

Andrew Valverde
 Lab 11
 ENGR 115
 Thursday 1400

Input Parameters:

Surface Area Lake(km ²)	0.008
Surface Area Lake(m ²)	8000
Evaporation(inch/nov)	1.04

Due to the inflow rate on both the velocity meter and the float technique being higher than the outflow rate of the lake, it is safe to say that the lake is unsteady. This, however, does not have a negative effect on Fern Lake because of the size, and some water flows into the fish hatchery on campus.

Based on the average flowrates in (20.8 m³/hr) and out (3.7 m³/hr) I would say that the lake is filling and that the volume change is positive (approx. 13m³/hr) and as a result the lake should be getting deeper.

Float Technique:

Inflow Method 1	Depth (cm)	Depth (m)	Width (cm)	Width (m)	Length (m)	Volume (m ³)	Time (s)	Time (hr)	Flowrate (m ³ /hr)
Trial 1	5.2	0.052	43	0.43	1.1	0.02460	4.21	0.00117	21.03
Trial 2	6.5	0.065	42	0.42	1.1	0.03003	4.37	0.00121	24.74
Trial 3	5.2	0.052	43	0.43	1.1	0.02460	5.28	0.00147	16.77
Average Flowrate:									20.8469606

Velocity Meter:

Inflow Method 2	Depth (cm)	Depth (m)	Width (cm)	Width (m)	Surface Area (m ²)	Measured Value (ft/s)	Measured Value (m/s)	Measured Value (m/hr)	Flowrate (m ³ /hr)
Trial 1	5.2	0.052	43	0.43	0.02236	0.5	0.1542	555.12	12.41
Trial 2	6.5	0.065	42	0.42	0.0273	0.5	0.1542	555.12	15.15
Trial 3	5.2	0.052	43	0.43	0.02236	0.5	0.1542	555.12	12.41
Average Flowrate:									13.33

Bucket Collection:

Outflow Method	Bucket Volume(gal)	Bucket Volume (m ³)	Time (s)	Time(hr)	Flowrate (m ³ /hr)
Trial 1	5	0.01893	19.88	0.00552	3.427
Trial 2	5	0.01893	17.59	0.00489	3.874
Trial 3	5	0.01893	17.34	0.00482	3.929
Average Flowrate:					3.744

Assumptions

It is safe to assume that the inflow stream is of consistent size. But the high inflow rate could have been caused by external sources such as increased precipitation, or heavy fog in the mornings. I also assume that the outflow rates could have varied depending on debris, evaporation, or even because of the unknown, varying outflow into the Fish Hatchery. We assume that the bucket used to measure outflow was the same during each trial. It is assumed that all units were converted correctly, and that the information was put into the spreadsheets correctly.