

Assumptions:

seepage is negligible

precipitation rate is 0

Average surface area of Fern Lake is 0.008 km^2

evaporation rate is 1.04 inches/dec

The width and depth of the stream at the spot where we did the float test is the same as the site where we used the velocity meter

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Input parameter	
Lake surface area (m ²)	8000
evaporation (inch/month)	1.04

Velocity Meter					
Inflow method 1	Depth (m)	Width (m)	cross area (m ²)	meter value (m/s)	flowrate (m ³ /hr)
trial 1	0.04	0.4	0.016	0.2	11.52
trial 2	0.01	0.4	0.004	0.2	2.88
trial 3	0.03	0.4	0.012	0.2	8.64
				avg flowrate=	7.68

Float Test							
Inflow method 2	Depth (m)	Width (m)	Length (m)	Volume (m ³)	Time (s)	Time (hr)	Flowrate (m ³ /hr)
trial 1	0.03	0.4	3	0.036	21	0.005833333	6.171428924
trial 2	0.03	0.4	3	0.036	22	0.006111111	5.890909198
trial 3	0.03	0.4	3	0.036	22	0.006111111	5.890909198
						avg flowrate=	5.984415773

Bucket Method					
Outflow method 1	Bucket Volume (gal)	Bucket Volume (m ³)	Time (s)	Time (hr)	Flowrate (m ³ /hr)
trial 1	5	2.5	6.9	0.001916667	1304.347599
trial 2	5	2.5	6.5	0.001805556	1384.615385
trial 3	5	2.5	7.2	0.002	1250
				avg flowrate=	1312.987661

Results	
Total Inflow	Average (m ³ /hr)
method 1	7.68
method 2	5.98
avg inflow	6.83

Total Outflow	Value (m/Nov)	Lake Surface (m ²)	Lake Evaporation (m ³ /hr)
Evaporation	0.02	8000	0.14

3) Fern Lake is not in a steady state, the output flowrate was much higher than the input flowrate.

Rate of Volume Change	Inflow (m ³ /hr)	Outflow (m ³ /hr)	Rate (m ³ /hr)
inflow-outflow	6.83	1312.99	-1306.16

Rate of Depth Change	Rate of Volume (m ³)	Surface Area (m ²)	Depth Change (cm/hr)
Rate of Volume Change	-1306.16	8000	-0.16327