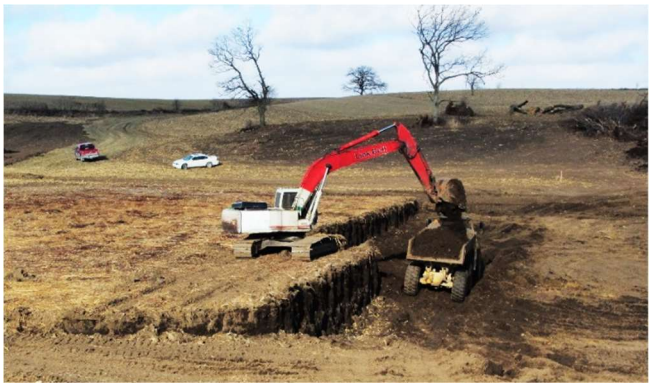
New Life for Old Flood Structure

Kevin Kuehner, Root River Field to Stream Partnership, August 2018

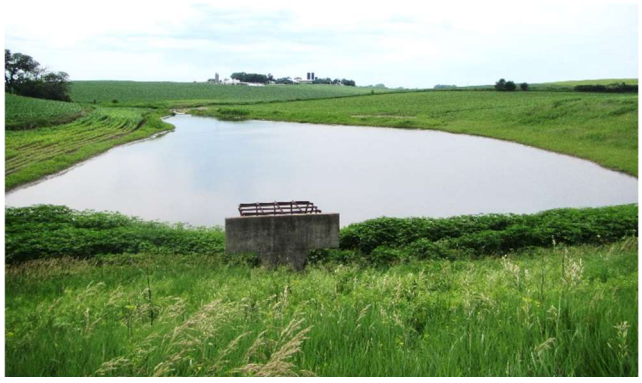
The black and white picture above shows the E3 structure one year after construction in 1955. The adjacent picture, taken fifty-seven years later, shows the four-acre pool area filled with topsoil. This sediment reduced the capacity of this structure to trap additional sediment and nutrients.

New life has been restored to a 1950's era flood retention structure (E3) in the Crystal Creek watershed. Utilizing funding from a targeted watershed grant by BWSR and technical assistance from the SE Technical JPB and Fillmore SWCD, 20,000 cubic yards (28,000 tons) of stored sediment was removed during a three-week period in December 2017. The project is expected to extend the sediment trapping benefits for an additional 30-50 years. To enhance upland treatment and prolong the benefits of the clean out, 25,000 feet of new and repaired grass waterways were installed by watershed farmers. A sentence to serve crew from Preston helped remove over-grown brush and small trees from the earthen dike as well.



This picture taken in early December of 2017 shows the excavation of nearly 60 years of topsoil, up to nine feet deep, within the structure pool area.

Over the past sixty years, topsoil loss from the upper half of watershed has displaced the pool area. This has had little effect on diminishing the flood-control benefits, but has significantly reduced sediment and nutrient trapping efficiency from an estimated 80% to 20%. With the project complete, the efficiency has been restored back to its original design and its roughly estimated that an additional 144 tons of soil, 1,152 pounds of nitrogen, and 288 pounds of phosphorus will be stored on an annual basis[1]. Sediment surveys will be conducted in the pool area to quantify actual sediment delivery rates and trapping efficiency.



Slow release of water after a heavy June rainfall on June 28, 2018. Picture was taken seven months after the sediment clean-out project.

This project was considered a high priority for the watershed study since 45% of the watershed drains to this area and has the capacity to store 23 million gallons of runoff at the principal spillway and nearly 70 million gallons at the emergency spillway. Estimates indicate flood retention structures can help reduce peak flow runoff volume during 10, 50 and 100-year rainfall events by up to 25% (MDNR HMS Modeling, 2016). Reducing peak flow can help reduce potential flooding impacts to downstream communities like Preston and could also help reduce streambank erosion on the main stem of the Root River. A 2016 sediment source study (Belmont, 2016) estimated that streambank erosion accounts for over 40% of the sediment load at the outlet of the Root River. The study found that Root River sediment concentrations increase with river flow at a greater rate than almost any other river in Minnesota due to the many large, accessible and easily erodible streambanks. Maintaining structures like E3 is a cost-effective practice for helping obtain water quality goals in the Root River Watershed.