US Army Corps of Engineers ®
Rock Island District

Saylorville Lake

5600 NW 78th Avenue
Johnston, IA 50131

Des Moines River

Reservoir Operations – Saylorville Lake, 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. However, the lake must also be operated to ensure its flood-storage pool does not impact areas above the lake. Other purposes include water supply, low flow augmentation, fish and wildlife management, and recreation. Saylorville Lake 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. The lake also implements a fall pool raise to accommodate migrating bird species.

Saylorville Lake's conservation pool level of 836-feet National Geodetic Vertical Datum 29 (NGVD29) occupies approximately 11.5% of the lake's total storage capacity. The conservation pool consists of approximately 73,600 acre feet of water (23.982 billion gallons) that must be maintained for authorized project purposes to include providing state-contracted water supply. Flood storage above the conservation pool to the full 890-foot NGVD29 flood storage pool elevation occupies 88.5% of Saylorville Lake's total storage capacity. The flood storage pool consists of approximately 641,000 acre feet of water (208.87 billion gallons).

Saylorville dam is built to stringent engineering standards to ensure it will withstand record flood events. The dam 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 dam is 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. 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.

The dam 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.

Snowmelt during winter and spring, and rain runoff throughout the year, enter the lake from a 5,823 square-mile watershed/drainage area above the lake. The lake's 836-foot-NGVD29 pool level is maintained to allow for snowmelt runoff, and for predicted and actual rainfall, to minimize downstream flooding. The pool level is also maintained to ensure minimal bank erosion which contributes to sedimentation on the lake floor, flood control, water supply, low flow augmentation, fish and wildlife, and recreation.

Reducing the lake's conservation pool does not provide significant flood storage capacity. The pool would fill in 12 to 18 hours at the maximum inflow rates experienced in 2008. Additionally, drastically lowering the pool in the spring would result in bank sloughing and increase the risk for fish kills and significant ice jams at the controlling works which could prevent the efficient release of flood waters and cause the pool to rise more rapidly.

(More Information on Reverse)

Under normal, non-flood conditions, the lake releases water through its outlet channel 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 836' level. The outlet channel is a single circular concrete conduit, 22 feet in diameter, located at the bottom of the west bluff. The control structure is located at the upstream end of the conduit and houses three gates, which have the capability of releasing a maximum outflow of 21,000 cubic feet of water per second (cfs), approximately 157,500 gallons per second, when the reservoir is nearly full and all the head pressure from the high lake level is pushing water out the conduit. A stilling basin is provided to dissipate the energy of the discharge from the outlet conduit.

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 exceeds full flood control level, Saylorville Lake will release water through its conduit pipe and over the spillway.

The spillway is designed to pass excessive inflows when the lake exceeds its flood-control pools. 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.

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

Saylorville Lake At A Glance

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. The dam has a 430-foot-wide concrete spillway at an elevation of 884-feet National Geodetic Vertical Datum (NGVD) 29. A 5,823 square-mile watershed flows into Saylorville Lake.

Saylorville Lake's pool is maintained at an elevation of 836-feet NGVD29 throughout the year. At 836' NGVD29, Saylorville Lake has 5,520 surface acres and stores 73,600 acre-feet of water for a distance of 24 miles upstream from the dam. The pool occupies approximately 11.5 % of Saylorville's flood level storage capacity.

At full flood-pool elevation of 890-feet NGVD29, Saylorville Lake has 16,100 surface acres and stores 641,000 acre-feet of water for a distance of 54 miles upstream from the dam.

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. 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' NGVD29. However, if the pool level is forecast to rise above 890' NGVD29, the inflatable dam will be lowered as we do not have the legal authority to maintain the pool above 890' NGVD29.

The record high pool elevation at Saylorville Lake was 892.03' NGVD29 on July 11, 1993. Since the dam was completed, the pool has reached the spillway five times in 1984, 1991, in April and July 1993, and in June 2008.