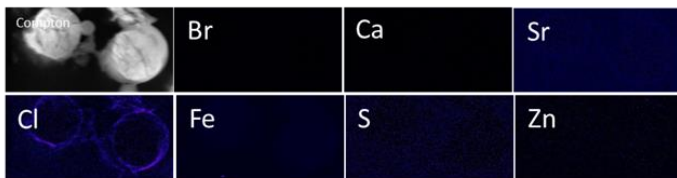
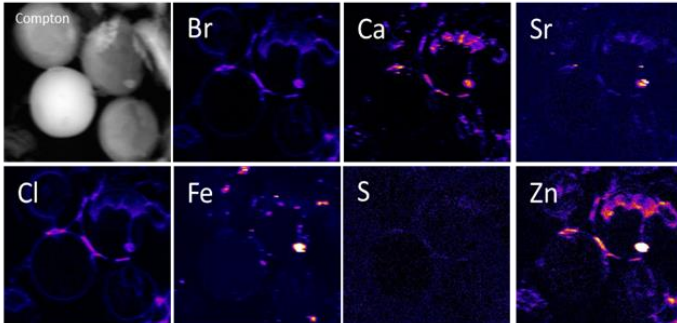


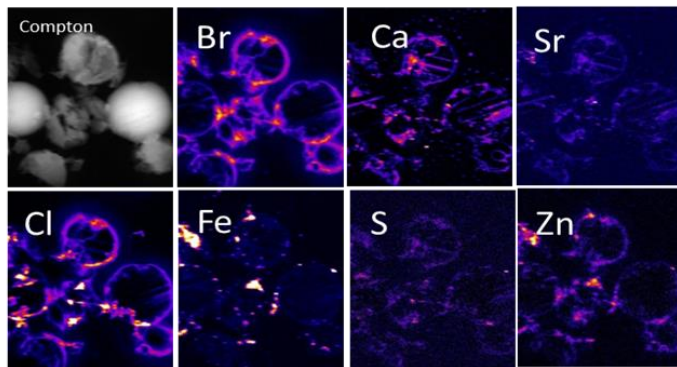
Figure S1. SEM-EDS spectrum locations for Table S1.



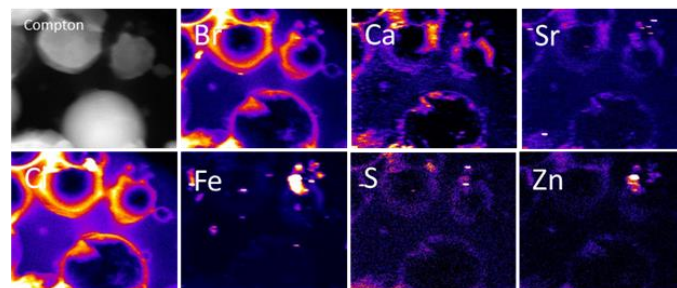
A. Control (undeveloped)



B. Freshwater



C. Estuarine



D. Marine

Figure S2. XFM elemental mapping of Freshwater, Estuarine, and Marine-deployed microspheres (19 days). Thresholds (ppm)

- Br = 0-56
- Ca = 0-601
- Cl = 0-2638
- Fe = 0-1154
- S = 0-3604
- Sr = 0-33
- Zn = 0-17

Table S2. Kd (mg l⁻¹) and retained tracer (Bq g⁻¹) values.

	mean	SD	GM	Median	min	max
IAEA 472, field (n=219)			29000		1600	5.20E+05
IAEA 472, laboratory (n=569)			9500		370	190000
HDPE micorspheres w/biofilm, freshwater laboratory	80.3	1.6	80.3	80.3	79.2	81.4
HDPE strips w/biofilm, freshwater laboratory	41.9	16.3	40.3	41.9	30.4	53.4
PP strips w/biofilm, freshwater laboratory	8.4	2.5	8.2	8.4	6.6	10.2
IAEA 422 Marine Coastal Margin recommended			4000.0		300	20000.0
Marine sediment, laboratory (n=25)			242.6		9	1100.0
HDPE microspheres w/biofilm, estuarine, laboratory	9.3	9.2	6.6	9.3	2.7	15.8
HDPE stripsw/biofilm, estuarine, laboratory	14.0	5.5	13.4	14.0	10.1	17.9
PP stripsw/biofilm, estuarine, laboratory	3.6	0.5	3.6	3.6	3.2	3.9
IAEA 472, field (n=13)			1200		230	6300
IAEA 472, laboratory (n=156)			190		14	2200
HDPE microspheres w/biofilm, freshwater laboratory	6.9	1.3	6.8	6.9	6.0	7.8
HDPE strips w/biofilm, freshwater laboratory	6.1	4.5	5.2	6.1	2.9	9.3
PP strips w/biofilm, freshwater laboratory	1.3	1.9	0.1	1.3	ND	2.7
IAEA 422 Marine Coastal Margin recommended			8.0		2.0	300.0
Marine sediment, laboratory (n=62)			1.3		0.3	300.0
HDPE microspheres w/biofilm, estuarine laboratory	5.0	4.9	3.5	5.0	1.5	8.4
HDPE strips w/biofilm, estuarine laboratory	14.0	5.9	13.4	14.0	9.8	18.2

PP strips w/biofilm,
estuarine laboratory

2.9

0.8

2.8

2.9

2.3

3.5

Host water, Elements by ICPAES

Client Identification	Samp#	Al mg/L	Be mg/L	Bi mg/L	Ca mg/L	Fe mg/L	K mg/L	Li mg/L	Mg mg/L	Na mg/L	P mg/L	S mg/L	Sc mg/L	Sr mg/L
Freshwater site, sample #1	1	0.03	<0.002	<0.1	12.9	0.163	6	0.019	13.5	129	<0.02	12.8	<0.002	L
Freshwater site, sample #2	2	0.03	<0.002	<0.1	12.9	0.161	5.91	0.019	13.5	126	<0.02	12.8	<0.002	L
Estuarine Site, sample #1	3	0.03	<0.002	<0.1	219	<0.01	227	0.105	679	6350	<0.02	530	<0.002	4.19
Estuarine Site, sample #2	4	0.03	<0.002	<0.1	216	<0.01	226	0.104	676	6220	0.03	524	<0.002	4.19

Host Water, Elements by ICPMS

	Samp#	As µg/L	Ba µg/L	Be µg/L	Cd µg/L	Co µg/L	Cr µg/L	Cs µg/L	Cu µg/L	La µg/L	Mg µg/L	Mn µg/L	Mo µg/L	Ni µg/L
Freshwater site, sample #1	1	<5	27.1	<0.1	<0.1	<0.5	<1	<0.1	100	<0.1	H	13.4	2	2.8
Freshwater site, sample #2	2	<5	32	<0.1	<0.1	<0.5	<1	<0.1	109	<0.1	H	15.8	2	3.3
Estuarine Site, sample #1	3	6	17.6	<0.1	0.1	<1	1	0.5	3	<0.1	H	1.9	6	7.2
Estuarine Site, sample #2	4	6	17.9	<0.1	<0.1	<1	1	0.8	3	<0.1	H	2.2	6	8.2

Pb	Rb	Se	Sn	Sr	Th	Ti	Tl	U	V	Zn	Zr
µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
45.9	2.1	<5	0.1	82.4	<0.5	<1	<0.1	0.3	<5	13	<0.1
54.2	2.5	<5	0.2	99.3	<0.5	<1	<0.1	0.3	<5	15	<0.1
0.7	68.9	<5	1.3	H	<0.5	7	<0.1	2.7	6	5	0.1
0.7	70.6	<5	1.3	H	<0.5	10	<0.1	2.8	9	5	<0.1

Host Water (Estuarine site), Anions by IC

Client Identification	Samp#	F ⁻	Cl ⁻	NO ₂ ⁻	SO ₄ ²⁻	Br ⁻	NO ₃ ⁻	PO ₄ ³⁻
		mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
In-Channel Top	1	<1	12000	<0.1	1640	45.3	0.63	<0.5
In-Channel Mid	2	1	11900	<0.1	1620	44.7	1.16	<0.5
In-Channel Bottom	3	<1	11900	<0.1	1630	45	0.74	<0.5
Bonnet Bay A water	4	<1	10900	<0.1	1480	41.6	0.2	<0.5
Bonnet Bay B water	5	<1	10400	<0.1	1420	40	<0.1	<0.5
Bonnet Bay C water	6	<1	10500	<0.1	1490	41.7	<0.1	<0.5