceived that dredging of streams and rivers is an acceptable and effective means of reducing the negative effects of floods. For this reason, the public continues to request that streams and rivers throughout the region be dredged to reduce flooding.

Findings:

- High water events that occur on a frequent basis (2 to 5 years) are normally contained within the stream channel or result in nuisance flooding (shallow flooding of yards, basements, and outbuildings). Removal of woody debris, trash and sediment on a frequent basis typically has a minimal effect on the elevation of these events.
- Low frequency flood events (25 to 100 years) usually overflow the existing stream channel and occupy the defined floodplain. These floods have greater depth of water, higher velocities, cover broader areas and cause extensive damages to roads, bridges, utilities, residential and commercial structures.
- There are a number of flood recovery, flood damage reduction and both commercial and recreational river traffic maintenance activities that are included under the term "dredging". The purposes for, effects from and impacts of each can be widely different.

- Dredging, as perceived by the public, is the removal of sediment and streambed material in an attempt to confine all flood-flows within the reconstructed stream channel.
 - The Corps of Engineers conducts dredging on several rivers within West Virginia to maintain authorized commercial navigation channels.
 - Many commercial terminal owners dredge sediment material from their docks to allow access by commercial barges and towboats.
 - The Corps of Engineers conducts snagging and clearing projects in West Virginia under Section 208 of the Continuing Authorities Program (CAP) that remove standing and fallen vegetation from the stream corridor to increase the hydraulic efficiency of the stream channel to pass flood waters.
 - Both the Corps of Engineers and the Natural Resources Conservation Service design and construct channel modification projects that enlarge the carrying capacity of stream and river channels to pass large flood flows through affected communities. These projects are effective in reducing flood damages, but they require sustained annual maintenance of the channel to maintain their effectiveness.
 - The WV Conservation Agency in partnership with local conservation districts and the Natural Resources Conservation Service conducts stream channel restoration activities to recover a portion of the hydraulic efficiency of the stream channel following flood events.
 - Figures numbered L-3 and L-4 in Appendix L – Dredging show the differences in channel modification for flood damage reduction and excavation for stream channel restoration and the anticipated effects on flood heights.
- Stream dredging causes environmental impacts to the aquatic and riparian communities located within and along the stream channel. These impacts are long-term due to the need for annual maintenance of the channel.
 - Many private citizens are unaware of the regulatory permits required under the Clean Water Act to conduct construction activities within the waters of the State. Channel excavation projects conducted by the Federal and State agencies and by commercial terminal operators are evaluated for environmental impacts through the permitting process (see Appendix D – Building Codes, Permitting and Enforcement)
 - Deposition of dredged materials from the stream channel within the regulatory floodway negates and in some cases amplifies the flooding heights in the local area due to blockage of the flood flows.
 - Stream channel restoration as defined above may reduce flooding on smaller, more frequently occurring flood events, if, and only if, the project is properly constructed and continually maintained. This type of stream channel modification has little to no effect on larger, less frequent floods that require the entire floodplain to discharge the flows.
 - Attempts to increase channel capacity by altering the dimension, pattern, and profile of a stream will cause bank erosion, lateral stream migration, channel down-cutting and increased sedimentation. Ultimately this will lead to increased flooding and flood-related damage both upstream and downstream from the dredged segment.

- In most cases the negative impacts far outweigh any positive benefits attributable to stream dredging.

j. Resource Extraction (Appendix I)

Issue: During the public workshops it became apparent that the public perceives mining, forestry operations and other resource extraction activities as being major contributors to flooding in West Virginia. Based on the information from these workshops, many individuals believe resource extraction should be more strictly regulated or stopped.

Findings:

- The Department of Environmental Protection has determined, through a study of two watersheds in southern West Virginia that mining and forestry operations may have had a combined effect of -3% to +21% on the discharge of water during the flood of July 8, 2001.
- Forested land adsorbs approximately 90% of all rainfall through interception, infiltration and soil moisture storage; even so the forest cannot prevent floods.
- Forests do prevent erosion and sedimentation, thus forests help maintain stream-channel capacity so they can carry storm flows with a minimum of flooding.
- Forestry operations increase erosion not by removal of the tree itself, but by the soil disturbance that accompanies the cutting and removal of the tree. Infiltration of stormwater is decreased, and erosion increased only to the extent that the forest soil is disturbed and compacted.
- Most land where forestry operations have occurred remains bare for a very short period, before rapid re-growth covers it with sprouts, tree seedlings, and herbaceous vegetation.

k. Stormwater Management (Appendix J)

Issue: Excessive uncontrolled and unregulated stormwater runoff volumes create nuisance flooding in many areas of the State and the cumulative effect of these incremental runoff volumes contribute to regional flooding events within the State.

Findings:

- Conversion of forested lands into land uses that increase the impermeability of the soil result in increased stormwater runoff.
- Installation of impermeable pavements and roof surfaces increases the likelihood of excessive stormwater runoff.

- Increased stormwater runoff from any one source or multitude of sources that exceeds the capacity of the receiving streams will result in flooding and may damage the stream channel stability and the riparian ecosystem.
 - The quality of stormwater generated by land conversion from some sites is regulated through WVDEP's NPDES permit system.
- Some counties and municipal governments regulate stormwater runoff volume through local ordinances.
- Increased residential and commercial growth within rural watersheds upstream from municipalities generates increased stormwater runoff and nuisance flooding in municipalities.
- Most industry standards require stormwater facilities to be designed to retain rainfall events in the 20-25 year frequency storm range. Rainfall events that exceed this standard will exceed the carrying capacity of most stormwater facilities.

1. Education (Appendix K)

Issue: Education of floodplain management professionals, political leaders, and the public is inadequate regarding the causes of flooding, alternative methods of reducing flood damages, regulatory permit requirements and floodplain management issues.

Findings:

- The risks and consequences of living in the floodplain are unknown to most residents and business owners. In addition, the methods of reducing these risks aren't commonly known or understood.
- In some cases risks and methods of reducing those risks are known and ignored by floodplain residents.
- Citizens, business owners, and public officials are unaware of the risks and consequences of potential dam failures in their areas.
- Few public officials or citizens are taking advantage of the available training in floodplain management, mitigation, and retrofitting residences to make their structures more resistant to flooding.
- Educational outlets in West Virginia (vocational-technical schools, community colleges, publicly owned colleges and universities) don't address floodplain management issues or flood-damage reduction issues.
- The requirements and processes for obtaining regulatory permits under the Clean Water Act to perform construction activities within the waters of the State are not well understood by the general public.

- FEMA provides funding for State-specific training for various disaster-preparedness situations that would benefit the region's floodplain managers, public officials and citizens.
- There is a lack of communication between the public and both Federal and State agencies regarding flooding and floodplain management issues.

m. Existing Flood-Prone Structures and Facilities (Appendix L)

Issue: Prior to the advent of the National Flood Insurance Program in 1979, a substantial number of structures and facilities were constructed within the designated 100-year frequency floodplain. Most of those structures and facilities were not constructed in such a way to avoid flood damages. Many of these structures and facilities remain subject to annual flood damages.

Findings:

- According to current information, it is estimated that at least 110,000 – 112,000 structures (residential, commercial and institutional) and associated facilities are located within the 100-year frequency floodplain in West Virginia. Table L-1 of Appendix L shows the potential numbers of structures and associated damages in the State's floodplains.
- Pre-FIRM (Flood Insurance Rate Map) structures and facilities were “grand-fathered” into the NFIP program as the various county and municipal floodplain management ordinances were enacted.
- The 2000 Census indicates that as much as 70% of the State's housing stock was constructed prior to the advent of the NFIP in West Virginia.
- A substantial number of those structures in the floodplain are located within the regulatory floodway as defined by the Flood Insurance Rate Maps (FIRMS).
- These pre-FIRM structures and facilities comprise a substantial portion of the damageable property located in the State's floodplains.
- Structures located within the regulatory floodway are subjected to frequent damaging floods that are characterized by high-velocity floodwaters, floatable debris and transported sediments.
- The number of these pre-FIRM damageable structures only decreases through catastrophic flooding losses, structure fires or structural deterioration and then only through strict enforcement of the existing floodplain management ordinances.