

# Kansas Begins to Restore Water Storage Capacity at John Redmond Lake



Great Lakes Dredge & Dock Corporation tested dredge production on John Redmond Reservoir, May 5, 2016.

**T**he State of Kansas has started removing sediment from John Redmond Reservoir, near Burlington, in an effort to restore lost water storage capacity affecting several downstream public water suppliers and industrial water users such as the Wolf Creek Generating Station. Other water supply restoration projects have been conducted in the State of Kansas, but the John Redmond project is by far the largest. For example, the Mission Lake dredging

project near Horton, was completed in 2010 and removed 1.0 million cubic yards of material, restoring the primary water supply for the city of Horton. Restoration was also conducted on Osage City's lake in 2015 to remove approximately 100,000 cubic yards of sediment and restore 80 percent of the lake's original capacity. By comparison, the John Redmond project is initially expected to remove three million cubic yards of material. The project is also

unique in that it involves restoration of a federal reservoir by an entity other than the federal government.

The dam creating John Redmond Lake was authorized by the Flood Control Act of 1950 and constructed by the U.S. Army Corps of Engineers (USACE) between 1959 and 1964. According to the John Redmond Dam and Reservoir Master Plan, the Neosho River flooded 57 times over a 34-year period of recorded history before the dam was built. The largest flood event occurred in 1951 when the City of Burlington was inundated with as much as 30 feet of water. The reservoir's namesake was the publisher of local newspapers who also championed the need for flood control and water conservation along the Neosho River.



Portion of the Confined Disposal Facility where sediments will be redeposited and water will be allowed to clarify before returning to the Neosho River.

**Studies conducted by the Kansas Biological Survey (KBS) indicate the reservoir has lost approximately 40% of its conservation-pool storage capacity.**

While the primary purpose of the reservoir is to provide flood control, other authorized uses include water supply, water quality and recreation, including fish and wildlife benefits. Studies conducted by the Kansas Biological Survey (KBS) indicate the reservoir has lost approximately 40% of its conservation-pool storage capacity. The loss of storage capacity over that period is attributed to upstream erosion and sedimentation within the reservoir.

The USACE and KBS estimate that 90% of the sediment entering the reservoir gets trapped behind the dam. According to the KBS study, the current estimated sedimentation rate for the conservation pool is approximately 80% more than was originally anticipated by the USACE at the time the reservoir was completed.

Preserving and restoring storage capacity in John Redmond Lake is an important initiative and may become a model for other such projects. The State of Kansas owns storage space in thirteen federal reservoirs, including John Redmond, which is one of three federal reservoirs used to supply water to members of the Cottonwood and Neosho River Water Assurance District. Water for this assurance district is also stored in Marion Lake, on the Cottonwood River, and Council Grove Lake, on the Neosho River. The district was formed in 1993 by industrial and municipal water right holders through the Kansas Water Assurance Program. The purpose of the water assurance program is to manage water releases from the state's storage allocations in order to ensure an adequate water supply, allowing members of those districts to continue to exercise their water rights and meet the demands of their customers during periods of significantly reduced streamflow or



**Water intake facility for Wolf Creek Generating Station located downstream from John Redmond Reservoir on the Neosho River.**

drought conditions. Water assurance districts have also been formed on the Kansas River and the Marias des Cygnes River. Once a district is established, participation is mandatory for all eligible water right holders who must reimburse the state for the purchase of storage space, operation, maintenance and repairs associated with

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**John Redmond (1873-1953)** was a native of Burlington. While he intended to follow in his father's footsteps by pursuing a law degree after high school, he was persuaded by William Allen White to become a journalist for *The Emporia Gazette*. He later wrote for *The Topeka Daily Capital*, then *The Wichita Star* and *The Wichita Beacon*. He moved back to Burlington in 1898 and acquired and merged newspapers that would ultimately become *The Daily Republican*. He was an advocate for civilian conservation corps projects in the 1930s and championed the need for flood control and water conservation along the Neosho River.



**John Redmond, 1940**  
 – Photo Courtesy Coffey County Historical Society and Museum.

**In addition to its obligations to the Cottonwood and Neosho River Water Assurance District, Kansas also manages a water marketing contract from John Redmond Reservoir, which allocates up to 9.7 billion gallons of water per year for use at the Wolf Creek Nuclear Power Plant.**

the assurance program storage space, as well as annual costs for administration and enforcement. In addition to its obligations to the Cottonwood and Neosho River Water Assurance District, Kansas also manages a water marketing contract from John Redmond Reservoir, which allocates up to 9.7 billion gallons of water per year for use at the Wolf Creek Nuclear Power Plant.

In an effort to restore storage capacity at John Redmond, the State of Kansas

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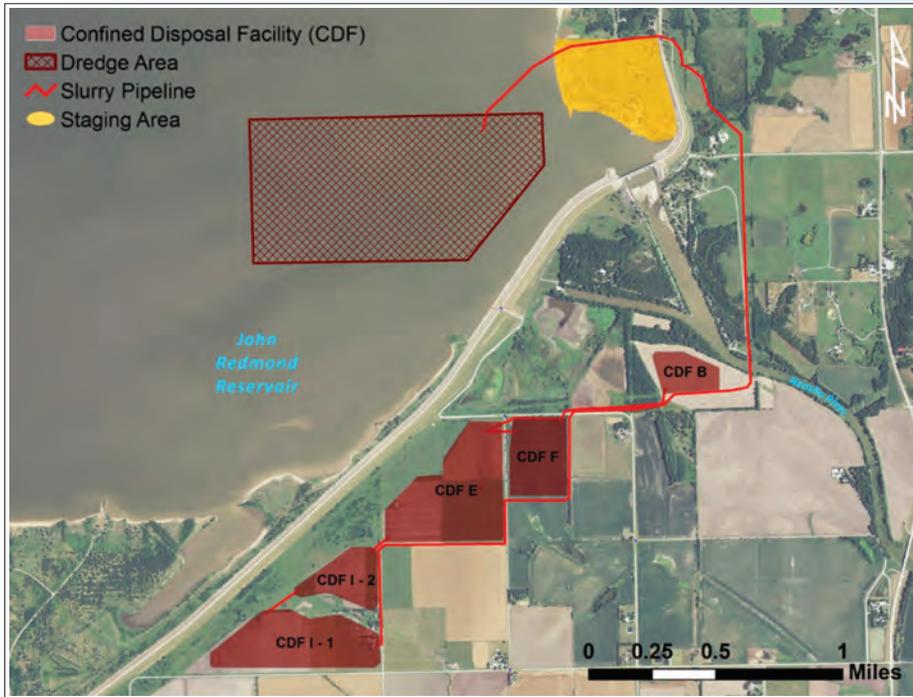
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successfully petitioned the USACE to conduct a reallocation study and raise the permanent pool by two feet in 2013. That action, however, will not be enough to meet the long term needs of downstream water users and was considered a small one-time only fix as further encroachment into the

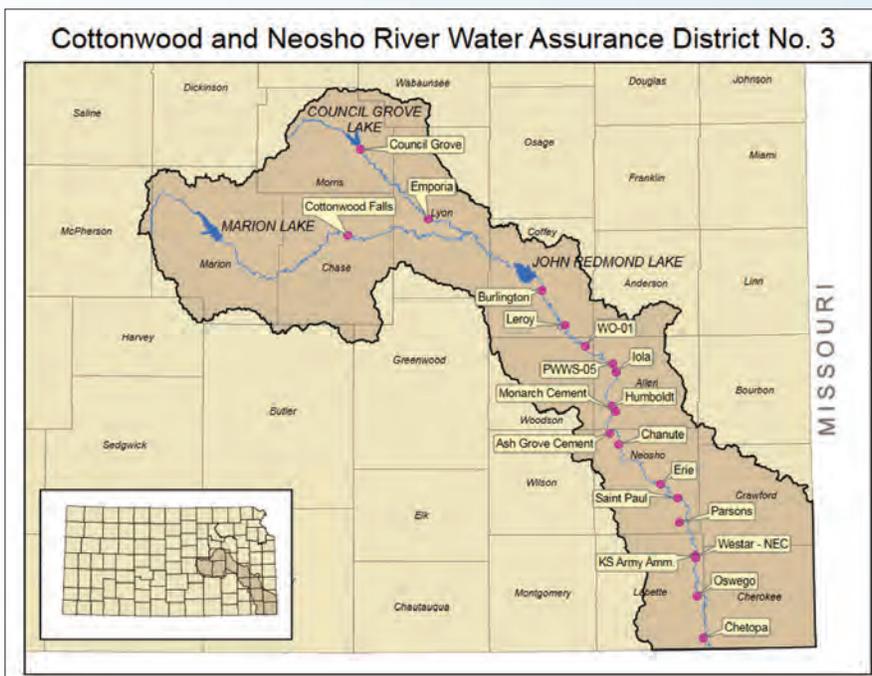
flood pool could potentially reduce the Corps' ability to mitigate flood events.

Additional storage capacity restoration at John Redmond is now being accomplished through a process of hydraulic dredging. A high capacity dredge has been floated onto the lake surface on a barge to excavate sediments from the lakebed. Sediments can also be loosened with an auger-like cutting head on the end of the dredge equipment. The slurry mixture of water and sediments will then be piped through a discharge line over the northwest edge of the dam. The slurry will be then piped into settling ponds or confined disposal facilities, which have been constructed downstream from the reservoir, where sediments will resettle. The remaining clarified water will ultimately return to the Neosho River. Upon completion of the project, the deposits will be left in place and the land will be returned to agricultural use.

Reservoir dredging and storage capacity restoration come with a steep price tag. The John Redmond project is expected to cost \$20 million to remove the first three million cubic yards of material, restoring 55,000 acre-feet of conservation storage. Funding for the project was generated through the sale of bonds which will be repaid after 15 years with revenues generated through water protection fees and water marketing funds. However, the cost to restore storage capacity in an existing reservoir is small when compared to the cost of acquiring land and building a new reservoir. Kansas is also investing in initiatives to reduce the amount of sediment flowing into the lake, including streambank stabilization and other best management practices.



Location of the area to be dredged and confined disposal facilities (CDFs) from the Kansas Water Office Supplemental Environmental Assessment Document - February 2016.



**Members of the Cottonwood/Neosho Water Assurance District No. 3**

Source KS Dept. of Agriculture/Division of Water Resources

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