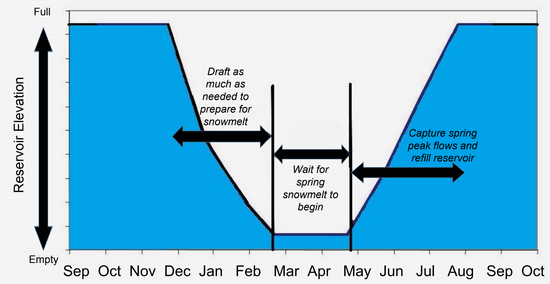
Flood Risk Management in the Columbia River Basin

Managing the System with Forecast-Informed Operations

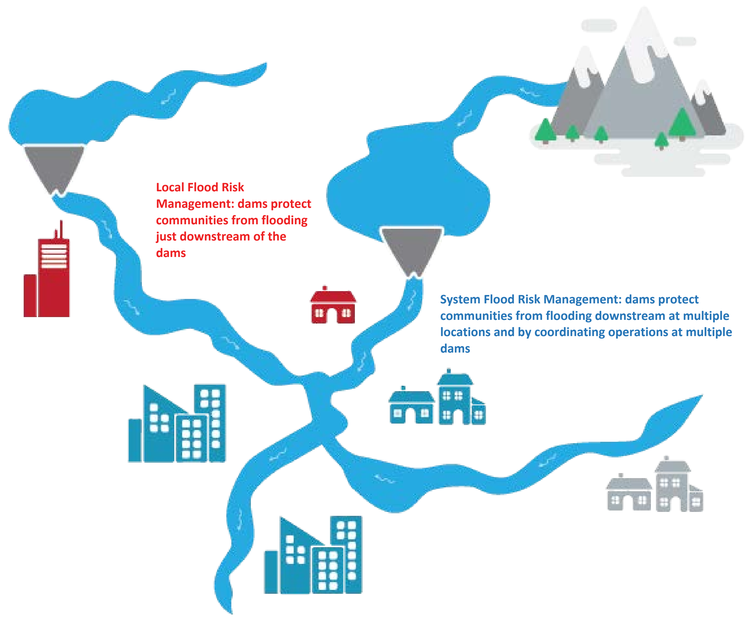
Flood storage dams in the Columbia River Basin system generally draft in the winter (i.e. empty out water to leave “space”) and refill in the spring and early summer. Reservoirs aren’t drafted to empty every year but only as much as operators predict is needed to capture spring snowmelt and rain that can cause flooding. Operators also want to ensure that reservoirs are full come summer so that water is available for other things such as recreation, irrigation, and fish.

In order to make sure dams are drafted enough but not too much, engineers create predictions of the volume of water that will run off. These predictions, called seasonal volume forecasts, are created using information such as the amount of snow on the ground upstream of a dam. The most difficult thing to predict, however, is how quickly snow will melt and how much additional rain will fall over the spring and early summer. This is one reason why managing flood risk is challenging. Reducing the drafted flood risk space too much may lead to flooding. If the drafted flood risk space increases too much, reservoirs might not fill by summer.

Flood Risk Management Generic Operation



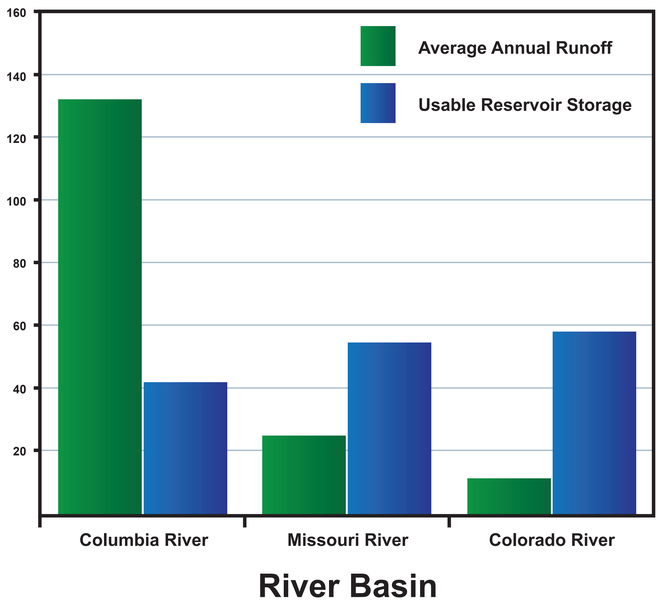
Local and System Flood Risk Management



Flood storage dams can only store inflow into the dam; they cannot capture rain or snowmelt downstream of the dams.

An Overview of the Reservoir Storage Space in the System

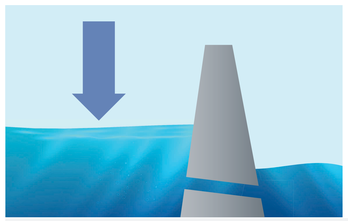
Only 1/3 of the average annual flow can be stored in the basins’ reservoirs. This means that in the event of a flood, the flood risk management storage in the basin can only REDUCE the peak. It CANNOT ELIMINATE the risk of flooding.

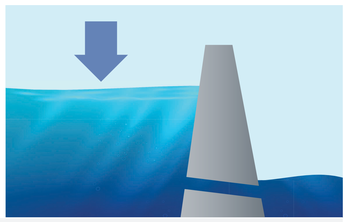


Snowmelt and Rain: A Complicated System

With a larger runoff forecast (more snow), the dams will draft more.

With a smaller runoff forecast (less snow), a dam will draft less, but it still needs space to store spring rainfall.





In years with lots of snow and/or rain, flooding CANNOT BE PREVENTED! After a reservoir reaches its spring draft, the physical risk is set, meaning that there is only so much water the reservoir can capture; the rest is up to mother nature. For example, a huge rainstorm could cause (or has caused) flooding that reservoirs cannot control.

The property and life safety consequences of flooding are severe, whether it’s from rain or snowmelt.