Sedimentation can’t be stopped, but it can be slowed

By TYLER HARRIS

KANSAS’ federal reservoirs aren’t that old. The first one, Kanopolis, was built in 1948.

Two-thirds of Kansans rely on these reservoirs for water in one way or another. There are another 290,000 impoundments of all sizes across Kansas. As many know, these reservoirs are facing a problem. “They’re all filling with sediment, and we can’t stop it,” says Jerry deNoyelles, deputy director and senior scientist at the Kansas Biological Survey and University of Kansas professor of ecology and evolutionary biology.

On average, all 24 federal reservoirs in the state will have lost 43% of storage capacity by the end of the century—that’s about 2.3 billion cubic yards of sediment. Already, an estimated 838 million cubic yards have accumulated. Some reservoirs have lost more than others. Eleven of the 24 reservoirs will have lost 50% or more of their original storage capacity by the end of the century, most notably Tuttle Creek, which will be half filled by 2022. For all 11, that’s about 927 million cubic yards, or 522,000 football fields covered in sediment 1-foot deep.

“As the century proceeds, at a clip of 17.6 million cubic yards a year we will reach 2.3 billion cubic yards of sediment, and a financial liability of about $13.8 billion at today’s costs if we were to remove it all by dredging. It would cost $106 million to remove just what is coming in each year,” deNoyelles says. While there are examples where dredging is necessary, like John Redmond Reservoir, deNoyelles says, “It is not the answer.”

A handle on the situation

It isn’t certain what the best solution is, but increasing the amount of water available helps buy some time until that solution is reached, although costly and not practical in certain cases. For example, reservoir water level can be raised, new reservoirs can be built, and water can be transferred — eight of the 11 reservoirs most impacted by sedimentation are within 35 miles of one of the 13 that aren’t. What about sedimentation? About 90% of sediment that enters a reservoir doesn’t stay there the time, during high flows. So, bypass systems are often used to channel this water around the reservoir. However, these reservoirs usually aren’t designed for flood control. Most reservoirs in Kansas are, so this isn’t a likely possibility.

A more practical option is building a settling basin above the reservoir to catch sediment before it can enter, providing an opportunity to excavate sediment more easily. Some basins use a pipe going through or around the reservoir, allowing the basin’s normal flow to pick up sediment, bypass the reservoir and go downstream.

Another possibility is flushing the reservoir, which can be done one of several ways. This includes releasing water at the bottom of the dam, stirring up sediment and taking it downstream; changing the shape of the reservoir to be more conducive to flushing; or even using a mechanical arm equipped with a dredge continuously moving across the bottom of the reservoir, stirring up and siphoning out sediment.

Conservation is key

DeNoyelles notes, these options require “fundamental changes in the way we manage reservoirs.”

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Key Points

- By 2100, 11 of Kansas’ 24 federal reservoirs will be 50% infilled.
- Sedimentation can be reduced; saving water buys more time.
- Some reservoirs are infilling faster than others; key step is finding out why.

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