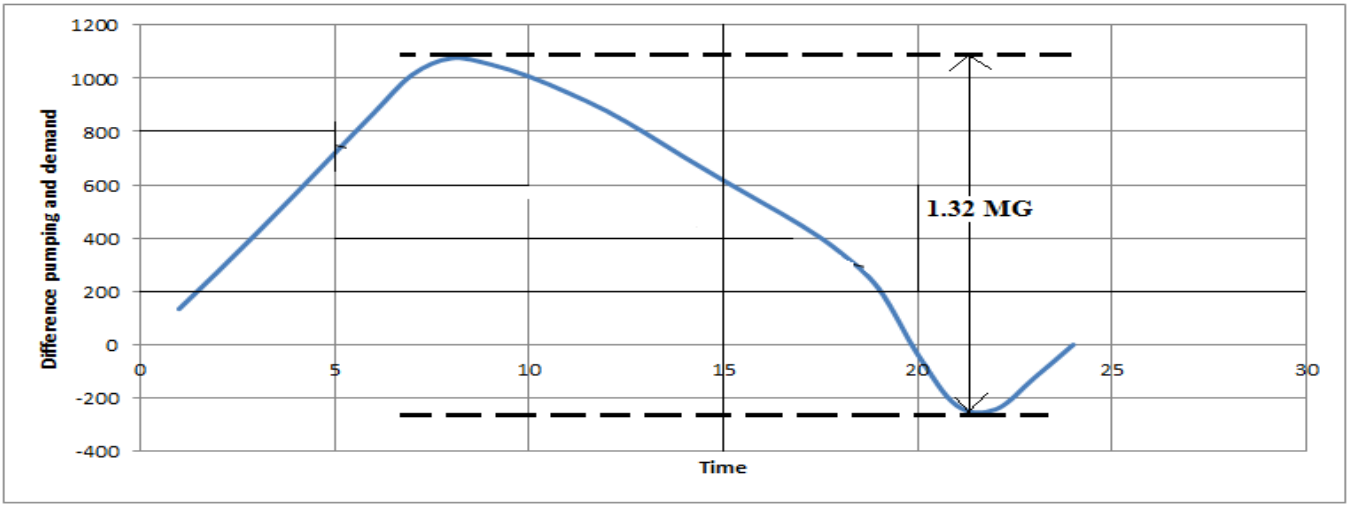
Example (2): for the data in table below, determine the storage capacity for a reservoir if the pumping rate of the pump from well to reservoir is (257.6 *1000) gal/hr, when:

1- **24-pumping per day,**
2- **12-pumping per day.**

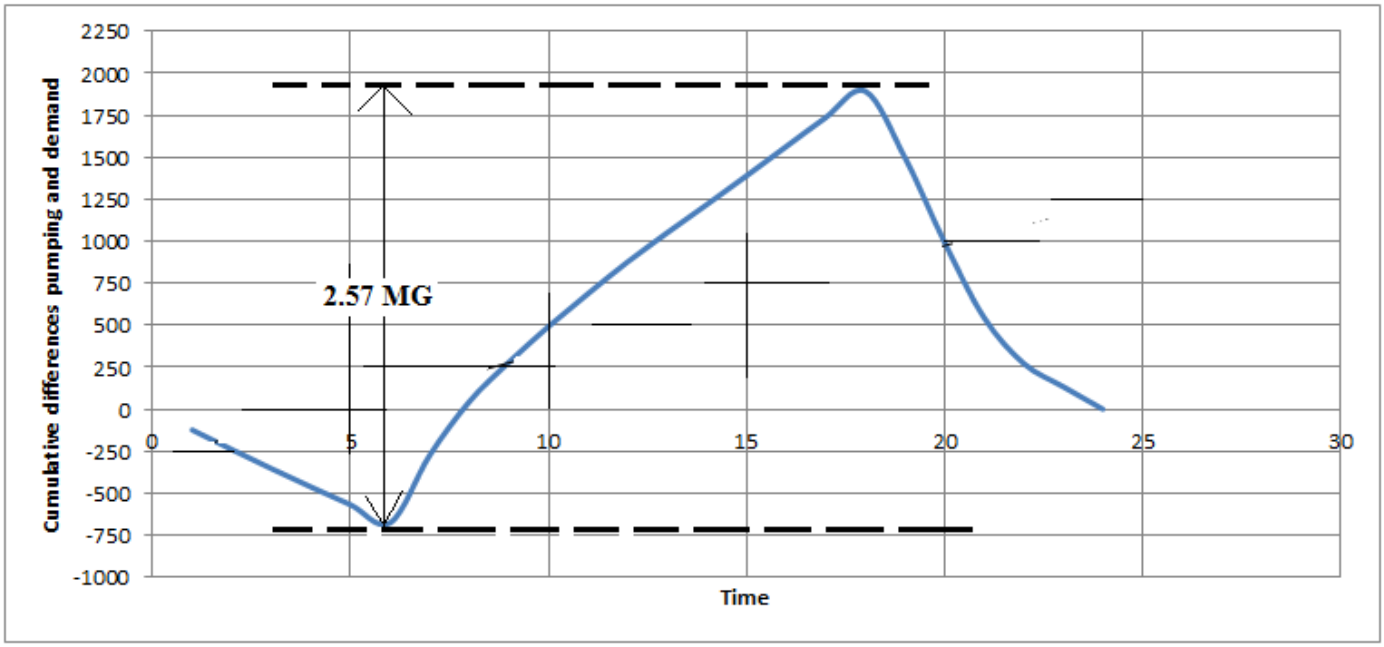
Time	Hourly Demand Rate (gpm)
12-midnight	2061
1am	1953
2	1890
3	1818
4	1773
5	1782
6	1872
7	3267
8	4671
9	5058
10	5310
11	5436
12	5688
1pm	5796
2	5733
3	5688
4	5706
5	5976
6	6588
7	8400
8	7488
9	4545
10	2313
11	2223

Sol:

Time	Hourly Demand Rate (gpm)	Hourly demand (gal*1000)	Cumulative hourly demand (gal*1000)	24-pumping		12-pumping	
				Cumulative 24-Pumping (gal*1000)	Cumulative Difference Col5-Col4 (gal*1000)	Cumulative 12-Pumping (gal*1000)	Cumulative Difference Col7-Col4 (gal*1000)
12-midnight	2061	123.7	123.7	257.6	133.9	0	-123.7
1am	1953	117.2	240.9	515.2	274.3	0	-240.9
2	1890	113.4	354.3	772.8	418.5	0	-354.3
3	1818	109.1	463.4	1030.4	567	0	-463.4
4	1773	106.4	569.8	1288	718.2	0	-569.8
5	1782	106.9	676.7	1545.6	868.9	0	-676.7
6	1872	112.3	789	1803.2	1014.2	515.2	-273.8
7	3267	196	985	2060.8	1075.8	1030.4	45.4
8	4671	280.3	1265.3	2318.4	1053.1	1545.6	280.3
9	5058	303.5	1568.8	2576	1007.2	2060.8	492
10	5310	318.6	1887.4	2833.6	946.2	2576	688.6
11	5436	326.2	2213.6	3091.2	877.6	3091.2	877.6
12	5688	341.3	2554.9	3348.8	793.9	3606.4	1051.5
1pm	5796	347.8	2902.7	3606.4	703.7	4121.6	1218.9
2	5733	344	3246.7	3864	617.3	4636.8	1390.1
3	5688	341.3	3588	4121.6	533.6	5152	1564
4	5706	342.4	3930.4	4379.2	448.8	5667.2	1736.8
5	5976	358.6	4289	4636.8	347.8	6182.5	1893.5
6	6588	395.3	4684.3	4894.4	210.1	6182.5	1498.2
7	8400	504	5188.3	5152	-36.3	6182.5	994.2
8	7488	449.3	5637.6	5409.6	-228	6182.5	544.9
9	4545	272.7	5910.3	5667.2	-243.1	6182.5	272.2
10	2313	138.8	6049.1	5924.8	-124.3	6182.5	133.4
11	2223	133.4	6182.5	6182.5	0	6182.5	0
total		**6182.5**					



Pumping 24-hr



Pumping 12-hr

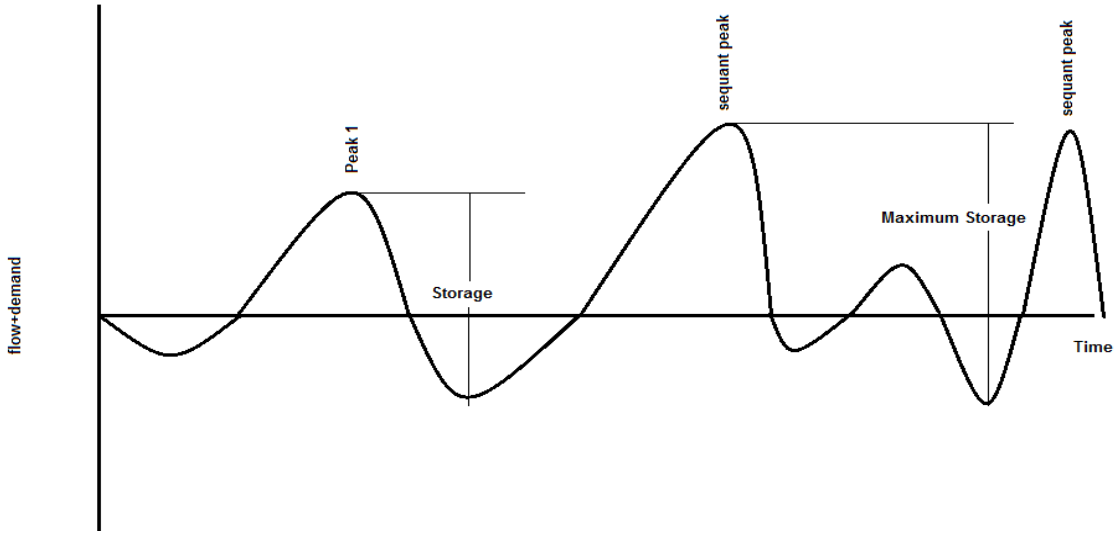
Selection of Capacity for a River Reservoir:

The determination of required capacity for river reservoir is usually called an *operation study* and is essentially a simulation of the reservoir operation for a period of time in accord with an adopted set of rule.

Operation study may analyze:

- **Only a selected "critical period" of very low flow (include no more than define the capacity required during the selected drought.**
- **Modern practice favors the use of a long synthetic record (synthetic data it is possible to estimate the reliability of reservoirs of various capacity.**
- **An operation study may be performing with annual, monthly, or daily time intervals. Monthly data are most commonly used, but for large reservoirs that carry over storage for many years, annual intervals are satisfactory.**

When lengthy synthetic data are to be analyzed, computer analysis is indicated and the *sequent- peak algorithm* (see fig. below) is commonly used.



Sequent- peak algorithm

In evaluating storage requirements a hydrologist would use various hydrological tools such as cumulative mass curves, runoff, estimation of flood design, flood routing and other factors.