Marlette Lake Dam Resilient Infrastructure Project

BCA 9 – Before Mitigation Estimation of Loss of Water Days

The use of water from Marlette Lake varies based on season and water availability. Water is pumped from Marlette Lake to Hobart Lake where is then continues through the Marlette Water System to either Carson City or Lake Tahoe. In the event of a dam failure at Marlette Lake, immediate water needs would be served by stored water in Hobart. If there is a dam breach at Marlette Lake, the length of time to design, permit and repair damages to the facility will likely take in excess of 12 months.

To estimate the potential loss of water days in the event of a dam breach, available data on the duration of pumping that has occurred between Marlette and Hobart reservoirs, in addition to precipitation data for the area were reviewed. The purpose of this was to determine typical patterns of pumping that indicate when and for how long water from Marlette is needed to supplement the demands of the system.

The State of Nevada has data from 2009 that shows the amount of water and number of months water was pumped from Marlette Lake into the Marlette Water System. These data indicate that pumping occurred anywhere from approximately 60 days to 150 days in any given year.

The Snow Water Equivalent Data from 1978 to 2018 from the Natural Resources Conservation Service (NRCS) SNOTEL site at Marlette Lake was reviewed. Of the nine years for which pumping data is available, five of those years were years of below average precipitation. Pumping occurred in eight of the last nine years. As to be expected, a larger volume of water was pumped in drought years and in the year immediately following a drought year. Of the 40 years of SNOTEL data for the Marlette Lake site, 15 of those years are below average precipitation (drought) years.

Using this data, an estimate of the number of days the affected residents could potentially be without water was calculated. The following assumptions were made:

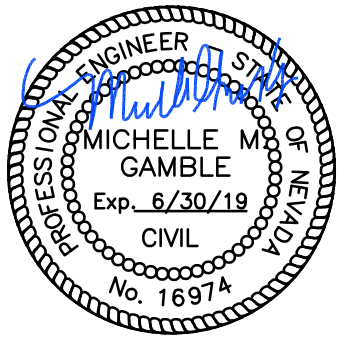
- Water is pumped from Marlette Lake to Hobart Reservoir as needed to meet system demands.
- If the dam fails, the time required to design and construct repairs to the dam would be in excess of 12 months due to seasonal access limitations for construction, design timeframes and permitting requirements.
- If the dam fails at any time during the year, it would be out of commission for at least one of the summer seasons during which pumping from Marlette to Hobart would typically be required to meet system demands.
- Typical pumping from Marlette to meet system demands occurs from approximately 60 to 150 days, depending on the water year.
- Water demands for the system may be initially met through water stored in Hobart Reservoir. However, the storage capacity of Hobart Reservoir is approximately 35,000,00 gallons (107 Ac-Ft). The volume of water alone pumped from Marlette to Hobart since 2009 exceeded Hobart's storage capacity in 8 of the ten years.
- If the dam fails and water cannot be pumped from Marlette Lake into Hobart Reservoir and the system, system demands will likely not be met if the dam is out of commission.
- To be conservative, the BCA assumes a minimum of 60 days of system demand may not be met.

Attached is pumping data and SNOTEL site data from Marlette Lake.

MARLETTE LAKE PUMPAGE RECORDS FOR MARLETTE TO HOBART RESERVOIR

Units are in acre feet

SNOTEL AnnualTotals (inches)	YEAR	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Total (AF)
39.3	**2009**									51.749	53.431			105.2
98.6	**2010**							79.8	132.465	124.927	1.34			338.5
182.7	**2011**									30.678	62.268	69.936	8.899	171.8
25.9	**2012**					17.469	110.829	136.359	136.997	181.239				582.9
56.1	**2013**						16.355	179.529	152.761	151.826				500.5
44.1	**2014**							158.638	187.031	106.617				452.3
21.3	**2015**							141.843	139.559	0	0			281.4
95.5	**2016**							146.286	169.639	177.999	13.676			507.6
182.5	**2017**								37.584	95.927				133.5
	2018						No Pumping in this year							0



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Natural Resources Conservation Service
MARLETTE LAKE (615) SNOTEL Site - 7884 ft.
Reporting Frequency: Monthly Data Ranges: Period of Record

Year	January	February	March	April	May	June	July	August	September	October	November	December	(1981 - 2010 average)	SWE Total	% of Annual	Drought
	SWE	SWE	SWE	SWE	SWE	SWE	SWE	SWE	SWE	SWE	SWE	SWE	Avg Water Year (in) =	76.7		
1978	13.4	21.3	27.2	32.8	0	0	0	0	0	0	1	3.8	Total Water Year	99.5	130%	
1979	6.5	8.7	16.7	20.6	17.7	0	0	0	0	0	0.4	1.4	1979	75.0	98%	
1980	5.8	14.4	21.8	28.3	23.1	5.3	0	0	0	0	0.2	0.8	1980	100.5	131%	
1981	2.3	9.1	11.3	15.2	3.8	0	0	0	0	0	2	6.6	1981	42.7	56%	Drought
1982	13	22.3	25.7	34.8	29.9	0	0	0	0	0.8	1.1	9.9	1982	134.3	175%	
1983	18.1	27.3	40.9	52.7	58.3	33.1	0	0	0	0	0	9.6	1983	242.2	316%	
1984	20.3	22.8	28.9	29	25.1	0	0	0	0	0.3	2	8.8	1984	135.7	177%	
1985	10.5	12.3	15.9	22.3	7	0	0	0	0	0	0	6.7	1985	79.1	103%	
1986	10.7	15	37.3	38	22.1	0	0	0	0	2	0	0.2	1986	129.8	169%	
1987	2	6.1	11.6	14.7	0	0	0	0	0	0	0.1	2.3	1987	36.6	48%	Drought
1988	4.7	10.1	10.3	4.9	0	0	0	0	0	0	0	4.5	1988	32.4	42%	Drought
1989	11.2	14.2	18.8	25.5	11.2	0	0	0	0	0	2.1	3.7	1989	85.4	111%	
1990	3.5	6.9	11.8	11.2	0	0.4	0	0	0	0	0	1.4	1990	39.6	52%	Drought
1991	3	3.6	4.5	14.6	7.3	0.2	0	0	0	0	3.1	2.7	1991	34.6	45%	Drought
1992	4.3	5.2	9.3	11.2	0	0	0	0	0	0	2	0.9	1992	35.8	47%	Drought
1993	13.2	22.7	31.8	33.8	23	0	0	0	0	0	0	2.3	1993	127.4	166%	
1994	4.7	6.5	11.5	10.3	0.8	0	0	0	0	0	0	8.9	1994	36.1	47%	Drought
1995	15.1	30	31.1	45.3	44.9	26.7	0	0	0	0	0	0	1995	202.0	263%	
1996	3.6	16.4	23.3	34.2	25.6	0	0	0	0	0	1	1.2	1996	103.1	134%	
1997	17.3	28.9	32.2	26.1	12.1	0	0	0	0	0	0	2.7	1997	118.8	155%	
1998	5.6	13.5	27.2	32.1	28.6	21.9	0	0	0	0	0	5.5	1998	131.6	172%	
1999	7.7	18.2	31.4	31.9	30.5	1.4	0	0	0	0	0	1.1	1999	126.6	165%	
2000	1.8	11.4	20.8	22	8.1	0	0	0	0	0	1.5	4.6	2000	65.2	85%	Drought
2001	5.5	8.1	11.6	9.3	5.1	0	0	0	0	0	0	2.8	2001	45.7	60%	Drought
2002	11.8	13.5	16.3	19.2	14.4	0	0	0	0	0	0	2.3	2002	78.0	102%	
2003	12.1	13.3	15.3	14.3	17.8	0	0	0	0	0	0.4	2.4	2003	75.1	98%	
2004	11.4	14.9	22	19	4.6	0	0	0	0	0	4.2	7.5	2004	74.7	97%	
2005	13.2	23.1	27.5	35.8	31.6	2.2	0	0	0	0	0	1.2	2005	145.1	189%	
2006	11.7	20	24.7	35.3	32.8	0.2	0	0	0	0	0	0.5	2006	125.9	164%	
2007	2.9	4.3	11.6	9.6	0	0	0	0	0	0	0	0	2007	28.9	38%	Drought
2008	4.5	16.9	21.7	19.3	10	0	0	0	0	0	0	0	2008	72.4	94%	
2009	3.2	5.6	9.3	14.3	6.9	0	0	0	0	0	0	1	2009	39.3	51%	Drought
2010	7.6	12.7	19.1	22.3	25.1	10.8	0	0	0	0	0.3	5.6	2010	98.6	129%	
2011	19.3	20.8	28.9	43.5	38.7	25.6	0	0	0	0	0	0.8	2011	182.7	238%	
2012	0.8	5	6.5	11.5	1.3	0	0	0	0	0	0.9	3.4	2012	25.9	34%	Drought
2013	11.4	13.4	13.6	13.4	0	0	0	0	0	0	1.6	2.2	2013	56.1	73%	Drought
2014	3.7	6.1	13.8	13.6	3.1	0	0	0	0	0	0.2	0.7	2014	44.1	57%	Drought
2015	4	4.3	9.2	2.9	0	0	0	0	0	0	0	2.5	2015	21.3	28%	Drought
2016	10.1	18.7	20.1	23	21.1	0	0	0	0	0	0.4	2.2	2016	95.5	125%	
2017	5.9	26.6	42.4	48.1	44.1	12.8	0	0	0	0	0	1.9	2017	182.5	238%	
2018	2.2	4.7	5.6	14.2	3.7	0	0	0	0	0	0	---	2018	32.3	42%	TBD
							0	0	0	0						

Website:

https://wcc.sc.egov.usda.gov/reportGenerator/view/customCalendarYearGroupByMonthReport/monthly/start_of_period/615:NV:SNTL%7Cid=%22%22%7Cname~0/POR_BEGIN,POR_END/WTEQ::value,WTEQ::median_1981,PREC::value,PREC::average_1981?fitToScreen=false

SWE = Snow Water Equivalent (inches)