



# Lake Red Rock

1105 Highway T15, Knoxville, IA 50138  
Des Moines River

**U.S. ARMY CORPS OF ENGINEERS**

**BUILDING STRONG®**

**Reservoir Operations** – Lake Red Rock, built and maintained by the U.S. Army Corps of Engineers, Rock Island District, is operated as a multi-purpose reservoir. The primary purpose authorized by Congress is flood risk management for areas below the lake. Other purposes include low flow augmentation, fish and wildlife management and recreation. Lake Red Rock maintains a conservation pool to augment low flows during drought and implements a fall pool raise to accommodate migrating bird species.



Lake Red Rock dam is built to stringent engineering standards to ensure it will withstand record flood events. The lake is under observation to ensure its structural integrity and safety. During normal operating conditions, the Corps evaluates pressure on the dam on a regular basis. The lake is visually inspected on a regular basis under normal operating conditions and is 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. The dam is 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.

Lake Red Rock is 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 lake from a 12,323 square-mile watershed/drainage area above the lake. The Lake's watershed/drainage area is equal to 1/5 of the land area of the state of Iowa.

Under non-flood conditions, the lake releases water through its gated conduits located at the base of the dam. Typically the outflow of the reservoir matches the inflow as long as the conservation pool can be maintained at the 742' level.

There are 14 hydraulically- operated sluice gates located inside the control structure which empty into the stilling basin below the dam. Each gate is five feet wide and nine feet tall. These gates are used when the outflow is less than 38,000 cubic feet per second. The stilling basin incorporates large concrete blocks called "baffles" to still river water as it flows out of the dam. Slowing the water decreases bank erosion. There are 25 baffles, each the size of a passenger van, lined up in two rows in the basin.

During high inflow conditions, the pool level will rise as releases are kept low to minimize downstream flooding. In this situation, inflows typically exceed outflows while flood waters are being stored. As the pool rises, the water level will eventually reach the lake's flood-control pool level. When the lake pool level approaches its full flood control level, Lake Red Rock will release water through its spillway's (upper) Tainter gates. Unlike some dams, Red Rock has a "controlled" spillway through the use of the Tainter gates. Each gate is 41-feet wide and 46-feet tall. These high outflow gates are used only during high water conditions.

The spillway is designed to pass excessive inflows when the lake exceeds its flood-control pool. Without a spillway, the lake could not be operated to release large inflows and the water levels would continue to rise. High lake water levels could cause overtopping of the dam and possibly cause erosion of the downstream side of the structure.

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

## **Lake Red Rock at a Glance**

Lake Red Rock is located 60 miles downstream from Des Moines on the Des Moines River. It was completed in 1969 and is the Rock Island District's largest lake. 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.

Unlike the District's Coralville and Saylorville Lakes, Lake 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 normal pool level of 742 feet National Geodetic Vertical Datum (NGVD) 29, Lake Red Rock has 15,250 surface acres and stores 189,000 acre feet of water (61.59 billion gallons) for a distance of 18 miles upstream from the dam. The summer 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.

At the flood-control pool level of 780' NGVD29, the lake has 64,480 surface acres and stores 1,436,000 acre-feet of water (467.92 billion gallons) for a distance of 33.5 miles upstream from the dam.

The record high pool elevation at Lake Red Rock was 782.67 feet on July 13, 1993.

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Visit Lake Red Rock on the Web @ <http://www.mvr.usace.army.mil/Missions/Recreation/LakeRedRock.aspx>

For more information about reservoirs operated by the Rock Island District, visit us on the Web @ <http://www.mvr.usace.army.mil/Media/FactSheets.aspx>

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**U.S. ARMY CORPS OF ENGINEERS – ROCK ISLAND DISTRICT**  
CLOCK TOWER BUILDING, P.O. BOX 2004, ROCK ISLAND, IL 61204-2004  
Corporate Communications Office, (309) 794-5274, [www.mvr.usace.army.mil](http://www.mvr.usace.army.mil)