



USACE Dam Safety Facts for Clinton Dam

U.S. ARMY CORPS OF ENGINEERS

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Project Location and Description: Clinton Dam was designed and built by the U.S. Army Corps of Engineers, Kansas City District and completed in 1977. USACE operates Clinton Dam for multiple purposes, including flood control, water conservation, water supply, fish and wildlife, and recreation.

The main components of the project are an earthen embankment, an outlet works for normal water releases, and an ungated overflow spillway section for releases during major flood events. The spillway is located on the left abutment (looking downstream) and is 500 feet wide with a crest elevation of 907.7 feet North American Vertical Datum 1988 (NAVD88). The spillway can pass up to 44,200 cubic feet per second (20 million gallons per minute). The earthen dam is 9250 feet long and 116 feet high. The elevation of the top of the earthen embankment is 928.3 feet (NAVD88). The foundation below the embankment generally has about 60 feet of clay overlying rock.



During normal operations, the lake is kept at a relatively consistent level (referred to as conservation pool). Should heavy rains occur in the spring or at any other time, 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 Clinton Dam: Clinton Dam plays a vital role in flood control protection within the Kansas River Basin. Clinton Dam and Lake provide \$46.8 million in annual flood risk management benefits to the Missouri counties of Clay, Jackson, Lafayette, Platte and Ray, and the Kansas counties of Douglas, Johnson, Leavenworth, Osage, Shawnee and Wyandotte. Clinton Lake provides drinking water to the City of Lawrence Treatment Plant and to the Tri-District Rural Water District in Kansas, serving over 100,000 Kansas residents. The reservoir provides an average mixed-use annual water supply of 53,500 acre-feet, producing \$12.7 million in annual benefits. Annual visitors to Clinton Lake averaged 1,800,000 between 2005 and 2009 producing \$13.3 million in annual benefits.

Risks associated with operating dams: Dams reduce the risk of damages and loss of life from inundation due to floods but do not eliminate this risk. Significant flooding would occur if a flood event exceeds the design flood storage. The spillway at Clinton will only discharge during large flood events, exceeding a "500 year" event. The Wakarusa and Kansas River stages would rise dramatically if local inflows were supplemented by discharges from the reservoir. The spillways are fixed crest, ungated, and required to prevent overtopping of the dam. However, it should be noted that unregulated river flows would be more damaging without the reservoir system.

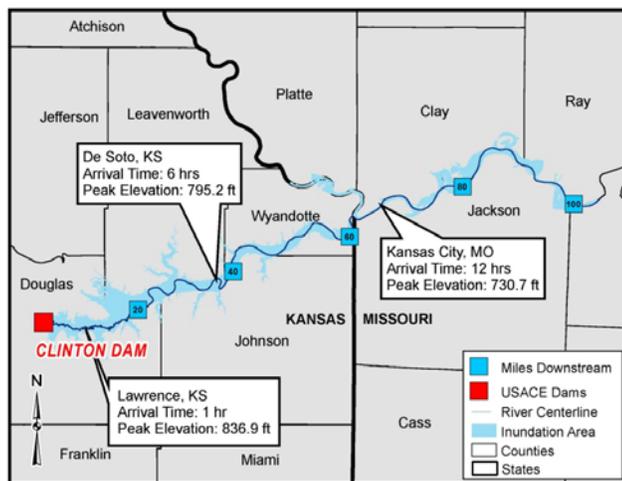
Risk associated with dam safety: With any constructed facility, there remains some risk of failure or misoperation. USACE completed an assessment of Clinton dam in 2013, considering potential mechanisms that could result in a breach of the dam and uncontrolled release of the reservoir. The worst case scenario for inundation along the Wakarusa and Kansas Rivers is a breach of the dam. The combination of consequences with probability of failure places Clinton dam in a low risk category among 700 dams operated by USACE. Routine dam safety and maintenance activities are planned. To manage 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.

What residents should know: Dams do not eliminate all inundation 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/outlet works flows. The population centers near rivers in Lawrence, Eudora and De Soto, KS and Kansas City and River Bend, MO warrant increased efforts on the part of USACE, local emergency management officials and residents to heighten awareness of flood risk management, including potential inundation risk associated with the dam.

The primary areas impacted should the dam breach with a full reservoir during a rare flood event are shown in the map. The potential for loss of life is highest near the dam, with loss of life concerns continuing to the confluence with the Missouri River. Advanced warning of problems and events plays a major role in protecting life and property. The map provides a general indication of inundation areas near the dam for the worst case scenario of the dam breaching when the water is at top of dam.

Public Awareness: Dams are designed to manage flood risk, not to completely eliminate it. This means there will always be inundation risk that has to be managed. The facts below include recommendations for managing risk, and some approximate values pertinent to both the value in preventing flood damages and risks posed by the dam.



Recommendations for Residents	Clinton Lake 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 full reservoir, rare flood event and breach (Top Active Flood Storage-Fail) / (Top of Dam-Fail)</p> <ul style="list-style-type: none"> • Population at risk: 8,200 / 20,000 • Structures at risk: 3,415 / No data available • Land and property at risk: \$400 million / \$1.7 billion <p>Estimated consequences with full reservoir, rare flood event and non-breach (Max High-No Fail)</p> <ul style="list-style-type: none"> • Population at risk: 1,400 • Structures at risk: No data available • Land and property at risk: \$66 million • Damages prevented to date: \$1.6 billion (1977-2010) <p>National Inventory of Dams # KS00026</p>

Residents should listen to and follow instructions from local authorities. For more information, please contact the USACE Kansas City District office at (816) 426-6320.

For additional information about dam safety and living with dams, please visit:
www.usace.army.mil/Missions/Civil-Works/Dam-SafetyProgram/
www.damsafety.org/