



Online HydroGRAM

Winfield City Lake Receives Physical for Sediment Load

Small municipalities across Kansas depend upon nearly 600 local or state owned reservoirs for recreation, flood control, irrigation, and drinking water.

Many city-owned reservoirs like Winfield City Lake are facing increased water quality problems due to sedimentation and nutrient loading. Located in Cowley County within the Walnut River Basin, Winfield City Lake provides water to more than 18,000 Winfield residents and several nearby rural water districts.

As with most small, non-federal reservoirs, Winfield City Lake has not historically been well mapped or monitored for changes, including sediment build-up, that may lead to water quality impairment.

Russ Tomevi, Winfield City Engineer, and now chair of the Walnut River Basin Advisory Committee (BAC), turned to the Kansas Biological Survey for assistance. He knew of the work that the Survey had underway through the Applied Science and Technology for Reservoir (ASTRA) Initiative on federal reservoir sediment mapping.

Since its inception in 2006, the ASTRA program has completed bathymetric (lake depth) surveys of 24 res-



Distinguishing between the original lake bottom and the accumulated sediment is relatively easy. The original substrate (left) is tightly packed and has coarser soil particles. A transition zone of old vegetation (center) separates it from the finer grained sediment (right).

ervoirs across the state. The surveys provide citizens and local and state government officials with the facts needed to make informed decisions about the water supply and long-term reliability of Kansas reservoirs.

The ASTRA team, working through a Kansas Water Office contract funded by the State Water Plan Fund, conducted a bathymetric mapping survey. Using state-of-the-art mapping sonar, ASTRA scientists created 3-D color coded depth maps of the reservoir. These highly detailed maps revealed images of the lake's bottom contours and sediment thickness.

To gain supporting information of current lake conditions, the City of Winfield contracted with ASTRA to perform sediment core sampling and compare it to the bathymetry results. Members of the ASTRA team in early August of 2008 extracted fourteen sediment cores from the bottom of Winfield City Lake. The accumulated sediment levels in the samples varied from 1.5 inches to 67 inches throughout the reservoir.



Core samples help validate the information obtained by using state-of-the-art mapping sonar to measure lake depth and the thickness of sediment deposits.

ASTRA team leader Dr. Mark Jakubauskas says, "Winfield City Lake still has a decent life span, given that its sedimentation rate is one-half inch per year. The reservoir is 38 years old and its greatest depth is still 40 feet."

Winfield City Manager Warren Porter said the Survey's work is important because the deposition of silt will ultimately determine the quality and quantity of Winfield's water supply in the future.

Recognizing that sediment deposits in the reservoir



are directly related to stream bank and field erosion in the watershed, the City of Winfield launched the Timber Creek Watershed Protection Program. It's funded by a fee of 2 cents for each 1,000 gallons of water sold by the city.

“We’ve worked with the Cowley County Conservation District to provide educational activities for landowners and producers in the watershed,” Porter says. “For the past three years, we’ve offered cost share funds to help landowners pay for conservation practices. Our money often complements funding from state and federal programs.”

Conservation practices have included buffer strip seeding, riparian area improvement, shore line protection with rip rap, abandoned well plugging. Grazing land also has been leased to control runoff.

“It has been a successful program, supported by both landowners and community members,” Porter says.



Kansas Biological Survey scientists Matt Linden, Scott Campbell, and Jerry deNoyelles (l. to r.) examine a sediment core extracted from Winfield City Lake. The lake is one of numerous reservoirs around the state being mapped and cored by KBS's Applied Science and Technology for Reservoir Assessment (ASTRA) Initiative, funded by the State Water Plan Fund through a contract with the Kansas Water Office.