

Mission Lake Dredging Project Nearing Completion

The Division of Water Resources regulates the use of water for hydraulic dredging as well as a dam constructed to store sediment as part of the Mission Lake dredging project. Recently, DWR staff visited the operation to observe the progress and check compliance. This article provides an overview of the project.

Mission Lake was constructed in 1924 to provide a source of water supply for the City of Horton, which is authorized under Vested Water Right, File No. BR-004. The reservoir is located on Mission Creek, a tributary to the Delaware River. The lake ceased to be used as a primary water supply in 1999 due to water quantity and water quality issues, although it still serves as a backup water supply for the city. A large volume of sediment has accumulated within the lake, especially in the upper portion (north end), which has significantly reduced the reservoir's water storage capacity. The original surface area of the lake was 169 acres, and the original capacity was 1,866 acre-feet. In 2007, the surface area was estimated to be 124 acres, and the storage capacity was 1,036 acre-feet.

The City of Horton, with help from the State Conservation Commission, is currently restoring the northern portion of the reservoir using a floating dredge operated by Dredge America, Inc. The



hydraulic dredging is authorized under Division of Water Resources, Term Permit, File No. 20099029.

Right: The floating dredge on Mission Lake (all photos by Katie Tietsort, DWR). Click any photo to enlarge.

The dredge cutter head was specially designed and shipped from Amsterdam, Holland, and is

approximately five feet in diameter.

The cutter head can effectively remove about four and a half feet of material each pass.



The dredging process generally includes the following activities:

1. The dredge is tethered on a cable secured to the banks. The cutter head, shown at right, is positioned to move in an arc across the bottom of the lake. If the sediment is greater than four and a half feet deep, multiple passes are made until the dredge cutter head hits the base of the lake.
2. The material is moved via a pipe through the dredge into a flexible line that runs through the lake and continues north of the lake approximately one mile, where the confined disposal facility (CDF) is located.
3. The dredge removes the sediment from the bottom of the lake and then pumps a sediment and water mixture (30 percent solids) at rates up to 10,000 gallons per minute uphill to the CDF.
4. All of the activity on the dredge is monitored from the command center. Digital displays indicate location and depth of the cutter head, pressures of all lines, and equipment and engine data. The captain monitors all activity from this location. This picture shows the data displays on the dredge "Spirit," which is the Mission Lake dredge.
5. On the other end of the dredge, the spud system anchors and then hydraulically pushes the dredge forward for the next pass.
6. The confined disposal facility was constructed as part of the dredging project in order to dispose of the significant volume of sediment. It is located approximately one mile upgradient of the lake. The sediment settles out of the mixture pumped into the disposal facility, and the clearer (filtered) water gravity flows back into Mission Lake. The projected completion date for removing the 1 million cubic yards of sediment is the end of August 2010. The CDF has a dam height of 52 feet and a length of 4,055 feet and was approved for construction under Division of Water Resources Structures Program Permit No. DBR-0338.
7. Finally, a flocculation agent is sprayed into the lake to further encourage sediment to settle before water flows out the drop inlet and moves through a natural stream back to Mission Lake.



This is not the first dredging project in Kansas, but it is viewed as a model for the future. More large-scale dredging projects of this nature are likely in the coming years to restore reservoir capacities lost to decades of sediment accumulation.