

Technical Analysis Sample

Created November 4, 2016

Assumptions

For the calculations of rate of volume change and rate of depth change it was assumed that the only inflow to Fern Lake is from the inlet, and the only outflow is the outlet and evaporation.

The value used for evaporation is from the National Weather Service historical pan evaporation data. The value of 1.04 inches in November was measured in Ferndale, CA and is an average over the years of 1963-1973.

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Input Parameter	
Surface Area Lake(m ²)	8000
Evaporation (in/Nov)	1.04

Float							
Inflow Method 1	Depth (m)	Width (m)	Length (m)	Volume (m ³)	Time (s)	Time (hr)	Flowrate (m ³ /hr)
Trial 1	0.01	0.52	1.21	0.006292	5.49	0.001525	4.125901639
Trial 2	0.01	0.52	1.21	0.006292	5.15	0.001430556	4.398291262
Trial 3	0.01	0.52	1.21	0.006292	4.66	0.001294444	4.860772532
						Avg Flowrate =	4.461655145

Velocity Meter						
Inflow Method 2	Depth (m)	Width (m)	Channel Area (m ²)	Meter Value (ft/s)	Meter Value (m/s)	Flowrate (m ³ /hr)
Trial 1	0.115	0.63	0.07245	0.6	0.18288	47.6987616
Trial 2	0.115	0.63	0.07245	0.6	0.18288	47.6987616
Trial 3	0.115	0.63	0.07245	0.6	0.18288	47.6987616
					Avg Flowrate =	47.6987616

Bucket Method						
Outflow Method 1	Bucket Height (m)	Bucket Diameter (m)	Bucket Volume (m ³)	Time (s)	Time (hr)	Flowrate (m ³ /hr)
Trial 1	0.365	0.29	0.024108975	46.75	0.012986111	1.856519979
Trial 2	0.365	0.29	0.024108975	47.12	0.013088889	1.841942042
Trial 3	0.365	0.29	0.024108975	46.32	0.012866667	1.873754512
					Avg Flowrate =	1.857405511

Results	
Total Inflow	Average (m ³ /hr)
Method 1	4.461655145
Method 2	47.6987616
Avg Inflow	26.08020837

Outflow	Value (in/Nov)	Value (m/Nov)	Lake Surface (m ²)	Lake Evaporation (m ³ /hr)
Evaporation	1.04	0.026416	8000	0.205457778

Outflow	Average(m ³ /hr)
Method 1	1.857405511

Total Outflow	(m ³ /hr)
	2.062863289

Fern Lake is not at a steady state. The total inflow is greater than the total outflow.

Rate of Volume Change	Inflow (m ³ /hr)	Outflow (m ³ /hr)	Rate (m ³ /hr)
Inflow - Outflow	26.08020837	2.062863289	24.01734508

increasing

Rate of Depth Change	Rate of Volume (m ³ /hr)	Surface Area (m ²)	Depth Change (cm/hr)
	24.01734508	8000	0.300216814

increasing