



Reservoir Operations

U.S. Army Corps of Engineers
Rock Island District

U.S. ARMY CORPS OF ENGINEERS

BUILDING STRONG®

The three reservoirs (Saylorville, Red Rock and Coralville) built and maintained by the U.S. Army Corps of Engineers, Rock Island District, are operated as multi-purpose dams. The primary purpose authorized by Congress is flood prevention for areas below the reservoirs. Other purposes include recreation and conservation. Corps reservoirs also maintain a conservation summer pool to augment low flows during drought and an additional fall pool raise to accommodate migrating bird species.



All Corps reservoirs are built to stringent engineering standards to ensure they will withstand record flood events. Each reservoir is under observation to ensure its structural integrity and safety. During normal operating conditions, the Corps evaluates pressure on the dams on a regular basis. Reservoirs are visually inspected on a regular basis under normal operating conditions and are visually inspected several times a day during flood events. Piezometers, permanently located at different elevations within the dam, are used at some locations. A piezometer measures internal hydrostatic pressures of the dam. During flood events, piezometers are evaluated daily. Corps dams are designed to withstand enormous pressures and water levels. Minor erosion adjacent to the outlet works can occur during major flood events but does not impair the structural integrity of the dam.

All of our reservoirs are operated to conform to a strict, standard regulation plan that is coordinated by the Corps of Engineers with local, state and federal agencies with water resources responsibilities. This standard includes regulation of releases during flood events.

Snow melt during winter and spring, and rain runoff throughout the year, enter the reservoirs from large drainage areas above the dam. In the spring, the reservoir pool levels are maintained to allow for snow melt runoff, and for predicted and actual rainfall, to prevent downstream flooding. The pool levels will occasionally fluctuate to prepare for such runoff and for National Weather Service rainfall predictions. Pool levels are also maintained to ensure minimal bank erosion which contributes to sedimentation on the reservoir floor, adequate summer water supply, continued river flow below the reservoir, conservation purposes, and for Iowa and surrounding areas recreational opportunities.

Under non-flood conditions, these dams release water through their conduits located at the base of the dam. During abnormal or extensive snowmelt and rainfall occurrences, the pool levels will rise as releases are kept low to prevent downstream flooding. As the pool rises, the water level will eventually reach the reservoirs' flood control pool level. When the reservoir pool level exceeds full flood control level, Coralville and Saylorville Reservoirs will release water through the conduit pipe and over the spillway. Red Rock Reservoir will release water through the gated conduits and the (upper) Tainter gates.

Spillways are designed to pass excessive inflows when reservoirs exceed their flood-control pools. Without spillways, reservoirs could not be operated to release large inflows and the water levels would continue to rise. High reservoir water levels could cause overtopping of the dam and possibly cause erosion of the downstream side of the structure. High reservoir water levels can also raise hydrostatic pressures behind the dam to unsafe levels.

During flood control operations, weather parameters are evaluated on an hourly basis to consider rainfall in the drainage area above the reservoirs; rainfall below the reservoirs; and National Weather Service rainfall predictions over a 24-hour period. This information is used by the Corps to anticipate inflows to the reservoirs and make adjustments to release rates to conserve flood storage capacity and minimize both up-river and down-river flooding.

The Corps of Engineers may also alter releases when water levels in the reservoirs threaten private property. The Corps has secured the rights of private land owners above the reservoirs to operate the pool at a specific elevation. When the reservoir approaches that level, the Corps must release water to ensure property above that elevation is not flooded.

Coralville Lake is located on the Iowa River immediately upstream from Iowa City. It was completed in 1958. The dam is an earth filled-structure 1,400-feet long, 100-feet high, and 22-feet wide at the top. A 3,084 square-mile watershed flows into Coralville. The record high pool elevation at Coralville Reservoir is 717.02 feet on June 15, 2008.

The dam has a 500-foot wide concrete spillway located at the west end of the dam at the 100-year flood elevation of 712 feet above mean sea-level (m.s.l.). At the 100-year flood storage level, Coralville has 24,800 surface acres and stores 421,000 acre feet (137.18 billion gallons) of water for a distance of 41.5 miles upstream from the dam. At normal pool, Coralville has 5,430 surface acres and stores 28,100 acre-feet of water for a distance of 23 miles upstream from the dam. The summer pool level occupies 6.7% of Coralville's 100-year flood level storage capacity. Under normal conditions, the dam releases water through a gated 23-foot diameter conduit located at the base of the dam. The conduit's maximum outflow is 20,000 cfs (one cubic foot of water is equivalent to 7.5 gallons). The first time water was released over the spillway was July 5, 1993, during the 1993 flood.

Saylorville Lake is located 11 miles upstream from Des Moines on the Des Moines River. It was completed in 1977. The dam is an earth-filled structure, 6,750 feet long, 105-feet high, and 44-feet wide at the top. Saylorville also operates to provide water supply for the City of Des Moines and maintains a conservation summer pool to augment low Des Moines River flows during times of drought. A 5,823 square-mile watershed flows into Saylorville.

The record high pool elevation at Saylorville Lake is 892.03 feet on July 11, 1993. Since the dam was completed, the pool has reached the spillway six times in 1984, 1990, in April and July 1993, June 2008, and in July 2010.

The dam has a 430-foot-wide concrete spillway at an elevation of 884 feet m.s.l. At full flood-pool elevation of 890 feet, Saylorville has 16,100 surface acres and stores 567,000 acre feet (184.7 billion gallons) of water for a distance of 54 miles upstream from the dam. At the summer pool elevation, Saylorville Lake has 5,520 surface acres and stores 74,000 acre-feet of water for a distance of 24 miles upstream from the dam at elevation 836 feet m.s.l. The summer pool occupies 11.5 % of Saylorville's flood level storage capacity. Under normal conditions, the dam releases water through a gated 22-foot diameter-conduit located at the base of the dam. The conduit's maximum outflow is 21,000 cfs (one cubic foot of water is equivalent to 7.5 gallons). Since the 1993 flood, the Corps has incorporated an inflatable dam (pneumatic crest gates) that, when inflated, provides an additional 6 feet of spillway elevation to 890 feet. However, if the pool level is forecast to rise above 890, the inflatable dam may not be deployed due to the potential for water overtopping, causing extensive damage to the inflatable dam.

Lake Red Rock is located 60 miles downstream from Des Moines on the Des Moines River. It was completed in 1969 and is our largest reservoir. The dam is an earth-filled structure 5,676-feet long, 110-feet high, and 44-feet wide at the top. A 12,323 square-mile watershed flows into Lake Red Rock. The record high pool elevation at Lake Red Rock is 782.67 feet on July 13, 1993.

Unlike the District's Coralville and Saylorville reservoirs, Red Rock has a "controlled" spillway through the use of five Tainter gates. Each gate is 41-feet wide and 46-feet high. These gates are usually used only during flood conditions. At the flood-control pool level of 780' m.s.l., the reservoir has 64,480 surface acres and stores 1,436,000 acre-feet (467.92 billion gallons) of water for a distance of 33.5 miles upstream from the dam. At the normal, conservation pool, Lake Red Rock has 15,250 surface acres and stores 189,000 acre-feet of water for a distance of 18 miles upstream from the dam. The conservation pool occupies 11.6% of Red Rock's flood-storage capacity. Under normal conditions, the dam releases water from 14 gated conduits at the base of the dam.

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