How a Watershed Flood Control Dam Works

Oklahoma Conservation Commission

The USDA Watershed Program: :

Flood Control and Much More

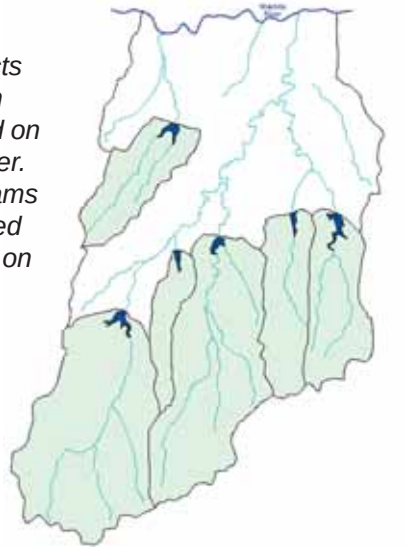
The watershed program helps communities and rural areas reduce flooding and collect sediment in 47 states. Since 1948 over 11,000 flood control dams have been built in more than 2,000 watersheds covering 160 million acres nationwide. In Oklahoma 2,105 dams have been built in 121 watersheds.

In addition to flood control, the lakes formed by the dams provide millions of dollars in benefits each year for recreation, municipal water supplies, irrigation and fish and wildlife habitat.

Watershed lakes average from 5 to 25 acres in surface area. A few are larger, and some are designed as dry "lakes" with no permanent water retained.

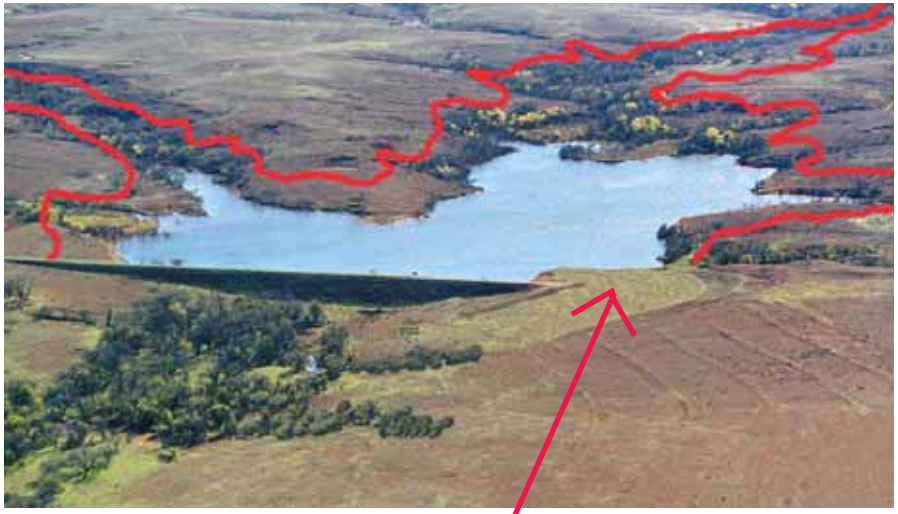
How Watershed Projects Reduce Flooding

The concept of watershed projects is simple. Upstream flood control dams are built across small tributaries to a larger steam to temporarily trap and store water runoff after heavy rainstorms. The dams slowly release the water over a period of several days through a pipe in the dam. This reduces the amount of water that reaches the main water course immediately after a rain, reducing flooding downstream.



Watershed projects consist of earthen dams constructed on tributaries to a river. The number of dams built in a watershed varies depending on the size of the watershed.

The red line on the photo below indicates the extent that water can back up in the flood pool upstream.



When there is more water than the lake can store and the principal spillway can release, water will flow through the auxiliary spillway.

Permanent Pool and Flood Pool

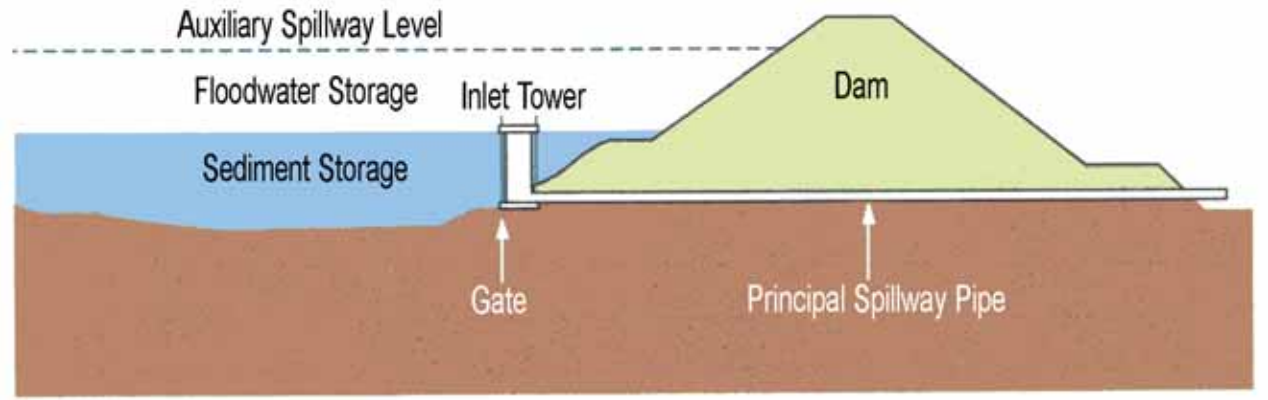
During most periods of the year the dams maintain a water level known as the permanent pool. The level of water is controlled by the elevation of the principal spillway in front of the dam. During heavy rainfall events water will back up, covering a larger area of land known as the flood pool. This water will recede after a few days as water is released through the pipe.

Project sponsors obtain easements from landowners to allow construction of the dams, storage of water in the permanent pool, and temporary storage of the water in the area that will be inundated during heavy rainfall events. Maps of the areas that will be temporarily flooded are available from local USDA Natural Resources Conservation Service offices.

A concrete tower connected to a pipe extending through the dam serves as a principal spillway for most dams, controlling the water level. A slide gate at the bottom can be opened to lower the water level even more to allow maintenance or repair.

Water is released through a pipe in the dam for several days after a heavy rainstorm.

Cross Section of a Watershed Dam



This cross section of a dam shows the concrete principal spillway (inlet) tower in front of the dam connected to the principal spillway pipe extending through the dam. When the water level reaches the inlet opening, it spills into the pipe and goes out the back of the dam. This controls the level of water in the lake.

The diagram also shows the auxiliary spillway level. When there is too much water for the principal spillway to handle, water will flow through the earthen spillway at the end of the dam. This prevents water from going over the top of the dam which could result in dam failure.

The area noted as sediment storage on the cross section is what makes up the permanent pool of water (lake). Over the lifetime of the dam, this area will usually fill with sediment (usually 50-100 years).

Watershed dams are built by the USDA Natural Resources Conservation Service under the authorization of the Flood Control Act of 1944 (PL78-534) and the Watershed Protection and Flood Control Act of 1954 (PL83-566) at the request of local watershed project sponsors. Local sponsors, usually conservation districts, obtain land rights and easements to build and maintain the dams.

Information about local watershed projects can be obtained from watershed sponsors. Conservation districts are often a primary sponsor of these projects.
Directory of Oklahoma's Conservation Districts: http://www.conservation.ok.gov/Directory/directory_CD.htm