2016 Rainy Season: What Are The Chances?

Once again speculation about rainfall at Lake Berryessa has begun. We had an El Nino last year and it did nothing for Lake Berryessa. Will the lake fill this year? Unlikely, since it would take more than 60 inches of rain to go up 40 feet. But there's always a chance.

The lake rose 38 feet in 1978, 40 feet in 1993, and 61 feet in 1995 due to an unusually wet season with two significant storm periods. But this raises the question as to what would happen if the lake were already at or near the Glory Hole level and the rain still kept coming. Could there be a year when the lake went over the dam?

The water supply for Lake Berryessa is derived from the 568 square mile drainage basin above the dam. There are four principal creeks that flow into Lake Berryessa: Capell Creek, Pope Creek, Eticuera Creek, and Putah Creek - the main drainage of the basin. There is no connection to the Sierras so snow is not a factor.

Lake Berryessa has a storage capacity of 1,600,000 acre-feet (AF) at elevation 440 feet (Glory Hole). The average annual inflow to the reservoir is 369,000 AF and the annual firm yield is 201,000 AF. An additional release of 22,000 AF is required annually to meet prior downstream water rights along Putah Creek. An upstream reservation of 33,000 AF was established by the State Water Resource Control Board to provide water for future development of the area above Monticello Dam. Reclamation appropriated 7,500 AF of the 33,000 AF to provide for future development around the reservoir.

The reservoir water level may fluctuate from 455 feet (lip of dam) to a minimum elevation of 253 feet - no further output allowed. A water level of 309 feet is considered dead storage elevation. During the severe drought of 1977 the level decreased to 388 feet.

The latest Probable Maximum Flood (PMF) study was published on August 28, 1984. Experience since then indicates that the study results were conservative. Worst case results show the lake would overtop the dam by about 7.7 feet to an elevation 463.7' for 51 hours. Of course, the probability of this happening is only 0.01% - a 10,000 year flood. Overtopping the dam is not expected to affect the safety of the dam. The following table, based on an analysis completed in 1986, depicts the water elevation that, on the average, can be expected to be reached or exceeded for various time periods.

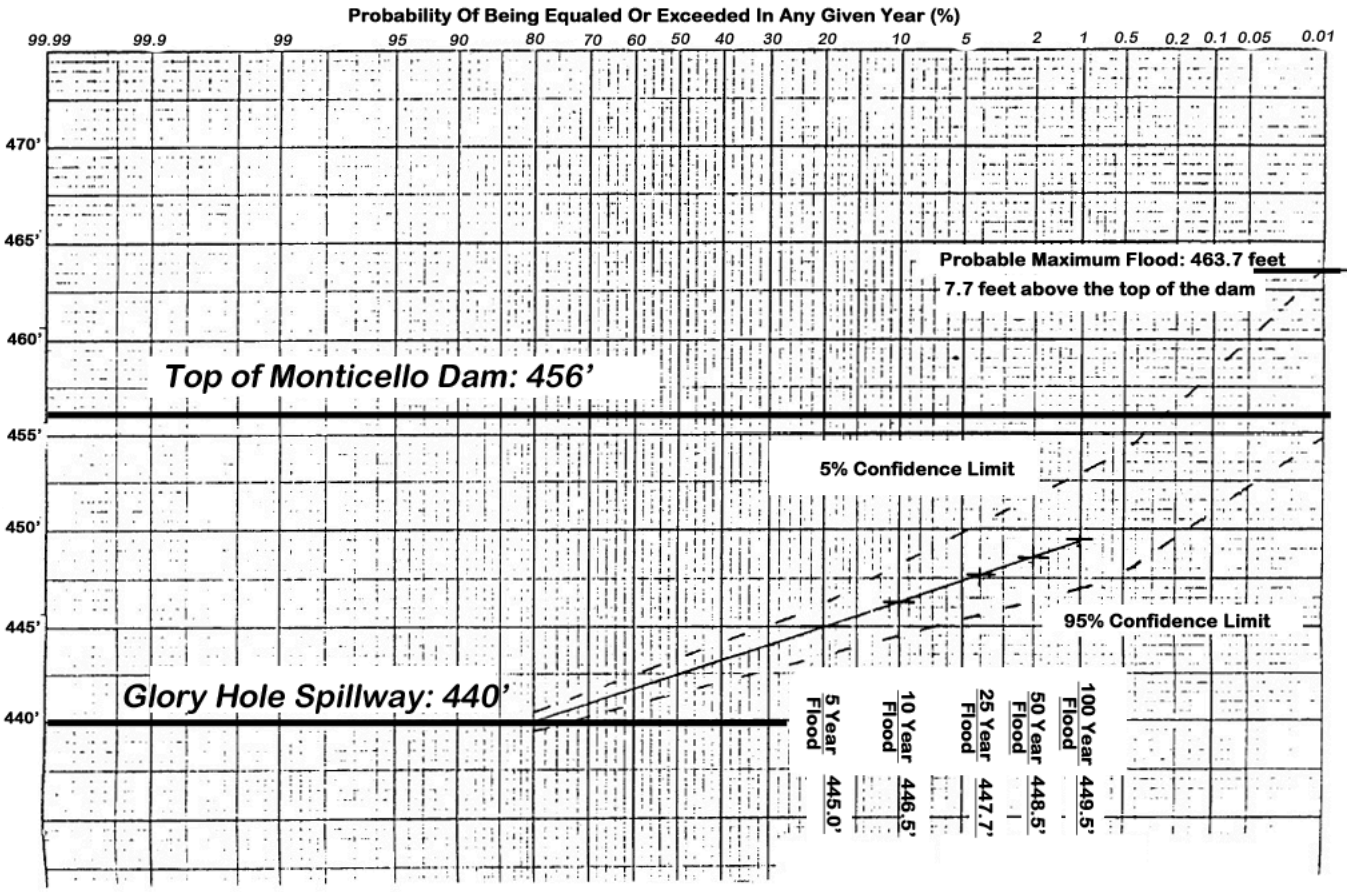
| Water Elevation Frequency | | |
|---|---|---|
| | | |
| Years | Feet | Confidence Range (Feet) |
| 1.25 | 440 Glory Hole | + or - .05 |
| 5 | 445 | + or - 1.5 |
| 10 | 446.5 | + or - 2.0 |
| 25 | 447.5 | + or - 2.5 |
| 50 | 448.5 | + or - 2.75 |
| 100 | 449.5 | + or - 3.0 |

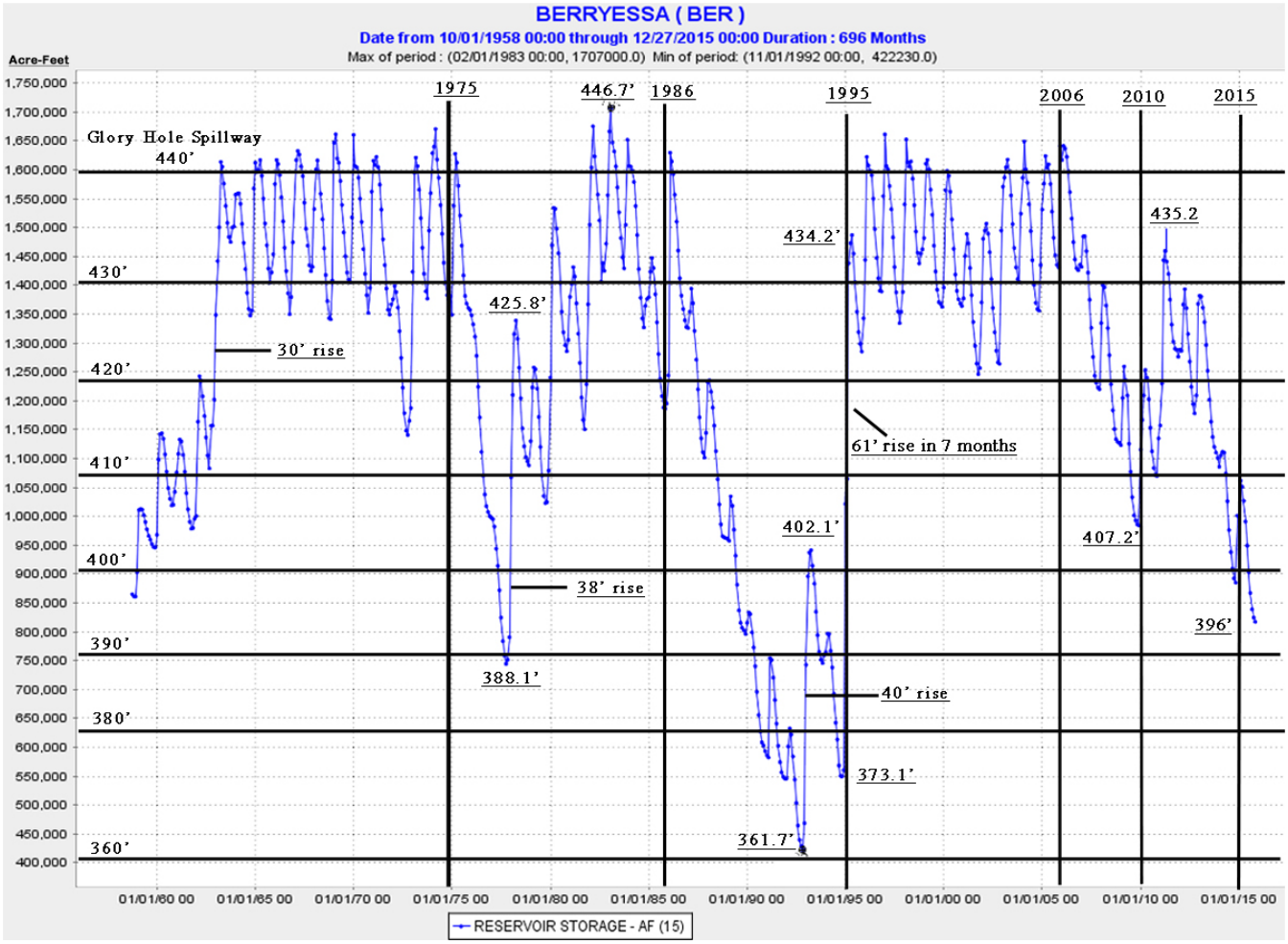
The probability graph below shows that the chance of the lake rising to overtop the dam is only about .05% - a 2,000 year flood of 456 feet + or -5 feet.

The highest level the lake has ever reached in 58 years was 446.7 feet (6.7 feet above Glory Hole) in 1983.

In those same 58 years the level has only reached Glory Hole itself 24 times. This data proves that the figures in the above table are conservative. The discharge flow capacity when the lake is at the Glory Hole level of 440 feet is 2,660 cu.ft/sec so there is a significant safety valve there too.

So flooding is the least of our worries. Bring on the rain!




BERRYESSA ( BER )
Date from 10/01/1958 00:00 through 12/27/2015 00:00 Duration : 696 Months
Max of period : (02/01/1983 00:00, 1707000.0) Min of period: (11/01/1992 00:00, 422230.0)
Acre-Feet
1,750,000
1,700,000
1,650,000
1,600,000
1,550,000
1,500,000
1,450,000
1,400,000
1,350,000
1,300,000
1,250,000
1,200,000
1,150,000
1,100,000
1,050,000
1,000,000
950,000
900,000
850,000
800,000
750,000
700,000
650,000
600,000
550,000
500,000
450,000
400,000
Glory Hole Spillway
440'
430'
420'
410'
400'
390'
380'
360'
1975
446.7'
1986
1995
2006
2010
2015
435.2
434.2'
425.8'
30' rise
61' rise in 7 months
402.1'
407.2'
38' rise
396'
388.1'
40' rise
373.1'
361.7'
01/01/60 00
01/01/65 00
01/01/70 00
01/01/75 00
01/01/80 00
01/01/85 00
01/01/90 00
01/01/95 00
01/01/00 00
01/01/05 00
01/01/10 00
01/01/15 00
RESERVOIR STORAGE - AF (15)