Results

SRP: As expected, SRP release rates were greater under anaerobic than aerobic conditions (Figure 1). Under aerobic conditions, SRP flux rates were negative at all sites during Experiments 1 and 2, with the exception of site EE (high release conditions; Table 1). This suggests that sediments in Lake Macatawa may serve as a sink for SRP when the sediments are oxygenated. Under anaerobic conditions, SRP release rates ranged between 0.16 and 0.41 mg $P/m^2/d$ during Experiment 1 and between 0.05 and 0.23 mg $P/m^2/d$ during Experiment 2 (Table 1). There were no striking differences in SRP release rates among sites.

If Lake Macatawa was anaerobic year-round, which is highly unlikely in reality but a useful assumption for setting upper limit boundary conditions, these rates would translate into average internal SRP loads of <1 ton/yr, with somewhat higher load estimates in Experiment 1 than 2 (Table 1). If the lake was anaerobic 20% of the year, the SRP load estimates would be even lower: <¼ ton/yr (Table 1). Under aerobic conditions, the sediments are capable of assimilating a very small amount of SRP (Table 1).

TP: Total phosphorus release rates were negative at all sites under aerobic conditions (Table 2), which was similar to the SRP data. Under anaerobic conditions, TP release rates ranged from 0.13 to 0.49 mg $P/m^2/d$ during Experiment 1 and between 0.08 to 0.28 mg $P/m^2/d$ during Experiment 2 (Table 2). TP release rate was somewhat higher at site PC than the other sites (Table 2).

If anaerobic conditions were present year-round, these release rates would translate into an internal TP load of between 0.4-1.4 tons/yr for Experiment 1 and between 0.2 and 0.8 tons/yr for Experiment 2 (Table 2). Assuming anaerobic conditions for 20% of the year, the overall internal TP load would be quite small and similar to SRP: <¼ ton per year (Table 2).

Table 1. Range of flux rates of SRP release and estimates of annual internal loading from sediments to Lake Macatawa water column under year-round anaerobic conditions and anaerobic conditions for 20% of the year. See text for more detail.

Treatment	**Site**	**Flux (mg P/ m^2/day)**	**Annual Load (100% anaerobic) (tons/yr)**	**Annual Load (20% anaerobic) (tons/yr)**
Experiment 1				
Anaerobic	EE	0.23-0.41	0.66-1.18	0.13-0.24
Anaerobic	PC	0.16-0.24	0.47-0.71	0.09-0.14
Anaerobic	WE	0.23-0.24	0.66-0.71	0.13-0.14
Aerobic	EE	-(0.07-0.15)	-(0.21-0.42)	-(0.04-0.08)
Aerobic	PC	-(0.09-0.18)	-(0.26-0.52)	-(0.05-0.10)
Aerobic	WE	-(0.05-0.10)	-(0.14-0.28)	-(0.03-0.06)
Experiment 2				
Anaerobic	EE	0.05-0.07	0.13-0.19	0.03-0.04
Anaerobic	PC	0.05-0.23	0.14-0.65	0.03-0.13
Anaerobic	WE	0.07-0.19	0.19-0.55	0.04-0.11
Aerobic	EE	-0.04-0.05	-0.12-0.13	-0.02-0.03
Aerobic	PC	-(0.01-0.06)	-(0.04-0.17)	-(0.01-0.04)
Aerobic	WE	-(0.01-0.07)	-(0.02-0.19)	-(0.01-0.04)

Table 2 Range of flux rates of TP release and estimates of annual internal loading from sediments to Lake Macatawa water column under year-round anaerobic conditions and anaerobic conditions for 20% of the year. See text for more detail.

Treatment	**Site**	**Flux (mg P/ m^2/day)**	**Annual Load (100% anaerobic) (tons/yr)**	**Annual Load (20% anaerobic) (tons/yr)**
Experiment 1				
Anaerobic	EE	0.26-0.33	0.76-0.94	0.15-0.19
Anaerobic	PC	0.33-0.49	0.94-1.42	0.19-0.28
Anaerobic	WE	0.13-0.33	0.38-0.94	0.08-0.19
Aerobic	EE	-(0.61-1.33)	-(1.76-3.83)	-(0.35-0.77)
Aerobic	PC	-(0.75-1.03)	-(2.17-2.97)	-(0.44-0.59)
Aerobic	WE	-(0.23-0.34)	-(0.66-0.99)	-(0.13-0.20)
Experiment 2				
Anaerobic	EE	0.08-0.11	0.24-0.32	0.05-0.07
Anaerobic	PC	0.16-0.28	0.47-0.81	0.09-0.16
Anaerobic	WE	0.08-0.23	0.24-0.65	0.05-0.13
Aerobic	EE	-(0.20-0.39)	-(0.59-1.13)	-(0.12-0.23)
Aerobic	PC	-(0.20-0.39)	-(0.59-1.13)	-(0.12-0.23)
Aerobic	WE	-(0.27-0.52)	-(0.79-1.51)	-(0.16-0.30)

Figure 1. SRP release rates from Lake Macatawa cores sampled during May-June, 2005 (Experiment 2).