



# USACE Dam Safety Facts for Lewisville Dam

10 Feb 2014

U.S. ARMY CORPS OF ENGINEERS

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**Project Location and Description:** Lewisville Dam was designed and built by the U.S. Army Corps of Engineers (USACE) and completed in 1955. USACE operates Lewisville Dam for water supply, flood damage reduction, recreation and hydropower.



The main components of the project are an earthen embankment section, which serves as the main water barrier composed of compacted earth; a concrete spillway, a segment of the structure used to provide additional release of water from the dam during major flood events; and an outlet works used to release water from the dam. The earthen dam is 32,888 feet in length, 125 feet in height and the top of dam is 20 feet wide. The design elevation of the top of the embankment is 560 feet<sup>1</sup>. The foundation is made up of homogeneous fill constructed of impervious clays and shale. The concrete spillway is located on the left abutment section, and is 560 feet wide. The spillway has an elevation of 532 feet<sup>1</sup>. The spillway can pass up to 1.8 million gallons per second (237,000 cubic feet per second) or over two and a half times the volume of an Olympic size swimming pool each second. The powerhouse has one turbine with a capacity of 2,892 kilowatts.

Typically, the reservoir is kept at or around the conservation pool elevation of 522 feet<sup>1</sup>. Should heavy rains occur, surface water runoff is stored in the lake 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 to protect the dam's integrity even though streams and rivers may have already reached or exceeded their capacity.

**Benefits Associated With Lewisville Dam:** This dam has provided \$536.8 million in average annual flood damage reduction since placed into service. Lewisville Dam provides 436,000 acre-feet (ac-ft)<sup>2</sup> of water to a number of communities downstream of the dam. The annual water supply benefits gained from Lewisville Dam amount to over \$206 million. Annual recreational benefits to the area are \$21.3 million. The Lewisville Dam hydropower benefits are \$552,475 annually.

**Risks Associated With Dams in General:** Dams reduce but do not eliminate the risk of economic and environmental damages and loss of life from flood events. When a flood exceeds the reservoir's storage capacity, large amounts of water may have to be released that could cause damaging flooding 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 the 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 Lewisville Dam:** Based upon the most recent risk assessment of Lewisville Dam in 2014, USACE considers this dam to be a high risk dam among its more than 700 dams because of the risk associated with stability of the spillway during very high flows in the spillway associated with rare flood events and seepage that could lead to internal erosion of the foundation and/or embankment. USACE has implemented interim risk reduction measures and/or long term risk reduction measures to reduce this risk.

<sup>1</sup> Mean Sea Level (MSL) is the same as North American Vertical Datum 1988 (or NAVD88)

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

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U.S. ARMY CORPS OF ENGINEERS – FORTH WORTH DISTRICT (SWF), SOUTHWESTERN DIVISION (SWD)

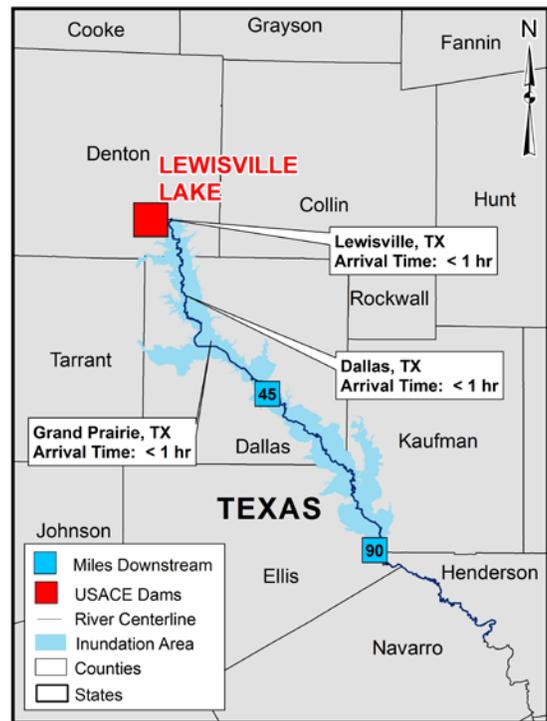
819 TAYLOR STREET, FORT WORTH, TX 76102, <http://www.swf.usace.army.mil/>

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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 or gated outlet flows. The high risk in the Texas communities of Lewisville, Coppell, Carrollton, Farmers Branch, Irving, and Dallas, and the related consequences even further downstream, warrant an increased effort on the part of USACE, local emergency management officials, and residents to heighten awareness of the potential flood risk associated with the dam.

Should the dam breach with a full reservoir during a rare flood event, or otherwise experience major spillway/outlet works flows, the primary areas impacted are shown on 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 rare flood event and breach.

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



Map inundation area displayed is a rare flood event and breach. Map Disclaimer: Actual areas inundated and flood arrival times will depend on specific flooding and failure conditions and may differ from the areas shown on the map.

Recommendations for Residents	Lewisville Dam Facts
<ul style="list-style-type: none"> <li>• Living with flood risk reduction infrastructure comes with risk—know your risk.</li> <li>• Living with flood risk reduction infrastructure is a shared responsibility—know your role.</li> <li>• Know your risk, know your role and take action to reduce your risk.</li> <li>• Listen for and follow instructions from local emergency management officials.</li> <li>• Strongly consider purchasing flood insurance.</li> <li>• Contact your elected local, county and state officials to make sound flood risk management decisions in your area.</li> </ul>	<p><b>Estimated consequences with rare flood event and breach:</b></p> <ul style="list-style-type: none"> <li>• Population at risk: ~431,000</li> <li>• Structures at risk: ~ 53,000</li> <li>• Land and property at risk: \$21.1 Billion</li> </ul> <p><b>Estimated consequences with rare flood event and no breach:</b></p> <ul style="list-style-type: none"> <li>• Population at risk: ~ 240,000</li> <li>• Structures at risk: ~ 23,000</li> <li>• Land and property at risk: \$9 Billion</li> </ul> <p>Damages prevented to date: \$32.2 Billion (1953 - 2012) National Inventory of Dams # TX00008</p>

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](http://www.damsafety.org/media/Documents/DownloadableDocuments/LivingWithDams_ASDSO2012.pdf)