

Rivers to Reservoirs

Osage County streams dammed, federal reservoirs constructed

Gabe Faimon
Herald-Chronicle

According to the U.S. Army Corps of Engineers (USACE), the fundamental function of a flood control project is to reduce or eliminate the threat of downstream flooding that could lead to property damage and loss of life. A project with storage capacity requires two features - a dam to restrict stream flow and a pool to store water.

USACE constructed rolled earth fill dams for its flood control projects in Osage County.

The compacted clay core forming the heart of the dam is nearly watertight. On the upstream side of the dam, compacted earth serves to keep water from removing the clay core and to protect the core from freezing and thawing cycles. Stone riprap on the face of the dam serves to protect the compacted earth and clay core from wave and wind action.

The outlet works of a dam consist of the intake tower and a conduit that passes through the bottom of the dam. The conduit is a large reinforced concrete structure, usually 10 or more feet in diameter. Hydraulically operated control gates serve as valves for controlling water outflow. Control gates are placed on the upstream side of the dam, housed by the intake tower, which supports control gate movement. The intake is at the base of the tower.

When a control gate is fully raised, water flows through the tube at several thousand cubic feet per second. Except when excessively high rates of precipitation occur for an extend-



Wayne White/Herald-Chronicle

Pomona Lake's dam holds back 70,603 acre-feet of water at a multi-purpose pool level.

ed period, control gates can be raised so that outflow through the conduit can equal high rates of upstream inflow.

In unusual situations when the flood control pool in a reservoir is at its maximum allowable depth, an uncontrolled chute sloping around one end of the dam provides an emergency spillway. The emergency spillway is designed to carry full stream flow during historic levels of upstream precipitation.

Since Pomona and Melvern reservoirs impound runoff from the upper reaches of the Marais des Cygnes River, the Corps knows that releases must be coordinated. Coordination is required not only to restrict discharges so that they do not aggravate problems downstream, but also to meet downstream low-flow needs during extended periods of little rain.

To ensure that roots could not serve a channel for wa-

ter to penetrate the compacted clay core, no vegetation is allowed to grow in riprap on either the upstream or downstream side of a dam.

Investment pays off

Construction of the dam for the Pomona Lake started in July 1959, and all construction was completed in October 1963. The multipurpose pool was filled by June 1965.

U.S. taxpayers invested \$13,272,108 in the Pomona Reservoir Project. Using benefit analysis approved by the U.S. Congress, USACE estimates that as of the end of 2008, the cumulative value of prevented downstream damage is \$197,266,000.

In July 1967, construction Melvern reservoir began. All construction was completed in October 1972, and the multipurpose pool was filled by April 1975.

For the Melvern Reservoir Project, U.S. taxpayers' in-

vestment was \$37,436,530. As of the end of 2008, the estimated cumulative value of prevented damage is \$173,793,000.

The USACE "Final Environmental Statement" for the Pomona Reservoir Project shows the federal government acquired title to 10,501 acres of land. Flowage easements were obtained for 1,696.13 acres.

Flowage easements are land for which the USACE acquired only the right to flood the property for a temporary period. Flowage easements restrict landowners from erecting buildings on the easement.

For the Melvern Reservoir project, the government acquired title to 24,817 acres, with flowage easements obtained for 831 additional acres. An agreement was also established authorizing the Kansas Department of Wildlife and Parks to maintain a 10,400-acre wildlife area.

Nature obstructs lakes' progress

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Flood control reservoirs are constructed to provide many years of use, but they are subject to forces of nature. As such, nature has placed two possible obstacles in future paths of progress for Osage County lakes - zebra mussels and sedimentation.

Sedimentation threatens lakes

According to information compiled by Kansas Water Office (KWO), sedimentation in Pomona and Melvern lakes could present a long-term, debilitating threat to future progress of the Osage County lakes.

KWO analyzed sedimentation of Pomona Lake in a 1989 survey. During the 26-year period since the gates had been closed, the multipurpose pool had lost 15.2 percent of its capacity. Although design life for sediment storage in the lake had been set for 100 years, the survey indicated that expected time to fill the sediment storage capacity had been extended until 2078 instead of 2062.

A 1993 survey of Melvern Lake sedimentation found that during its 23 years, the multipurpose pool had lost 4.4 percent of its capacity - expected time to fill the sediment storage capacity had decreased and Melvern Reservoir was projected to fill by 2062 instead of 2070.

"Neither one of the lakes, Pomona nor Melvern, are in imminent danger, but there is a pending problem," said Kansas Department of Wildlife and Parks (KDWP) Secretary Mike Hayden recently. "In other words, the state is concerned and is not ignoring the problem."

U.S. Army Corps of En-

gineers' (USACE) policy is that loss of flood pool capacity for flood control reservoirs cannot be compromised, for that would defeat their purpose. But from the Corps' view, if the lake's multi-purpose pools fill with sediment, the reservoirs still serve their intended purpose.

"Even in a worst case scenario, although the multipurpose pool may become shallow, capacity of the flood control pool will be relatively unchanged," said David Green, USACE project manager at Pomona and Melvern lakes. "Consequently, the role of the USACE will not change significantly, for the primary purpose of the reservoirs, flood control, will not change."

Although the threat from sedimentation may be distant, its effect could be devastating for residents and firms who are dependent on water recreation at the two reservoirs. The government has investigated the potential for science and technology to counter the threat.

According to state Rep. Willie Prescott, the Kansas Legislature has considered the loss of the state's lakes' capacities. "The silt problem at John Redmond Reservoir has brought the issue of sedimentation to the Statehouse for development of a plan to remove the sediment," Prescott said.

Hayden said the Kansas Biological Survey is conducting studies using sophisticated radar that looks through the water and sediment. "We can tell from those studies how deep the sediment actually is and where it is within the reservoir," he said.

He said that a small dredging project had been funded for Mission Lake, at

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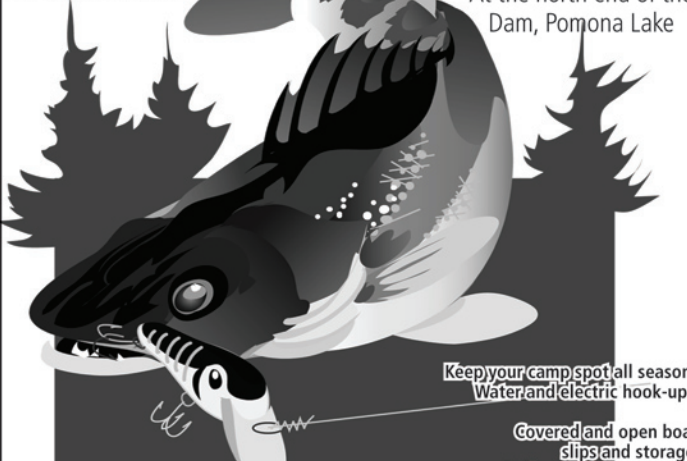
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