Quabbin Reservoir Elevation

Every day since August 14, 1939, engineers have measured the elevation of Quabbin Reservoir. They measure the reservoir not in gallons of water, or in water depth, but in feet above the Boston City Base (BCB). BCB is an elevation equivalent to Boston Harbor at low tide. When the water elevation is listed as 525.75 feet that is its current elevation above the Boston City Base. When Quabbin Reservoir is at 100% capacity it measures 530 feet BCB. Compromised water quality was a major concern during a long period of drought in the 1960's. In March 1967 the reservoir hit its all time low of 495.7 feet BCB or 45% of capacity. However, one glance at our graph will reassure you that this has not been an issue in the past several years.



Enfield Lookout in January of 1941 as the reservoir was slowly filling.

To many visitors the most striking feature of the Winsor Dam is its spillway. Designed to allow water to be released from the reservoir when needed, the spillway creates a spectacular waterfall when in use. Located on the east side of the Winsor Dam, the spillway is activated when the reservoir reaches capacity. Water pours over the wall and plunges dramatically down an 80-foot cascade under the arched spillway bridge. It then travels a half mile through an excavated channel to the original stream bed of the Swift River. There are times, generally to prevent flooding downstream, when the spillway is deliberately activated. When the reservoir is within two feet of capacity, stop logs are removed from a 30-foot section of the spillway wall, and water is allowed to flow freely through the channel.



DCR engineers use an elevation gauge and observation well to record the daily elevation. The

elevation

gauge is

the

steel

attached to

observation

well by a

measuring





tape. Daily information is available at the following website .

<u>https://stevens-</u> <u>connect.com/public/project/244/dashboard</u>



The Quabbin Reservoir Elevations and Capacities chart illustrates the annual levels of the reservoir for the past several years. On the left the levels are recorded in feet above BCB. On the right are indicated the number of gallons of water and what those gallons represent in percentage. As a benchmark, 1984 was included to show the highest elevation of the reservoir ever recorded; 531.82 feet BCB, 420,800.0 billion gallons, or 103% of capacity in June of 1984. This may seem to be a small amount, a mere foot and a half above capacity, but when the reservoir is full the top inch alone equals 750 million gallons of water. When Quabbin Reservoir is at capacity it holds 412 billion gallons of water. However, from the viewpoint of drinking water standards, if a reservoir declines below a certain percent of capacity the water quality may deteriorate as physical, chemical and biological conditions change and the water may no longer be considered safe for consumption. This is called the minimum pool level theory. At Quabbin, the minimum pool level is 38% capacity or 159 billion gallons of water. According to



In dry years, old roads that ran through the Valley are often visible. This photo from 2016 shows a part of a road that once ran from Dana Center to North Dana.

Looking at the graph, it is easy to see seasonal fluctuations in the water level. Spring is the traditional time for the reservoir to be replenished, or recharged, through snow melt and spring rains. Tracking the reservoir elevation through the year shows that by summer the reservoir level is dropping. Trees are in full leaf in summer, drawing more water from the ground to produce food. As well, water evaporates more quickly in the strong sun of a summer day. However, the major contributor to the drop in elevation is from water users watering lawns, gardens and filling pools while they enjoy the warmer months. When the reservoir reaches capacity, water flows over the spillway wall...



The current chart records the past several years of elevation. Until 2016 reservoir elevations were higher than the historic average. Due to modernization of the water distribution system, which included repairs of leaky pipes and a restructuring of water rates as well as an emphasis on water conservation, daily water usage dropped to an average of about 200 million gallons, much lower then the 300 million gallon usage that is the safe yield of the system.

However in 2016 Massachusetts experienced a severe drought which caused reservoir levels to drop to 79.0% at the end of the year. By the end of 2017 with sufficient rain and snow the reservoir had recovered to 85.3% . Transfer of water from the Ware River also helped raise the reservoir levels. On November 29, 2018 the reservoir reached full capacity for the first time since January of 2012. ...through the channel...



this theory, if the Quabbin were to ever drop below 38% of capacity the water quality would be considered compromised.

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The years when Quabbin Reservoir has reached capacity: 1947 1948 1949 1951 1952 1953 1955 1956 1960 1961 1976 1978 1980 1983 1984 1991 1993 1994 1996 1997 1998 2005 2006 2007 2008 2009 2010 2011 2012 2018 2019, 2020

...and down an 80-foot drop until it joins with the Swift River.