SUPPORTING INFORMATION

Manuscript Title: Effect of sand bed depth and media age on *Escherichia coli* and turbidity removal in biosand filters

Authors: Julie Napotnik, Derek Baker, and Kristen Jellison

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Figures: S1 – S7

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Contents include supplementary figures and tables providing additional details on filter construction (dimensions and sand size distribution), influent water quality, and filter performance

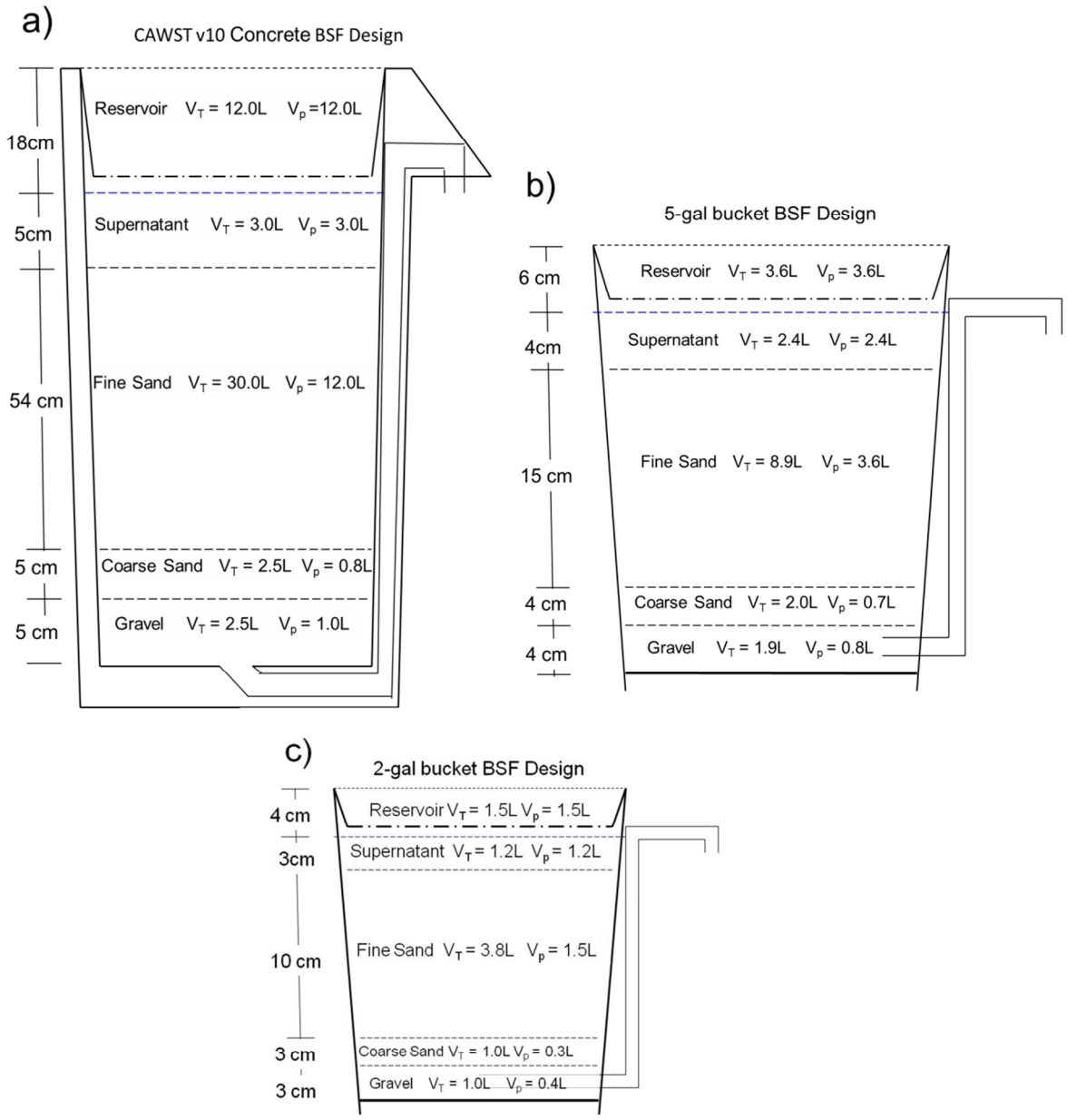

Figure S1. Schematics of the filter design for the a) concrete, b) 5-gal bucket, and c) 2-gal bucket casings (not to scale), highlighting the differences in depth, total volume (V_T) and pore volume (V_P) for the filter regions.

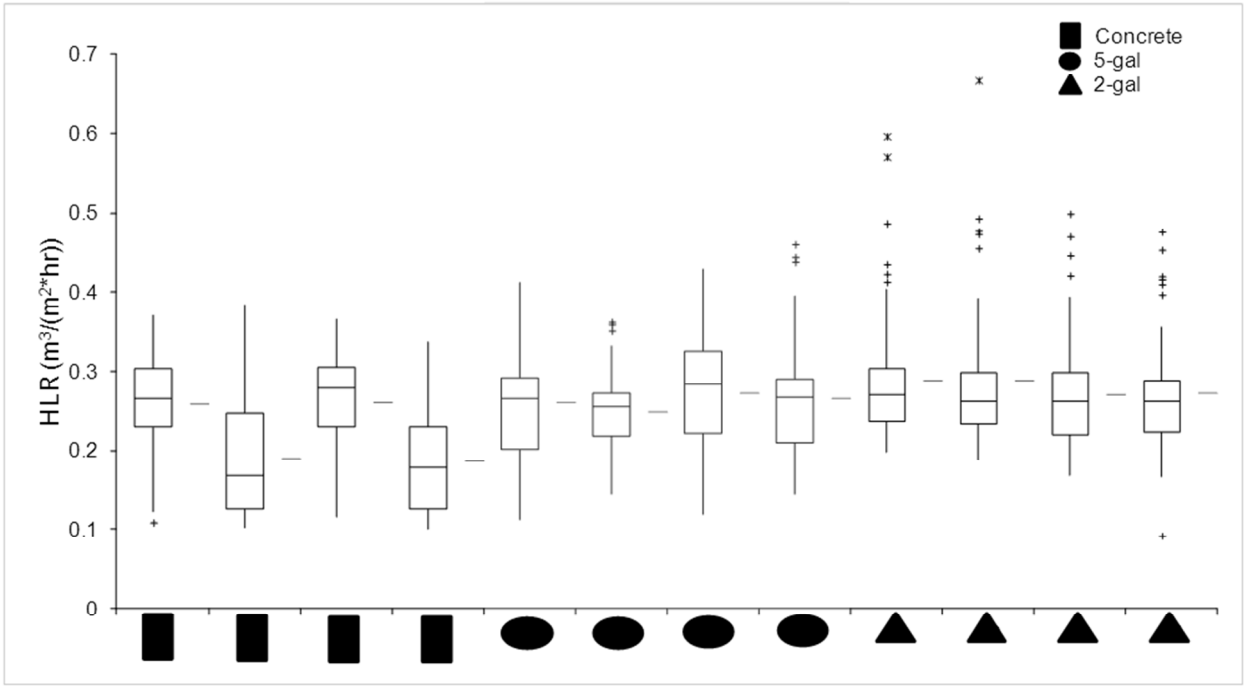

Figure S2. Hydraulic loading rates ($m^3/m^2 \cdot hr$) presented as outlier boxplots for each test filter.

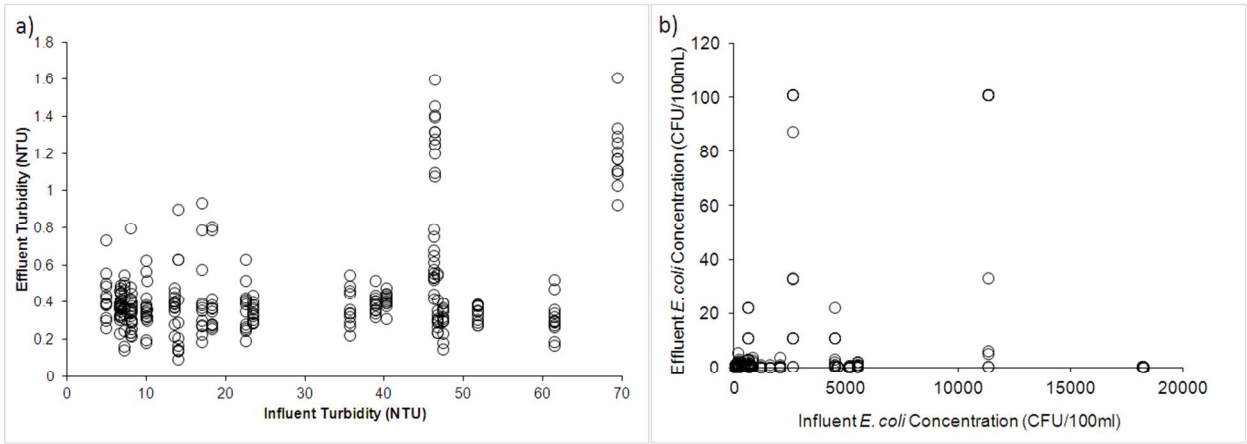

Figure S3. Filter effluent as a function of filter influent for a) turbidity (NTU) and b) *E. coli* concentration (CFU/100mL).

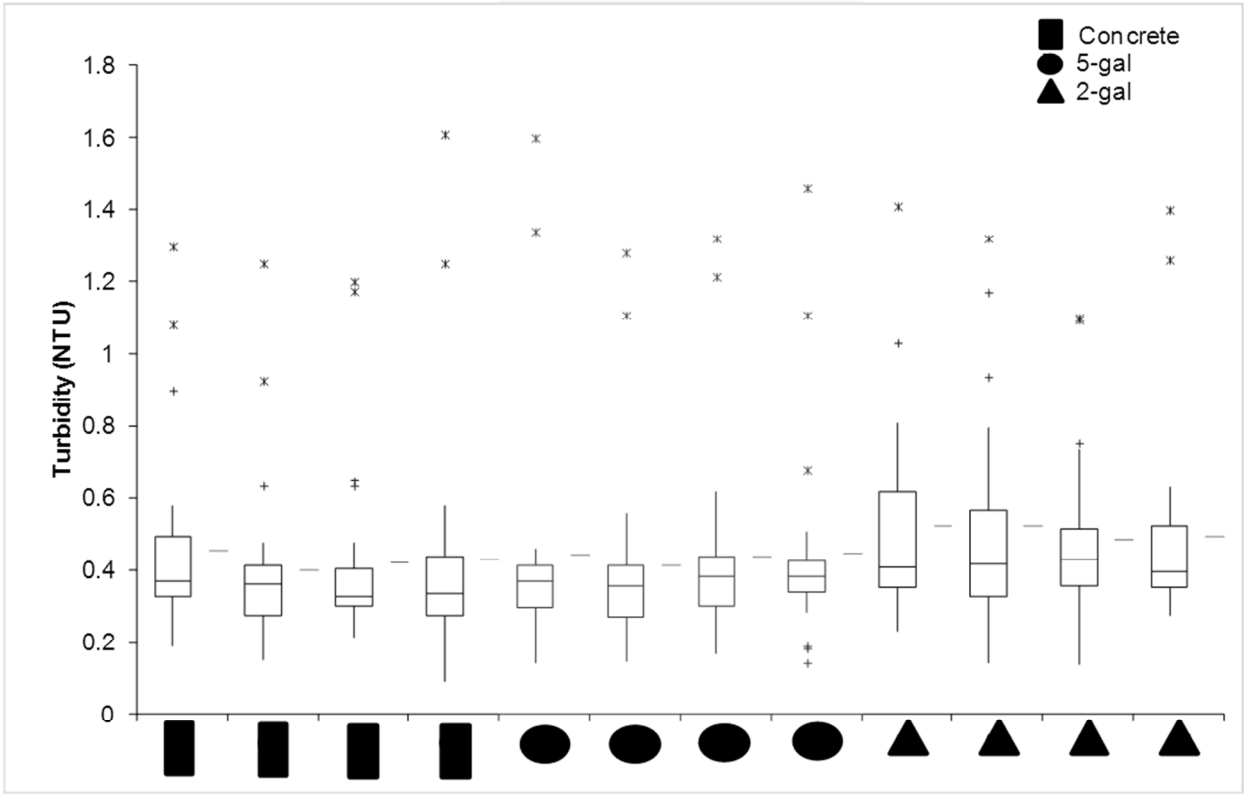

Figure S4. Effluent turbidity (NTU) presented as outlier boxplots for each test filter.

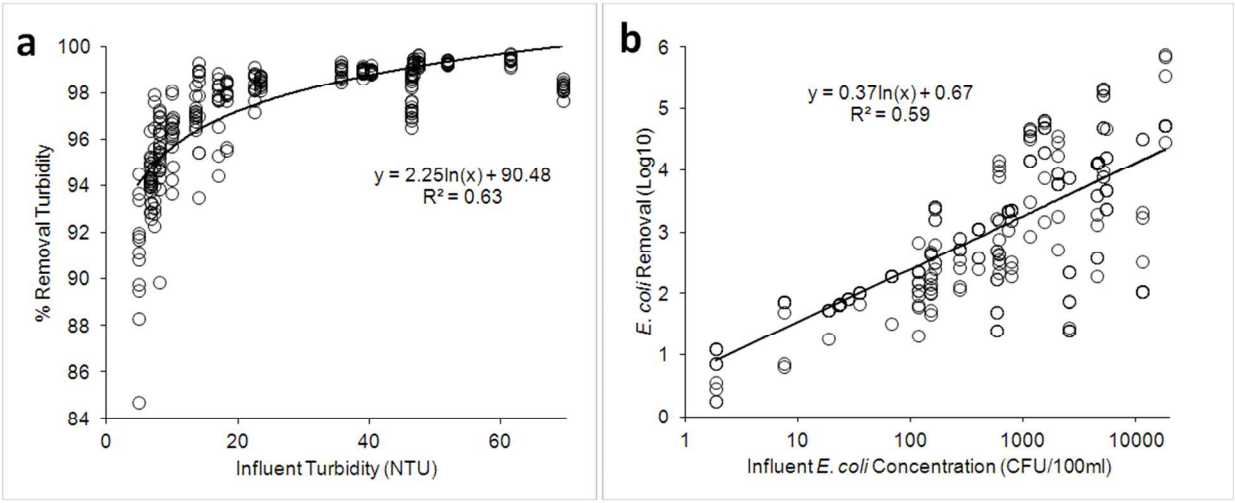

Figure S5. Contaminant removal as a function of influent level for a) turbidity (n=280) and b) *E. coli* (n=328), with trendline equations and coefficients of determination (R^2).

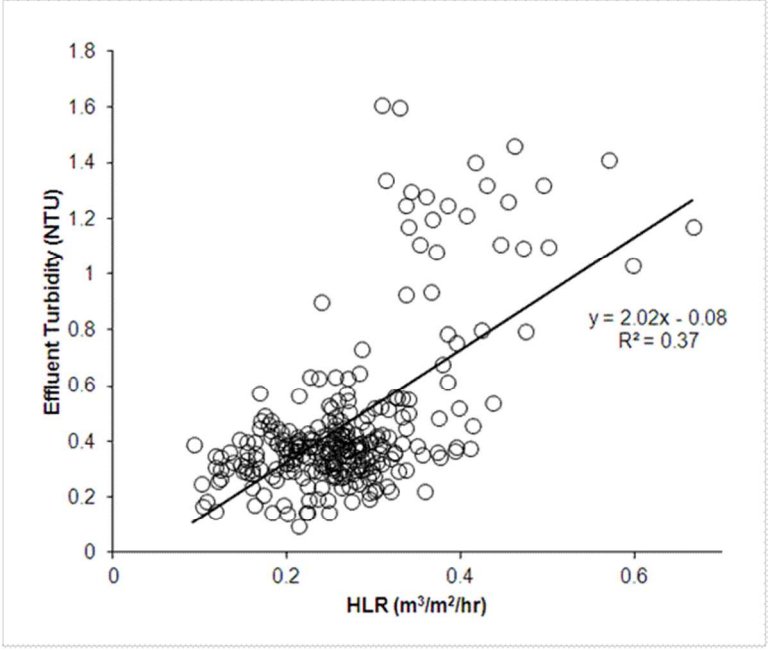

Figure S6. Effluent turbidity (NTU) as a function of hydraulic loading rate (HLR) ($m^3/m^2 \cdot hr$) (n=268).

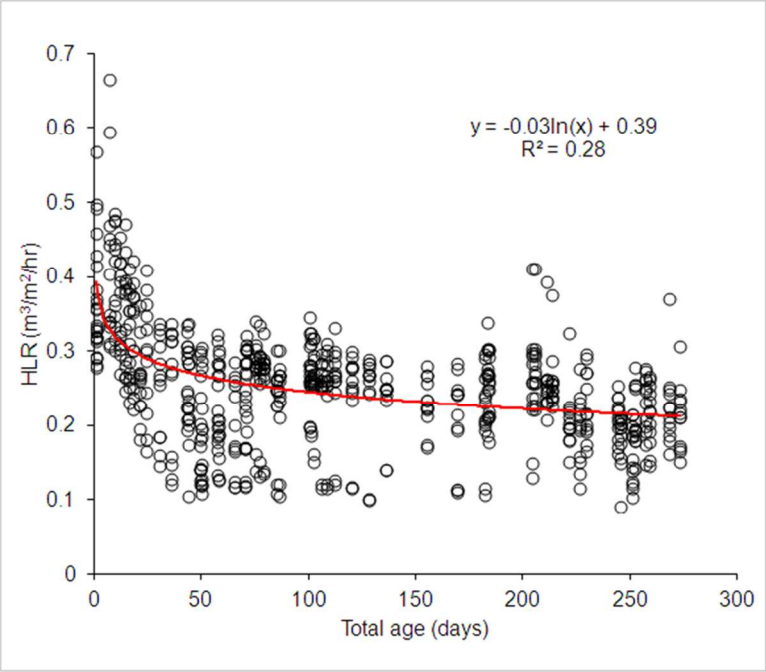

Figure S7. Hydraulic loading rate (HLR) ($m^3/m^2 \cdot hr$) as a function of total age of filter (days) (n=659).

Table S1. Particle size distribution parameters of the composite sand samples for the four replicate filters of each size.

	Concrete				5-gal bucket				2-gal bucket			
d_{10} (mm)	0.18	0.18	0.18	0.17	0.18	0.18	0.18	0.19	0.16	0.17	0.16	0.17
d_{60} (mm)	0.33	0.30	0.42	0.32	0.32	0.33	0.32	0.43	0.29	0.34	0.31	0.30
U[a]	1.83	1.67	2.33	1.88	1.78	1.83	1.78	2.26	1.81	2.00	1.94	1.76

[a]Uniformity coefficient, $U=d_{60}/d_{10}$

Table S2. Summary of influent water quality.

	Average ± Standard Deviation	Range (Min-Max)
Total Organic Carbon (mg/L)	12.5 ± 6.8	5.8 - 24.2
Total Nitrogen (mg/L)	6 ± 4.8	2 - 14
Phosphorus (mg/L PO_4^{3-})	0.21 ± 0.15	0.07 – 0.47
pH	7.5 ± 0.4	7.1 – 8.8
Alkalinity (mg/L)	41 ± 9.8	30 - 58
Hardness (mg/L)	339 ± 77.3	247 - 492

Table S3. Median *E. coli* and turbidity removals for each test filter across all test days with p-values for comparison of 1) replicate filters of the same size and 2) all twelve filters.

	***E. coli* Removal (log10)** Replicate Filters					**% Turbidity Removal** Replicate Filters				
Filter Size	1	2	3	4	**p-value**	1	2	3	4	**p-value**
Concrete	4.0	3.8	4.0	3.9	0.9745	98.1	98.4	98.3	98.2	0.9651
5-gal	3.8	3.8	3.8	3.7	0.9620	98.2	98.4	98.4	98.4	0.9869
2-gal	3.7	3.8	3.8	3.9	0.9082	97.4	98.2	98.4	97.9	0.9943
All 12 filters					0.9758					0.9927

Table S4. Number of microbial challenge experiments performed for various schmutzdecke age groups.

	Schmutzdecke Age			
Days since last cleaning	**1 Week** (1-8 days)	**2 Weeks** (9-19 days)	**3 Weeks** (20-32 days)	**4 Weeks** (>32 days)
Concrete	11	5	7	5
5-gal	7	6	6	8
2-gal	7	6	6	8