



Willamette Valley – Operating the Reservoirs Introducing the Rule Curve

U.S. ARMY CORPS OF ENGINEERS

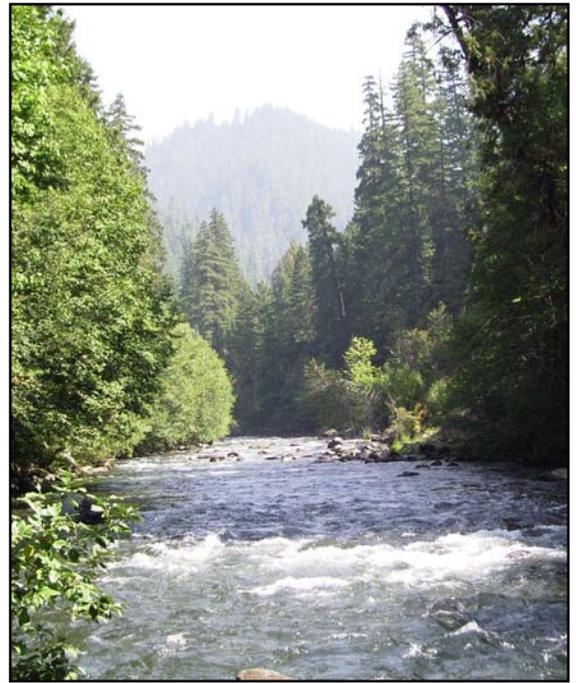
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Congress originally authorized the construction of the Corps' Willamette Valley dams to reduce the risk of and damages from flooding, and to support navigation. Flood damage reduction remains the dams' highest priority authorization, but they are also authorized for irrigation, water quality, fish and wildlife, and recreation.

Managing reservoir and river levels

For most of the dams, the Corps begins draining the reservoirs in the fall to maintain low water levels in the reservoir for the purpose of flood damage reduction. Big Cliff and Dexter reservoirs are operated within a narrow pool range, and do not have additional storage for flood damage reduction.

The Corps begins filling the reservoirs in late winter, with the goal of having them full for other purposes by mid-May. Lake levels vary between mid-May and early September and may vary from year to year, depending on inflow to the reservoir. Starting with the highest achievable level during the filling period, the Corps operates the reservoirs for several authorized purposes. Requirements under the Endangered Species Act call for the release of a minimum amount of water to maintain river flows for fish and wildlife downstream. These releases also help maintain water quality and provide for purchased irrigation water.



Combined with surface evaporation during the drier summer months and these releases, many reservoirs “draw down” throughout the summer.

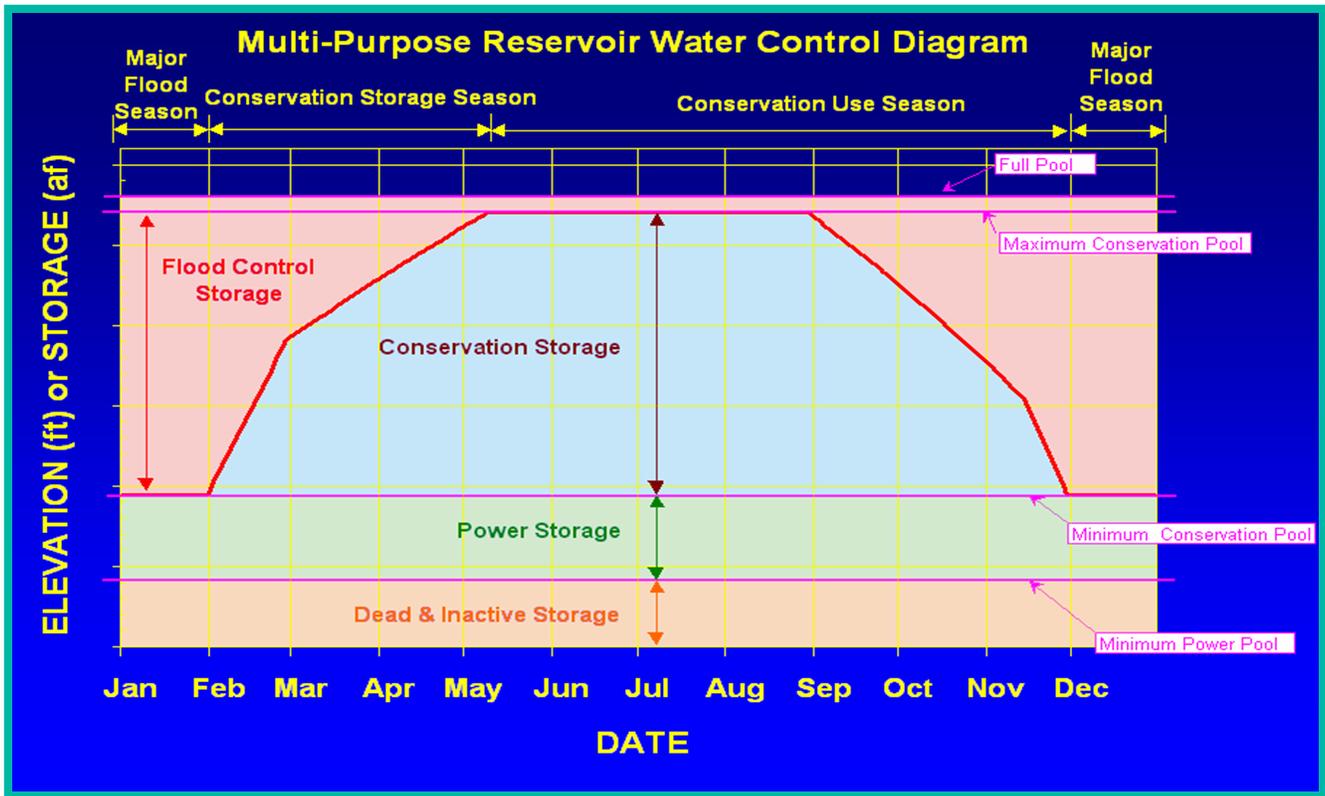
The Corps makes operational decisions based on the missions specific to the time of year, current individual and systemwide reservoir capacity, and weather and stream flow forecasts. They also use data collected from stream gauges located downstream, which measure the depth of water from releases from the dams and other uncontrolled runoff and transmit real time data to reservoir regulators.

The water control diagram

The Corps developed a water control diagram for each dam. The diagram reflects the anticipated uses of water and the Corps' legal responsibilities and limitations. The Corps compiles these diagrams and associated goals, limitations and requirements in a Water Control Manual used by reservoir regulators. The water control diagram includes a flood damage reduction rule curve to manage the dam for a 100-year storm event, which has a one percent probability of occurring in any year.

The rule curve shows the maximum elevation to which the Corps can fill a reservoir during various times during the year, with the exception of real-time flood operations.

For information on reservoir operations, visit http://www.nwp.usace.army.mil/water/home_levels.asp. Each project's “teacup” includes observed inflow, precipitation levels and its specific rule curve. 7- and 30-day looks at past operations are also available.



How high?

The National Weather Service references gauge depths in three basic terms that identify how property can be affected. These levels typically vary along different parts of a river during the same storm; many factors influence how local, uncontrolled flows and topography and other conditions affect individual properties.

Bankfull: The level at which any further rise would result in water moving into the flood plain.

Flood Stage: The level at which hazards to lives, property or commerce begin to occur. The issuance of flood (or in some cases flash flood) warnings is linked to flood stage.

Major Flood Stage: The level at which significant damage to residential or other improved property begins to occur. This is usually defined as a point that causes more than just basement flooding unless significant health hazards are involved. A major flood stage can be identified for agricultural land if extensive areas can be flooded during the growing season

The National Weather Service's Northwest River Forecast Center is responsible for issuing official flood warnings and forecasts. The public is encouraged to visit their website at <http://www.nwrfc.noaa.gov/> for information about rising river levels. The Corps uses information on this site to help estimate river flows.