



USACE Dam Safety Facts for Bluestone Dam (April 2017)

U.S. ARMY CORPS OF ENGINEERS

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Project Location and Description: Bluestone Dam is a flood risk management project that was designed and built by the U.S. Army Corps of Engineers (USACE); construction was completed in 1948. The dam is located approximately one and a half miles upstream of the City of Hinton, West Virginia and a half mile upstream of the confluence of the New and Greenbrier Rivers. The project began operations in 1949 and regulates a drainage basin approximately 4,600 square miles in size. The dam is founded on rock and is a conventional concrete gravity dam measuring nearly a 0.5 mile long and 165 feet tall.



Bluestone Dam helps to reduce flood risks in the New and Kanawha River valleys, through the West Virginia State Capital of Charleston and all the way to Point Pleasant and beyond. To reduce flood risks when heavy rains occur, storm water runoff is stored in the reservoir until the swollen streams and rivers below the dam recede and can handle the release of stored water without damage to lives, property or the environment. Sometimes water must be released from the reservoir to protect the dam's integrity even though streams and rivers may have already reached or exceeded their capacity, contributing to flooding downstream of the dam.

The dam is equipped with gated and penstock spillways designed to pass extreme storms. During an extreme storm, the spillway could have to pass as much as seven times the amount of water that passes over Niagara Falls on an average day. Once water is released through the gated spillway, flooding downstream is anticipated.

Benefits associated with Bluestone Dam: This dam has provided \$87 million in annual flood risk management benefits since it became operational. Annual recreational benefits to the area are \$16.5 million.

Risks associated with all dams: Dams reduce, but do not eliminate the risk of loss of life, economic damages, and environmental damages from flood events. When a flood exceeds the reservoir's storage capacity, a large amount of water may have to be released that could cause damaging floods downstream. A fully-functioning dam could be overtopped when a rare, large flood occurs, or a dam could breach because of a deficiency, both of which pose risk of property damage and life loss. This means there will always be flood risk that has to be managed. To manage these risks USACE has a routine program that inspects and monitors its dams regularly. USACE implements short and long term actions, on a prioritized basis, when unacceptable risks are found at any of its dams.

Risk associated with Bluestone Dam: Based upon the most recent risk assessment of Bluestone Dam in 2016, USACE considers this dam to be a high risk dam among its more than 700 dams because of instability in the spillway monoliths (a monolith is a large block of concrete that stands on its own and serves as a section of the dam). USACE has implemented interim risk reduction measures and/or long term risk reduction measures to reduce this risk. Since, 2000 USACE has worked to increase the stability of Bluestone Dam with significant investments to improve its reliability for future generations. This work is projected to continue into the 2040s. Until such time as this work is completed, USACE alters how the dam stores and discharges water to reduce the probability of a structural failure (breach).

¹ Mean Sea Level is the same as North American Vertical Datum 1988 (or NAVD88)

² One acre-foot is equal to 1/2 Olympic-size swimming pool

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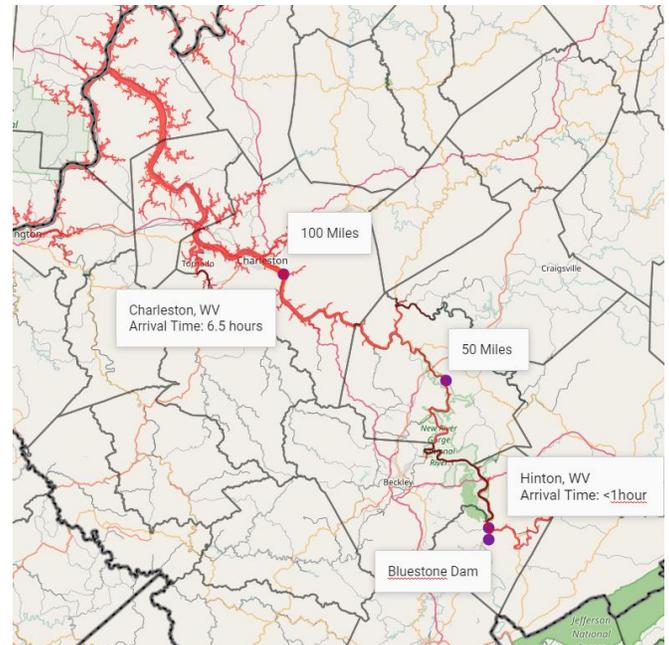
U.S. ARMY CORPS OF ENGINEERS – HUNTINGTON DISTRICT (LRH), GREAT LAKES & OHIO RIVER DIVISION (LRD)

502 Eighth Street, Huntington, WV 25701-2070, <http://www.lrh.usace.army.mil/>

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What residents should know: Dams do not eliminate all flood risk so it is important that residents downstream from the dam are aware of the potential consequences should the dam breach, not perform as intended, or experience major spillway/gated outlet flows. The high risk throughout the New and Kanawha River valleys in West Virginia warrant increased efforts on the part of USACE, local emergency management officials and residents to heighten awareness of the potential flood risk associated with the dam.

The primary areas impacted should the dam breach with a full reservoir during a flood event or experience major spillway/outlet works flows are shown in the map. The potential for loss of life is *highest within a couple of miles of the dam with the loss of life concerns decreasing substantially beyond 60 miles downstream of the dam.* Advanced warning of problems and events plays a major role in protecting life and property. See the map for a general indication of flooding with a full reservoir during a rare flood event.



Public Awareness: Dams are designed to pass large amounts of water on a regular basis and this means there will always be risk of flooding that has to be managed (see facts below).

Recommendations for Residents	Bluestone Dam Facts
<ul style="list-style-type: none"> Living with flood risk reduction infrastructure comes with risk—know your risk. Living with flood risk reduction infrastructure is a shared responsibility—know your role. Know your risk, know your role and take action to reduce your risk. Listen for and follow instructions from local emergency management officials. Strongly consider purchasing flood insurance. Contact your elected local, county and state officials to make sound flood risk management decisions in your area. 	<p>Estimated consequences with rare flood event and breach:</p> <ul style="list-style-type: none"> Population at risk: ~160,000 Structures at risk: ~85,000 Land and property at risk: ~\$8.5 billion <p>Estimated consequences with rare flood event and no breach:</p> <ul style="list-style-type: none"> Population at risk: ~145,000 Structures at risk: ~75,000 Land and property at risk: ~\$7.7 billion <p>Damages prevented to date: ~\$5 billion (1948-2015) National Inventory of Dams # WV08902</p>

Residents should listen to and follow instructions from local authorities. For more information, please contact USACE Huntington district office using the information on this fact sheet. You can also contact at the West Virginia Division of Homeland Security and Emergency Management at (304) 558-5380.

For additional information about dam safety and living with dams, please visit <http://www.usace.army.mil/Missions/CivilWorks/DamSafetyProgram.aspx> and http://www.damsafety.org/media/Documents/DownloadableDocuments/LivingWithDams_ASDSO2012.pdf

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