



United States Department of Agriculture
Natural Resources Conservation Service

Dam Rehabilitation Fact Sheet

Mills Creek Dam, Augusta County, Virginia

South River Dam No. 10A

September 2010

South River's Short Story: In 1955, a plan for flood prevention and watershed protection was completed for the South River Watershed in Augusta County. The USDA NRCS (then Soil Conservation Service) was asked to plan, design, and fund construction for several dams throughout the 156,700 acres of the South River Watershed. Twelve dams were built from 1956 to 1980. One dam was built in 1954 prior to plan completion.

Since these dams were built, there have been multiple storm events. In each case, the dams stored millions of gallons of water that would otherwise have contributed to local flooding.

The county has done an excellent job maintaining these dams. However, since the land use in the area below many of the dams has changed to include more housing, the

hazard class of these dams has increased from low or significant to high. The dam safety criteria are more stringent for high hazard dams, requiring modifications.

NRCS has provided financial and technical assistance on rehabilitation of three dams in the watershed. Rehabilitation has been completed on Inch Branch, Robinson Hollow, and Toms Branch. The rehabilitation plan for the Mills Creek Dam was completed in September 2010. Other dams in the watershed may be considered for rehabilitation in the future.



Mills Creek

Purpose: Rehabilitating the Mills Creek Dam will reduce risks to downstream residences and commuters, comply with current dam design and safety standards, and maintain the present level of flood control.

Benefits:

- Reduce threat to loss of life and property for approximately 355 people who live and work downstream of the dam;
- Protect 57 single family homes, 4 businesses, and five churches and maintain access to emergency services for an additional 131 homes;
- Protect two major roads used by 3,850 vehicles per day; and
- Provide \$154,400 in monetary benefits/year for 50 years after construction.

Concerns: There is a threatened plant species located downstream of the dam. NRCS will work with the USDA Forest Service to protect the plant and its habitat during construction. The brook trout fishery in the lake and downstream of the lake will be closed during construction since the lake will be drained. The Virginia Department of Game and Inland Fisheries plans to restock once construction is finished. After completion of the rehabilitation, the lake level will be 24 feet lower. The lake will also be about a third of its original size.

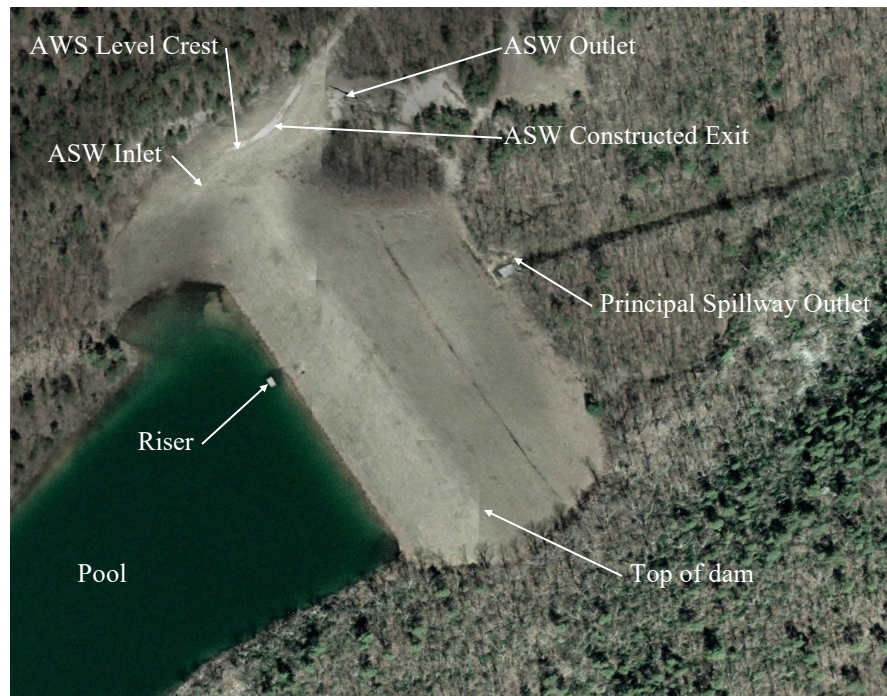
Estimated Project Cost: \$3,008,500 total. The USDA Natural Resources Conservation Service will provide \$1,955,500 and Augusta County will cover the remaining \$1,053,000.

Sponsor: The Augusta County Board of Supervisors.

Cooperating Agency: USDA Forest Service.

Dam Rehabilitation Schedule: The rehabilitation plan for Mills Creek was completed in September 2010. The design will be completed in 2011 and construction is planned to occur in 2012. Once modifications for Mills Creek are completed, the dam's flood protection, recreation, and water quality benefits will continue for the next 50 years.

Aerial photograph of the Mills Creek dam (2007).



The Mills Creek dam was built in 1963 to provide flood control and water supply. At the time of design, this dam was considered to be a significant hazard dam due to the presence of roads and some isolated houses. Changes in land use have caused the hazard class of this dam to change to high. The design criteria is more stringent for a high hazard dam and the dam must be rehabilitated to meet the stricter requirements.

The dam stores flood water during storm events and gradually releases it into the stream over several days through the principal spillway pipe. At the present time, Mills Creek can store the runoff from about 8.4 inches of rain in 24 hours. Excess water that cannot be stored in the reservoir will pass through the grassy area at the end of the dam known as the auxiliary spillway. The principal spillway riser system regulates the water level in the dam and controls the rate at which the detained storm water is released from behind the dam.

Presently, there are several problems with the Mills Creek Dam.

- The auxiliary spillway does not have the capacity to safely convey the runoff from the Probable Maximum Precipitation (PMP) as required for a high hazard dam. The PMP would occur if 28" of rain fell in 24 hours.
- The soils in the auxiliary spillway will erode during large storm events. This could cause the auxiliary spillway to breach which would release all the water in the lake.
- In large storm events, the back side of the dam will have some erosion because the training dike is too low and too short to keep water away from the downstream side of the dam.
- The principal spillway system is leaking in multiple places due to concrete and metal deterioration.

The plan includes the following rehabilitation items:

- The auxiliary spillway crest will be lowered by 3 feet to increase the capacity and eliminate the potential for a breach.
- The crest and constructed outlet section of the auxiliary spillway will be armored with concrete blocks that are cabled together (Articulated Concrete Blocks).
- A concrete training dike will be installed from the top of the dam to the valley floor. An earthen berm will be constructed at the end of the concrete training dike to provide additional protection for the toe of the dam.
- The principal spillway riser and 130 feet of the principal spillway pipe will be replaced. The concrete box at the principal spillway outlet will be replaced with a riprap stilling basin.
- The water supply capacity of the dam will be removed. The new water level will be approximately 24 feet lower than the original elevation. This will increase the flood storage and increase the level of flood protection.