

Mansfield Dam Floodgate Rehabilitation Project

Mansfield Dam

Built: 1937 to 1942

Purposes: Flood management, water storage, hydroelectric power

Dimensions: 278 feet high, 7,089.39 feet long

Top of dam: 750 feet msl

Spillway elevation: 714 feet msl

Miles of tunnels inside: 3

Parts in each paradox floodgate: More than 5,500

Weight of each floodgate assembly: 50,000 pounds

Type of dam: Concrete gravity, flanked by earthen embankments

Amount of concrete used in construction: 1.8 million cubic yards

Floodgates: 24

Total discharge capacity*: More than 130,000 cubic feet per second (cfs):

- 23 floodgates at more than 5,250 cfs each
- 1 variable discharge gate at 2,285 cfs
- 2 turbines at 2,500 cfs each
- 1 turbine at 2,400 cfs

Hydroelectric power generating capacity: 108 megawatts

*When at 681 feet msl. Discharge capacities increase as the lake level rises.

At 278 feet tall, Mansfield Dam – which creates Lake Travis – is the tallest dam in Texas.

LCRA and the Bureau of Reclamation built the dam from 1937 to 1942, after repeated floods along the lower Colorado River devastated Austin and other downstream communities. LCRA now is engaged in a decade-long, \$10.5 million project to rehab the dam's floodgates. The project is intended to enable LCRA to continue operating Mansfield Dam safely and reliably for generations to come.



Mansfield Dam during flood operations in May 2016.

The project marks the first time the floodgates have been removed since their original installation. The project will restore parts to their original condition and protect the dam against future corrosion and deterioration.

During the project, LCRA will take one or two gates offline at a time while keeping the remaining gates operational, allowing LCRA to maintain the ability to manage floods at all times. Lake Travis and the other Highland Lakes are in Flash Flood Alley, where flooding can occur quickly and without much warning.

The project began in 2014 and is expected to be complete in 2025.

Working in tight quarters

Removing the floodgates is no easy task. When the dam was under construction, crews used large cranes to install the floodgates because the top half of the dam was not yet in place. Workers today are constrained by the dam's existing structure, and must use heavy-duty hoists and rail carts to remove floodgates. In some cases, crews have less than an inch of leeway as they disassemble and remove large pieces of the floodgate.



Mansfield Dam rehabilitation project, January 2017.

After removing the floodgate assembly, crews refurbish each gate piece by piece. The floodgate motor is sent off to be refurbished by a contractor, while LCRA crews clean and replace other components. Various gate parts are sandblasted, coated and/or machined as needed.

Each gate is fully tested before being returned to service.



Crews must perform some of the rehab work in the small, narrow floodgate slots.

Construction of Mansfield Dam

Mansfield Dam was built across a deep canyon at Marshall's Ford, a long-time river crossing and settlement.

The dam is one of six dams LCRA constructed along the Highland Lakes from the 1930s to the 1950s. It remains the only dam in the system specifically designed to hold back floodwaters.

During construction of the dam in 1938, Central Texas saw yet another historic rainfall. In July, rains flooded the Colorado River near Austin, causing it to reach flood stage and flow at a rate of 260,000 cfs, or 7 billion gallons an hour. In response to the flood, the height of Mansfield Dam was raised 78 feet, to 278 feet, where it remains today.

Water has never flowed over the spillway of Mansfield Dam, but it has come close. Floodwaters came within 4 feet of the spillway during the historic Christmas flood of 1991.



Mansfield Dam construction, 1938. (LCRA Archives W00170)

Mansfield Dam today



Mansfield Dam during flood operations in May 2016.

lake exceeds 681 feet msl, LCRA makes floodgate releases under protocol in the U.S. Army Corps of Engineers Water Control Manual for Mansfield Dam and Lake Travis, The amount and duration of the releases vary, depending upon the weather and flood conditions above and below the dam.

Though Mansfield Dam has 24 floodgates, the most floodgates opened at any one time has been six, in a 1957 flood.

LCRA maintains and operates Mansfield Dam with safety as its highest priority.

Mansfield Dam maintenance includes frequent dam inspections by LCRA staff, regular testing of every floodgate to ensure they are ready to operate at any time, annual inspections by engineers and regular inspections by outside consultants. Mansfield Dam meets or exceeds all state regulations.

LCRA releases water through Mansfield Dam almost daily to meet the needs of Austin and other downstream customers.

During floods, the dam holds back floodwaters in Lake Travis until LCRA can safely release them downstream. Even when Lake Travis is full for water supply purposes at 681 feet msl, the lake can store an additional 787,000 acre-feet – or 256 billion gallons -- of water, to help manage downstream flooding and protect communities such as Austin. When the elevation of the