

Table 1. Averaged temperature coefficients $[(\partial \ln p\text{CO}_2 / \partial T) / p\text{CO}_2]$ for each salinity bin. Simulated surface water $p\text{CO}_2$ values at varying salinities were computed using river and ocean end-member TA and DIC values of 900 and 960 $\mu\text{mol kg}^{-1}$ and 2300 and 2000, respectively.

Salinity	Coefficient
0 – 5	0.0332
5 – 10	0.0382
10 – 15	0.0411
15 – 20	0.0417
20 – 25	0.0417
25 – 30	0.0415
30 – 35	0.0420

Table 2. Area-averaged, standard deviation, and range of $p\text{CO}_2$ and CO_2 flux (F_{CO_2}) in five of the six zones in the Delaware Estuary during each cruise.

		Mar 2014	Jun 2013	Jul 2014*	Aug 2013*	Aug 2014	Oct 2013*	Oct 2014	Nov 2013	Dec 2014*	Annual Average
Average $p\text{CO}_2$ (μatm)											
Lower Bay	Mean $\pm$ SD	230 $\pm$ 23	477 $\pm$ 11	473 $\pm$ 52	384 $\pm$ 42	315 $\pm$ 59	421 $\pm$ 6	405 $\pm$ 8	387 $\pm$ 3	596 $\pm$ 11	410
	Range	194 – 267	456 – 528	397 – 648	317 – 491	243 – 432	413 – 437	395 – 419	380 – 393	570 – 627	
Mid-Bay	Mean $\pm$ SD	198 $\pm$ 8	540 $\pm$ 66	559 $\pm$ 97	530 $\pm$ 36	250 $\pm$ 16	465 $\pm$ 22	422 $\pm$ 2	390 $\pm$ 8	590 $\pm$ 21	438
	Range	187 – 232	464 – 759	402 – 777	464 – 607	223 – 310	429 – 516	417 – 431	378 – 415	566 – 654	
Upper Bay	Mean $\pm$ SD	289 $\pm$ 47	919 $\pm$ 192	917 $\pm$ 97	680 $\pm$ 58	470 $\pm$ 98	566 $\pm$ 39	463 $\pm$ 19	434 $\pm$ 11	658 $\pm$ 26	599
	Range	225 – 401	645 – 1374	768 – 1149	594 – 846	312 – 697	508 – 651	428 – 483	411 – 461	597 – 744	
Turbidity Maximum Zone	Mean $\pm$ SD	595 $\pm$ 121	2087 $\pm$ 499	1473 $\pm$ 162	1237 $\pm$ 139	1102 $\pm$ 317	726 $\pm$ 34	575 $\pm$ 79	542 $\pm$ 61	786 $\pm$ 39	1014
	Range	397 – 854	1327 – 2981	1141 – 1680	837 – 1370	689 – 1866	645 – 754	481 – 737	457 – 709	711 – 1000	
Urban River	Mean $\pm$ SD	868 $\pm$ 48	3287 $\pm$ 163	2994 $\pm$ N/A	2542 $\pm$ N/A	2310 $\pm$ 589	1199 $\pm$ N/A	816 $\pm$ 133	880 $\pm$ 179	878 $\pm$ N/A	1753
	Range	762 – 945	3007 – 3600	N/A	N/A	1822 – 4000	N/A	640 – 1330	615 – 1450	N/A	
Average F_{CO_2} ($\text{mmol m}^{-2} \text{d}^{-1}$)											
Lower Bay	Mean $\pm$ SD	-15.4 $\pm$ 2.3	3.8 $\pm$ 0.5	4.4 $\pm$ 2.5	3.8 $\pm$ 1.9	-3.0 $\pm$ 2.7	1.6 $\pm$ 0.4	0.8 $\pm$ 0.6	-1.2 $\pm$ 0.3	13.5 $\pm$ 1.0	0.9
	Range	-19.4 – (-12.0)	2.8 – 6.2	0.5 – 13.1	0.8 – 8.5	-6.4 – 2.5	1.1 – 2.6	0.1 – 1.8	-1.9 – (-0.7)	11.6 – 15.7	
Mid-Bay	Mean $\pm$ SD	-20.0 $\pm$ 0.6	6.8 $\pm$ 3.2	11.1 $\pm$ 6.8	10.2 $\pm$ 1.6	-6.7 $\pm$ 0.7	4.8 $\pm$ 1.8	2.0 $\pm$ 0.1	-1.1 $\pm$ 0.7	13.5 $\pm$ 2.0	2.3
	Range	-21.0 – (-17.8)	3.2 – 17.4	0.8 – 27.8	7.3 – 13.6	-8.0 – (-3.9)	2.1 – 9.0	1.6 – 2.7	-2.1 – 1.3	11.2 – 19.3	
Upper Bay	Mean $\pm$ SD	-12.1 $\pm$ 4.9	25.3 $\pm$ 9.5	39.5 $\pm$ 7.3	16.8 $\pm$ 2.6	5.7 $\pm$ 6.0	13.0 $\pm$ 2.9	5.0 $\pm$ 1.4	3.4 $\pm$ 1.2	19.7 $\pm$ 2.0	12.9
	Range	-18.4 – (-0.5)	11.8 – 48.0	26.9 – 54.7	13.0 – 24.3	-3.8 – 19.0	8.4 – 18.6	2.5 – 6.5	0.9 – 5.9	14.2 – 25.1	
Turbidity Maximum Zone	Mean $\pm$ SD	15.9 $\pm$ 9.6	83.9 $\pm$ 25.2	63.5 $\pm$ 2.9	42.2 $\pm$ 6.9	37.1 $\pm$ 13.9	21.1 $\pm$ 0.9	12.3 $\pm$ 5.1	10.1 $\pm$ 3.0	26.7 $\pm$ 1.9	34.8
	Range	-0.9 – 36.9	45.6 – 129.1	54.3 – 65.5	23.9 – 47.6	18.6 – 71.9	18.3 – 21.7	6.3 – 23.6	5.6 – 19.7	23.3 – 44.8	
Urban River	Mean $\pm$ SD	38.3 $\pm$ 4.3	144.8 $\pm$ 8.1	131.0 $\pm$ N/A	109.8 $\pm$ N/A	98.9 $\pm$ 25.9	52.1 $\pm$ N/A	30.2 $\pm$ 8.6	31.0 $\pm$ 8.1	32.1 $\pm$ N/A	74.2
	Range	33.6 – 45.5	130.4 – 160.0	N/A	N/A	83.0 – 175.4	N/A	17.8 – 64.1	20.9 – 66.4	N/A	

*Months when surveys did not extend into Urban River. Area averaged was estimated by linearly regressing data from adjacent months with sample measurements. Standard deviation and range not available.

Table 3. Flushing time in five of the six zones in the Delaware Estuary during each cruise.

	Mar	Jun	Jul	Aug	Aug	Oct	Oct	Nov	Dec	Annual
	2014	2013	2014	2013	2014	2013	2014	2013	2014	Average
Flushing Time (day)										
Lower Bay	14.5	11.7	26.5	23.8	36.2	21.9	18.5	21.9	16.1	21.2
Mid-Bay	29.9	22.9	54.5	38.1	64.1	41.3	30.9	40.0	28.3	38.9
Upper Bay	15.1	13.3	26.6	23.9	32.8	25.5	27.6	27.2	16.6	23.2
Turbidity Maximum Zone	7.6	7.5	11.9	13.3	18.5	19.9	16.1	16.9	11.3	13.7
Urban River	2.5	2.3	3.7	6.1	6.9	6.5	6.5	6.5	5.9	5.2

Table 4. Calculated $\Delta p\text{CO}_{2\text{thermal}}$, $\Delta p\text{CO}_{2\text{non-thermal}}$, $T - B$, and T/B values for each salinity interval in the Delaware Estuary.

	0-5	5-10	10-15	15-20	20-25	25-30
$\Delta p\text{CO}_{2\text{thermal}}$ (μatm)	1005	800	635	514	417	431
$\Delta p\text{CO}_{2\text{non-thermal}}$ (μatm)	773	477	615	635	604	473
$T - B$ (μatm)	232	323	20	-121	-187	-42
T/B	1.30	1.68	1.03	0.80	0.69	0.91