

Nutrient Dynamics in between sediment and water column: Fluxes

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Nutrient Concentration change

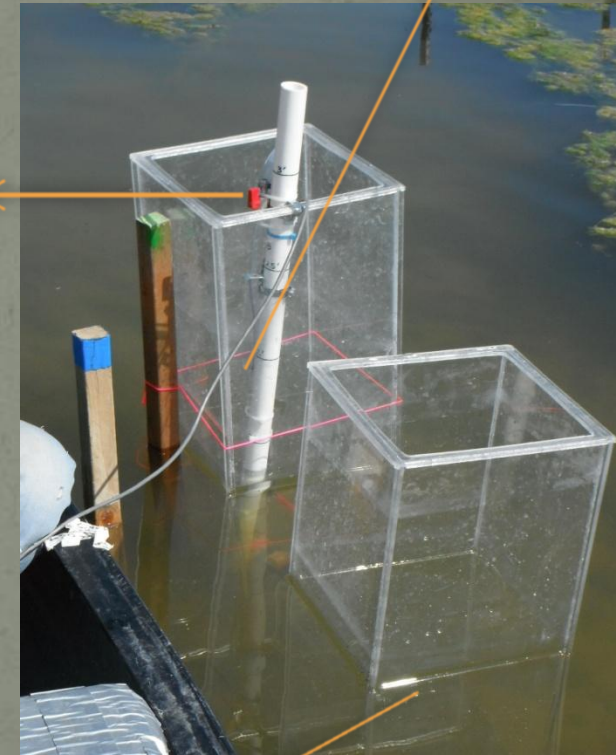
- Measured using in-situ square chambers

_ Chamber's dimensional features:

Height: 3 feet

Wall thickness: $\frac{1}{4}$ inch

Cross sectional area: $100 \text{ in}^2(10'' \times 10'')$



Valve

Pump wire

Control Chamber (close bottom)

Sediment Chamber (open bottom)

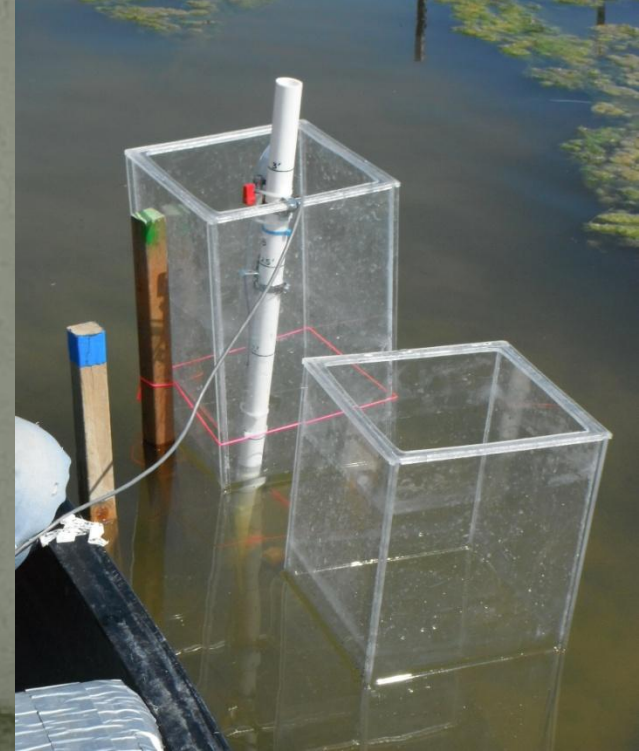
Analytical Methods

In the Field:

- _ Water samples filtered through 0.45 micron and stored in ice cooler
- _ pH, DO and temperature recording

In the Lab:

- _ Dissolved Nutrients (Ammonia, Nitrate, Nitrite, phosphate)
- _ DOC
- _ TSS-VSS
- _ TP (Total Phosphorous)



Results

Sed. Control plot								TP as P (mg/l)	
Chamber	Time	dissolved (mg/L), Unspiked					DOC mg C/l	Time (hrs)	TP
		NH ₄ -N	NO ₂ -N	NO ₃ -N	TIN	PO ₄ -P			
Sediment Chamber	0	0.011	0.138	0.044	0.193	0.033	13.26	0	0.093
	1	0.037	0.15	0.05	0.233	0.04	12.99		
	2	0.023	0.145	0.045	0.213	0.038	13.22		
	2	-0.012	-0.007	-0.001	-0.02	-0.005	0.04		
Control chamber	0	0.027	0.14	0.05	0.212	0.04	13.37	2	0.081
	1	0.027	0.125	0.048	0.2	0.038	13.50		
	2	0.025	0.121	0.048	0.194	0.037	12.66		
	2	0.002	0.015	0.001	0.018	0	0.71		

W.C. Control plot								TP as P (mg/l)	
Chamber	Time	dissolved (mg/L), Unspiked					DOC mg C/l	Time (hrs)	TP
		NH ₄ -N	NO ₂ -N	NO ₃ -N	TIN	PO ₄ -P			
Sediment Chamber	0	0.038	0.10	UR	0.14	0.03	13.32	0	0.111
	1	0.066	0.09	UR	0.15	0.03	13.26		
	2	0.014	0.09	UR	0.11	UR	13.27		
	2	0.024	0.008	0	0.032	#VALUE!	0.05		
Control chamber	0	0.029	0.06	0.04	0.134	0.04	13.25	2	0.142
	1	0.016	0.07	0.04	0.127	0.04	13.04		
	2	0.02	0.06	0.04	0.126	0.04	13.31		
	2	0.009	-0.001	0	0.008	-0.001	-0.06		

Results

Sed. Low range plot								TP as P (mg/l)	
Chamber	Time	dissolved (mg/L), Unspiked					DOC mg C/l	Time (hrs)	TP
		NH ₄ -N	NO ₂ -N	NO ₃ -N	TIN	PO ₄ -P			
Sediment Chamber	0	0.049	0.117	0.046	0.212	0.052	14.72	0	0.107
	1	0.032	0.132	0.05	0.212	0.04	14.24		
	2	0.016	0.124	0.045	0.185	0.044	13.57		
	2	0.033	-0.007	0.001	0.027	0.008	1.15		
Control chamber	0	0.019	0.10	0.05	0.163	0.05	13.48	2	0.084
	1	0.014	0.12	0.05	0.175	0.04	13.17		
	2	0.008	0.11	0.05	0.162	0.04	13.62		
	2	0.011	-0.008	-0.002	0.001	0.013	-0.14		

W.C. Low range plot								TP as P (mg/l)	
Chamber	Time	dissolved (mg/L), Unspiked					DOC mg C/l	Time (hrs)	TP
		NH ₄ -N	NO ₂ -N	NO ₃ -N	TIN	PO ₄ -P			
Sediment Chamber	0	0.048	0.062	0.057	0.167	0.048	14.32	0	0.115
	1	0.116	0.056	0.07	0.241	0.05	13.22		
	2	0.133	0.061	0.074	0.268	0.052	13.32		
	2	-0.085	0.001	-0.017	-0.101	-0.004	1		
Control chamber	0	0.051	0.07	0.07	0.197	0.05	13.33	2	0.116
	1	0.033	0.07	0.07	0.17	0.05	12.99		
	2	0.023	0.06	0.07	0.154	0.04	13.08		
	2	0.028	0.012	0.003	0.043	0.01	0.25		

Results

Sed. High range plot								TP as P (mg/l)	
Chamber	Time	dissolved (mg/L), Unspiked					DOC mg C/l	Time (hrs)	TP
		NH ₄ -N	NO ₂ -N	NO ₃ -N	TIN	PO ₄ -P			
Sediment Chamber	0	0.141	0.105	0.104	0.35	0.067	13.73	0	0.112
	1	0.135	0.117	0.10	0.352	0.06	13.15		
	2	0.122	0.114	0.097	0.333	0.059	13.14		
	2	0.019	-0.009	0.007	0.017	0.008	0.59		
Control chamber	0	0.046	0.11	0.06	0.22	0.06	13.56	2	0.083
	1	0.041	0.13	0.06	0.228	0.05	13.36		
	2	0.029	0.12	0.06	0.205	0.06	13.37		
	2	0.017	-0.003	0.001	0.015	0.001	0.19		

W.C. High range plot								TP as P (mg/l)	
Chamber	Time	dissolved (mg/L), Unspiked					DOC mg C/l	Time (hrs)	TP
		NH ₄ -N	NO ₂ -N	NO ₃ -N	TIN	PO ₄ -P			
Sediment Chamber	0	0.064	0.07	0.062	0.196	0.033	14.10	0	0.104
	1	0.02	0.064	0.05	0.135	0.05	13.57		
	2	UR	0.061	0.049	0.11	0.046	13.07		
	2	#VALUE!	0.009	0.013	0.086	-0.013	1.03		
Control chamber	0	0.019	0.06	0.06	0.138	0.04	13.54	2	0.115
	1	UR	0.07	0.05	0.12	0.04	12.96		
	2	UR	0.07	0.05	0.11	0.04	13.22		
	2	#VALUE!	-0.001	0.007	0.025	-0.002	0.32		

Results

Sed. Low range plot (spiked with 1 mg/l NH ₃ -N, 0.5 NO ₃ -N, 0.1 PO ₄ -P)								TP as P (mg/l)	
Chamber	Time	dissolved (mg/L), Unspiked					DOC mg C/l	Time (hrs)	TP
		NH ₄ -N	NO ₂ -N	NO ₃ -N	TIN	PO ₄ -P			
Sediment Chamber	0	0.914	0.117	0.45	1.48	0.11	14.25	0	0.107
	1	0.818	0.132	0.43	1.379	0.10	13.95		
	2	0.764	0.124	0.41	1.293	0.10	13.54		
	2	0.15	-0.007	0.04	0.187	0.015	0.71		
Control chamber	0	0.888	0.099	0.431	1.418	0.129	13.55	2	0.084
	1	0.889	0.117	0.44	1.442	0.13	14.08		
	2	0.87	0.114	0.44	1.419	0.13	13.70		
	2	0.018	-0.015	-0.004	-0.001	-0.002	-0.15		

Sed. High range plot (spiked with 2 mg/l NH ₃ -N, 1.5 NO ₃ -N, 0.5 PO ₄ -P)								TP as P (mg/l)	
Chamber	Time	dissolved (mg/L), Unspiked					DOC mg C/l	Time (hrs)	TP
		NH ₄ -N	NO ₂ -N	NO ₃ -N	TIN	PO ₄ -P			
Sediment Chamber	0	2.01	0.12	1.42	3.55	0.43	13.25	0	0.112
	1	1.81	0.07	1.32	3.201	0.39	13.14		
	2	1.82	0.07	1.31	3.193	0.38	13.65		
	2	0.019	-0.009	0	0.017	0.008	0.59		
Control chamber	0	1.72	0.106	1.278	3.104	0.389	13.45	2	0.083
	1	1.73	0.126	1.29	3.15	0.39	13.55		
	2	1.72	0.114	1.27	3.103	0.39	13.39		
	2	0	-0.008	0.009	0.001	0.003	0.06		