The following supplement accompanies the article

Macrofaunal irrigation traits enhance predictability of nutrient fluxes across the sediment–water interface

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Table S1. Detection ranges of the segmented flow analysis (SEAL AA3 HR Autoanalyzer) and ISO standard procedures (MT 18, MT 19) of the manufacturer (SEAL Analytical, also see: https://www.seal-analytical.com/Methods/AutoAnalyzerMethods/AutoAnalyzerMulti-testMethods/tabid/80/language/en-US/Default.aspx).

Analyte	Method	Lower Range	Upper Range	Filter	ISO standard procedure
Nitrite	G-173-96	0–4.2 to 0–84 µg/l	0–84 to 0–700 µg/l as N	550	MT 18
Nitrate	G-172-96	0–40 to 0–650 µg/l	0–700 to 0–7000 µg/l as N	550	MT 19
Ammonia	G-171-96	0–41 to 0–380 µg/l	0–0.35 to 0–0.42 mg/l as N	660	MT 19
Silicate	G-177-96	0–0.5 to 0–6 mg/l	0–7 to 0–60 mg/l as SiO2	820	MT 19
Phosphate	G-297-03	0–500 µg/l		880	MT 19

Table S2. Total number of bioirrigation measurement replicates for each TREATMENT and excluded replicates due to the respective reasons of exclusion in superscript: 1: replicates were excluded due to seemingly increasing Br^- concentrations (i.e. negative bioirrigation) caused by an erroneous first or last measurement; 2: methodological errors during measuring (e.g. the breaking of the sample container during freezing); 3: outlier.

Treatment	Total replicates	Excluded replicates + reasons
L_{summer}	10	10^2
LC_{spring}	25	$6^2,1^1$
$L_{community}$	10	2^1
AE_{summer}	15	1^1
AE_{spring}	25	$5^1,1^3$
$A_{community}$	10	3^2
N_{summer}	10	1^1
N_{spring}	25	$4^1,3^2$
$N_{community}$	10	1^1

Table S3. Results from the collinearity analysis for the different data subsets (ds-w: whole data set; ds1: data subset 1; ds2: data subset 2; ds3: data subset 3; ds4: data subset 4) of the community predictors with the TREATMENT, the season, the sediment and the community treatment by calculation of variance inflation factors according to Zuur et al. (2010) within the R statistical programming environment (R Core Team 2013). In accordance with Zuur et al. (2010) we chose a very stringent approach where a VIF value larger than 3 was chosen as threshold for to strong collinearity.

X	VIF TREATMENT	VIF Season		VIF Sediment		VIF Community treatment	
	ds-w	ds1	ds3	ds3	ds4	ds2	ds4
Density	2.03	1.02	1.12	1.21	1.01	2.31	1.50
WM	1.27	1.13	1.02	1.19	1.25	1.09	1.01
AFDM	1.36	1.17	1.05	1.20	1.38	1.08	1.00
IPcWM	1.36	1.23	1.02	1.24	1.37	1.21	1.01
IPcAFDM	1.53	1.18	1.05	1.30	1.59	1.14	1.00
mIPcWM	1.67	1.20	1.02	1.35	1.80	1.36	1.01
mIPcAFDM	1.81	1.22	1.05	1.42	1.87	1.27	1.06
BPcWM	1.52	1.24	1.04	1.41	1.91	1.02	1.07
BPcAFDM	1.83	1.36	1.07	1.42	1.68	1.00	1.14

Table S4. Species found in n cores (maximum n = 10) of the different community TREATMENT categories (*tr*). Density (A) of species (i) as sum of individuals across all replicates (ind.) and percent across all replicates (%) as well as wet mass of i ((WM_i (g)) across all of that TREATMENT for the respective. Bioturbation (BP_c) and irrigation potential (IP_c) characteristics according to Queiros et al. (2013) and Wrede et al. (2017): mobility (M_i): 1 living in fixed tube, 2 limited movement, 3 slow free movement, 4 movement through burrow system; reworking type (R_i): 1 epifauna, 2 surficial modifiers, 3 upward or downward conveyor; 4 biodiffusors; feeding type (FT_i): 1 surface filter feeder, 2 predator, 3 deposit feeder, 4 sub-surface filter feeder; burrow type (BT_i): 1 epifauna or internal irrigation (i.e. siphons), 2 open irrigation (i.e. Y- or U-shaped burrow), 3 blind ended burrow; irrigation depth (ID_i) (also termed injection pocket depth by Wrede et al. 2018): 1 0-2 cm, 2 2-5 cm, 3 5-10 cm, 4 > 10 cm.

tr	Species (i)	n	A_i (ind.)	A_i (%)	WM_i (g)	BP_c		IP_c		
						M_i	R_i	BT_i	ID_i	FT_i
$A_{community}$	*Abra alba*	1	1	0.88	0.19	2	2	1	3	1
	Abra nitida	1	1	0.88	5.52	2	2	1	2	1
	Amphiura filiformis	10	71	62.28	580.16	4	4	2	3	4
	Camelea gallina	1	1	0.88	0.35	2	2	1	1	1
	Cylichna cylindracea	1	1	0.88	10.27	2	2	3	2	2
	Echinocardium cordatum	1	1	0.88	1251.44	4	4	3	4	3
	Echiurus echiurus	1	1	0.88	0.43	3	3	1	1	1
	Kuritella bidentata	1	1	0.88	0.07	2	2	3	3	4
	Lanice conchilega	1	1	0.88	0.71	3	3	3	4	3
	Nephtys assimilis	1	1	0.88	39.76	4	4	3	1	2
	Nephtys hombergii	1	1	0.88	17.87	4	4	3	1	2
	Nucula nitidosa	5	13	11.40	15.35	2	2	3	1	3
	Ophiura albida	2	2	1.75	150.03	2	2	1	1	3
	Parambus typicus	1	3	2.63	0.04	1	1	1	1	3
	Pectinaria auricoma	1	1	0.88	6.59	2	2	3	2	3
	Phaxas pellucidus	1	1	0.88	21.12	2	2	3	1	1
	Pholoe balthica	1	1	0.88	0.14	2	2	1	1	3
	Phoronis mulleri	3	8	7.02	1.59	2	2	3	1	1
	Spiophanes bombyx	1	1	0.88	0.29	3	3	3	4	3
	Sthenelais limicola	1	1	0.88	2.31	4	4	1	1	2
	Tellimya ferruginosa	1	1	0.88	0.01	2	2	3	4	4
	Thyasira flexulosa	1	1	0.88	0.72	3	3	3	3	3
$L_{community}$	*Aremicola marina* juv.	5	5	0.05	0.58	5	5	3	4	3
	Capitella capitata	1	1	0.01	0.13	3	3	3	4	3
	Carcinus maenas	1	1	0.01	6.12	1	1	1	1	2
	Exogone naidina	1	2	0.02	0.01	4	4	1	1	3
	Lanice conchilega	10	55	0.58	1419.24	3	3	3	4	3
	Macoma balthica	1	1	0.01	290.73	2	2	1	3	3
	Malmgreniella marphysae	1	1	0.01	0.30	4	4	1	4	2
	Microphtalmus sczellcowii	1	7	0.07	0.04	4	4	3	4	3
	Mytilus edulis	2	2	0.02	0.09	1	1	1	1	1
	Nemertea	2	2	0.02	0.09	4	4	2	2	2
	Nephtys assimilis	4	4	0.04	10.85	4	4	3	1	2
	Nephtys hombergii	1	1	0.01	2.77	4	4	3	1	2
	Phyllodoce maculata	2	2	0.02	2.28	4	4	1	1	2
	Scoloplos armiger	6	10	0.11	15.10	4	4	3	4	3
$N_{community}$	*Abra alba*	3	7	0.09	62.69	2	2	1	3	1
	Abra nitida	1	1	0.01	8.59	2	2	1	2	1
	Ampharete lindstroemii	1	1	0.01	0.37	3	3	3	1	2

tr	Species (*i*)	*n*	A_i (ind.)	A_i (%)	WM_i (g)	BP_c		IP_c		
						M_i	R_i	BT_i	ID_i	FT_i
	Ampharete sp.	1	1	0.01	0.72	3	3	3	1	2
	Corbula gibba	4	5	0.06	19.45	2	2	1	1	1
	Eumida sanguinea	1	1	0.01	0.22	4	4	1	1	2
	Glycera alba	1	1	0.01	0.92	4	4	2	3	2
	Glycera lapidum complex	2	2	0.02	85.75	4	4	2	2	2
	Lagis koreni	1	1	0.01	13.54	3	3	3	2	3
	Nemertea	3	4	0.05	37.16	4	4	2	2	2
	Nephtys assimilis	1	1	0.01	0.91	4	4	3	1	2
	Nucula nitidosa	9	21	0.26	39.48	2	2	3	1	3
	Ophiura ophiura	2	3	0.04	44.63	2	2	1	1	3
	Ophiuridae	1	1	0.01	0.03	2	2	1	1	3
	Owenia fusiformis	7	25	0.31	112.59	2	2	3	1	3
	Phoronis mulleri	2	2	0.02	0.17	2	2	3	1	1
	Podarkeopsis helgolandica	1	1	0.01	0.35	4	4	1	1	1
	Scoloplos armiger	3	3	0.04	1.04	4	4	3	4	3

Table S5. Full coefficents tables of the best generalized linear model of nitrite (i.e. nitrite flux ~ $IP_{c,WM}$ + *tr* + $IP_{c,WM}$: *tr*) with *tr* being the TREATMENT categories. Asterisks indicate significance (i.e. Pr(>|t|) < 0.01). Null deviance was 0.059421 on 140 degrees of freedom. Residual deviance was 0.017694 on 123 degrees of freedom. AIC was -828.51.

	Estimate	Std. Error	t value	Pr(>|t|)	
Intercept	–3.69e–03	3.33e–03	–1.106	0.270853	
$IP_{c,WM}$	3.63e–07	2.80e–07	1.294	0.198021	
AE_{summer}	–1.81e–02	4.66e–03	–3.897	0.000159	***
$A_{community}$	1.64e–03	5.86e–03	0.279	0.780391	
$L_{community}$	2.01e–02	7.17e–03	2.803	0.005883	**
$N_{community}$	3.65e–03	5.63e–03	0.648	0.518104	
LC_{spring}	–2.04e–03	5.06e–03	–0.404	0.686931	
L_{summer}	–1.68e–03	6.25e–03	–0.269	0.788574	
NO_{spring}	9.32e–04	4.86e–03	0.192	0.848167	
N_{summer}	1.83e–03	6.31e–03	0.29	0.772242	
$IP_{c,WM}$: AE_{summer}	1.45e–06	5.24e–07	2.763	0.006604	**
$IP_{c,WM}$: $A_{community}$	–1.16e–07	5.96e–07	–0.194	0.846293	
$IP_{c,WM}$: $L_{community}$	3.43e–06	6.79e–07	5.054	1.52e-06	***
$IP_{c,WM}$: $N_{community}$	4.48e–07	4.32e–06	0.104	0.917478	
$IP_{c,WM}$: LC_{spring}	3.35e–06	7.89e–07	4.243	4.29e-05	***
$IP_{c,WM}$: L_{summer}	1.39e–05	4.29e–06	3.248	0.0015	**
$IP_{c,WM}$: NO_{spring}	–6.85e–07	7.93e–06	–0.086	0.931293	
$IP_{c,WM}$: N_{summer}	5.26e–06	8.43e–06	0.624	0.533998	

Table S6. Full coefficents tables of the best generalized linear model of nitrate (i.e. nitrate flux ~ $IP_{c,WM}$ + *tr* + $IP_{c,WM}$: *tr*) with *tr* being the TREATMENT categories. Asterisks indicate significance (i.e. Pr(>|t|) < 0.01). Null deviance was 1.7528 on 107 degrees of freedom. Residual deviance was 0.4676 on 92 degrees of freedom. AIC was -247.28.

	Estimate	Std. Error	t value	Pr(>|t|)	
Intercept	–1.28e–01	1.93e–02	–6.613	2.44e–09	***
$IP_{c,WM}$	9.30e–06	2.63e–06	3.531	0.000649	***
$A_{community}$	1.01e–01	3.46e–02	2.932	0.004244	**
$L_{community}$	1.47e–01	4.24e–02	3.476	0.00078	***
$N_{community}$	1.91e–01	3.55e–02	5.379	5.67e–07	***
LC_{spring}	1.29e–01	2.99e–02	4.326	3.85e–05	***
L_{summer}	3.29e–01	3.69e–02	8.917	4.34e–14	***
NO_{spring}	1.11e–01	3.08e–02	3.611	0.000496	***
N_{summer}	7.18e–02	3.72e–02	1.926	0.057145	.
$IP_{c,WM}$: $A_{community}$	–1.19e–05	4.09e–06	–2.9	0.004669	**
$IP_{c,WM}$: $L_{community}$	–3.17e–05	4.52e–06	–7.003	4.03e–10	***
$IP_{c,WM}$: $N_{community}$	–7.62e–06	2.59e–05	–0.295	0.768939	
$IP_{c,WM}$: LC_{spring}	–3.53e–05	5.11e–06	–6.907	6.29e–10	***
$IP_{c,WM}$: L_{summer}	–4.33e–05	2.56e–05	–1.692	0.094012	.
$IP_{c,WM}$: NO_{spring}	–5.86e–05	4.90e–05	–1.194	0.235418	
$IP_{c,WM}$: N_{summer}	–6.46e–05	5.01e–05	–1.288	0.201021	

Table S7. Full coefficents tables of the best generalized linear model of ammonium (i.e. ammonium flux ~ $IP_{c,WM}$ + *tr* + $IP_{c;WM}$: *tr*) with *tr* being the TREATMENT categories. Asterisks indicate significance (i.e. Pr(>|t|) < 0.01). Null deviance was 24.038 on 140 degrees of freedom. Residual deviance was 8.364 on 123 degrees of freedom. AIC was 39.841.

	Estimate	Std. Error	t value	Pr(>|t|)	
Intercept	–3.89e–02	7.24e–02	–0.537	0.59219	
$IP_{c,WM}$	2.87e–05	6.09e–06	4.701	6.82e–06	***
AE_{summer}	–9.11e–02	1.01e–01	–0.9	0.36973	
$A_{community}$	7.99e–02	1.28e–01	0.627	0.53188	
$L_{community}$	3.56e–01	1.56e–01	2.285	0.02401	*
$N_{community}$	4.88e–02	1.22e–01	0.399	0.69063	
LC_{spring}	1.47e–01	1.10e–01	1.338	0.18345	
L_{summer}	4.41e–02	1.36e–01	0.325	0.74571	
NO_{spring}	–3.28e–02	1.06e–01	–0.31	0.75689	
N_{summer}	–5.02e–02	1.37e–01	–0.366	0.71505	
$IP_{c,WM}$: AE_{summer}	–1.10e–06	1.14e–05	–0.096	0.92361	
$IP_{c,WM}$: $A_{community}$	–5.46e–06	1.30e–05	–0.421	0.67443	
$IP_{c,WM}$: $L_{community}$	4.80e–05	1.48e–05	3.25	0.00149	**
$IP_{c,WM}$: $N_{community}$	1.16e–06	9.39e–05	0.012	0.99019	
$IP_{c,WM}$: LC_{spring}	3.50e–05	1.72e–05	2.039	0.0436	*
$IP_{c,WM}$: L_{summer}	1.92e–04	9.33e–05	2.053	0.04223	*
$IP_{c,WM}$: NO_{spring}	2.23e–06	1.72e–04	0.013	0.98972	
$IP_{c,WM}$: N_{summer}	4.61e–05	1.83e–04	0.252	0.80155	

Table S8. Full coefficents tables of the best generalized linear model of silicate (i.e. silicate flux ~ $IP_{c,WM}$ + *tr* + $IP_{c,WM}$: *tr*) with *tr* being the TREATMENT categories. Asterisks indicate significance (i.e. Pr(>|t|) < 0.01). Null deviance was 49.857 on 140 degrees of freedom. Residual deviance was 20.904 on 123 degrees of freedom. AIC was 168.99.

	Estimate	Std. Error	t value	Pr(>|t|)	
Intercept	2.25e–01	1.15e–01	1.964	0.051757	.
$IP_{c,WM}$	4.88e–05	9.63e–06	5.061	1.48e–06	***
AE_{summer}	2.80e–01	1.60e–01	1.75	0.082532	.
$A_{community}$	6.44e–02	2.02e–01	0.32	0.749744	
$L_{community}$	–1.43e–01	2.47e–01	–0.582	0.561936	
$N_{community}$	–1.26e–02	1.93e–01	–0.065	0.948129	
LC_{spring}	–1.74e–01	1.74e–01	–1.002	0.318369	
L_{summer}	–2.24e–01	2.15e–01	–1.043	0.299183	
NO_{spring}	–2.71e–02	1.67e–01	–0.163	0.871056	
N_{summer}	4.54e–01	2.17e–01	2.095	0.038236	*
$IP_{c,WM}$: AE_{summer}	7.12e–05	1.80e–05	3.948	0.000132	***
$IP_{c,WM}$: $A_{community}$	–3.57e–05	2.05e–05	–1.742	0.083984	.
$IP_{c,WM}$: $L_{community}$	–4.42e–05	2.34e–05	–1.894	0.0606	.
$IP_{c,WM}$: $N_{community}$	–1.67e–05	1.48e–04	–0.113	0.910482	
$IP_{c,WM}$: LC_{spring}	–3.41e–05	2.71e–05	–1.258	0.210953	
$IP_{c,WM}$: L_{summer}	–3.39e–05	1.48e–04	–0.23	0.818719	
$IP_{c,WM}$: NO_{spring}	6.06e–05	2.73e–04	0.222	0.824445	
$IP_{c,WM}$: N_{summer}	2.96e–04	2.90e–04	1.021	0.309369	

Table S9. Full coefficents tables of the best generalized linear model of phosphate (i.e. phosphate flux ~ $mIP_{c,AFDM}$ + *tr* + $mIP_{c,AFDM}$: *tr*) with *tr* being the TREATMENT categories. Asterisks indicate significance (i.e. Pr(>|t|) < 0.01). Null deviance was 0.0102372 on 102 degrees of freedom. Residual deviance was 0.0058581 on 96 degrees of freedom. AIC was -698.49.

	Estimate	Std. Error	t value	Pr(>|t|)	
Intercept	–7.90e–03	1.76e–03	–4.48	2.06e–05	***
$mIP_{c,AFDM}$	2.41e–06	6.00e–07	4.008	0.000121	***
$A_{community}$	4.01e–03	2.99e–03	1.343	0.182535	
$L_{community}$	1.44e–02	3.27e–03	4.4	2.80E–05	***
$N_{community}$	6.85e–03	2.99e–03	2.287	0.024399	*
LC_{spring}	2.15e–04	2.26e–03	0.095	0.924536	
NO_{spring}	5.67e–03	2.32e–03	2.443	0.01638	*

Table S10. Statistic results (χ^2, *df* and $p > \chi^2$) from the ANOVA analysis of the best (lowest AIC) generalized linear models of nitrite, nitrate, ammonium, silicate and phosphate flux as a function of all predictor variables (*x*) except IP_c (i.e. density, ash free dry mass (AFDM), wet mass (WM), modified irrigation potential (mIP_c) and bioturbation potential (BP_c) both based on AFDM as well as WM), the TREATMENT (*tr*) and the interaction (*in*) between predictor variable and TREATMENT. Asterisks indicate significance $\alpha < 0.01$ in column $p > \chi$. Dashes indicate that backward selection via lowest AIC has either excluded the interaction from the model or the predictor variable. Blanks indicate that there was no significant impact of the variable.

x	nutrient	χ^2			*df*			$p > \chi^2$		
		x	*tr*	*in*	*x*	*tr*	*in*	*x*	*tr*	*in*
density	nitrite	3.72	112.48	21.21	1	8	8		*	*
	nitrate	10.31	107.92	15.30	1	7	7	*	*	*
	ammonium	–	88.63	–	–	8	–	–	*	–
	silicate	–	49.71	–	–	8	–	–	*	–
	phosphate	0.31	34.53	9.38	1	5	5		*	
AFDM	nitrite	0.14	142.13	38.35	1	8	8		*	*
	nitrate	10.17	105.75	33.01	1	7	7	*	*	*
	ammonium	18.07	92.88	34.26	1	8	8	*	*	*
	silicate	2.64	74.77	65.94	1	8	8		*	*
	phosphate	2.60	50.93	12.89	1	5	5		*	
WM	nitrite	0.02	143.76	35.78	1	8	8		*	*
	nitrate	3.81	104.09	30.11	1	7	7		*	*
	ammonium	15.90	105.54	41.58	1	8	8	*	*	*
	silicate	5.53	82.22	77.73	1	8	8		*	*
	phosphate	3.85	48.09	10.81	1	5	5		*	
$mIP_{c,AFDM}$	nitrite	52.54	86.31	18.51	1	8	8	*	*	
	nitrate	39.22	91.86	16.65	1	7	7	*	*	
	ammonium	33.88	33.50	–	1	8	–	*	*	–
	silicate	7.19	68.03	33.53	1	8	8	*	*	*
	phosphate	16.07	30.52	–	1	5	–	*	*	–
$mIP_{c,WM}$	nitrite	67.75	104.67	19.48	1	8	8	*	*	
	nitrate	31.01	107.26	35.19	1	7	7	*	*	*
	ammonium	64.77	39.01	–	1	8	–	*	*	–
	silicate	30.58	93.20	48.65	1	8	8	*	*	*
	phosphate	15.81	33.76	–	1	5	–	*	*	–
$BP_{c,AFDM}$	nitrite	3.89	121.29	27.84	1	8	8		*	*
	nitrate	27.37	101.04	20.54	1	7	7	*	*	*
	ammonium	17.71	62.50	–	1	8	–	*	*	–
	silicate	2.08	55.06	15.62	1	8	8		*	
	phosphate	–	48.21	–	–	5	–	–	*	–
$BP_{c,WM}$	nitrite	1.86	140.21	43.20	1	8	8		*	*
	nitrate	15.95	101.17	32.91	1	7	7	*	*	*
	ammonium	24.51	77.74	26.04	1	8	8	*	*	*
	silicate	7.08	72.97	47.85	1	8	8	*	*	*
	phosphate	0.57	51.92	12.33	1	5	5		*	

Table S11. AIC values of the full-factorial GLMs used to describe phosphate, nitrite, nitrate, ammonium and silicate fluxes in data subset 1 as a function of community descriptor (*x*), the season and interaction between *x* and season. Bold typeface and light grey background indicates the model which has the lowest AIC for the respective nutrient flux. Column names indicate degree of model complexity:

full: flux~ *x* + Season + *x*:Season;
m2: flux~ *x* + Season;
m1: flux~ *x*;
Tr: flux~ Season;
null: flux~1

Nut	x	full	m2	m1	Tr	null
NH_4^+	Density	12.8	10.8	10.1	19.0	19.0
	AFDM	11.4	14.6	12.8	19.0	19.0
	WM	13.2	16.8	15.3	19.0	19.0
	BPcAFDM	7.8	11.1	9.2	19.0	19.0
	BPcWM	12.0	15.1	13.2	19.0	19.0
	IPcAFDM	7.0	9.5	7.5	19.0	19.0
	IPcWM	**–0.3**	1.8	0.0	19.0	19.0
	mIPcAFDM	10.3	13.2	11.3	19.0	19.0
	mIPcWM	8.9	9.2	7.5	19.0	19.0
NO_2^-	Density	–166.4	–168.3	–170.2	–157.4	–159.4
	AFDM	–157.3	–155.7	–157.5	–157.4	–159.4
	WM	–158.5	–156.2	–157.9	–157.4	–159.4
	BPcAFDM	–157.2	–155.4	–157.4	–157.4	–159.4
	BPcWM	–157.9	–155.7	–157.5	–157.4	–159.4
	IPcAFDM	–170.2	–168.4	–168.8	–157.4	–159.4
	IPcWM	–169.4	–168.2	–168.1	–157.4	–159.4
	mIPcAFDM	–170.2	–167.5	–167.7	–157.4	–159.4
	mIPcWM	–170.6	–170.8	**–171.7**	–157.4	–159.4
NO_3^-	Density	–47.1	–47.7	–23.0	–42.5	–18.9
	AFDM	–43.3	–44.7	–25.8	–42.5	–18.9
	WM	–42.1	–43.3	–23.1	–42.5	–18.9
	BPcAFDM	–47.6	–49.0	–34.9	–42.5	–18.9
	BPcWM	–44.1	–45.4	–28.5	–42.5	–18.9
	IPcAFDM	–52.8	–54.5	–35.4	–42.5	–18.9
	IPcWM	–58.0	**–60.0**	–41.1	–42.5	–18.9
	mIPcAFDM	–49.6	–51.0	–33.9	–42.5	–18.9
	mIPcWM	–50.6	–52.6	–30.3	–42.5	–18.9
SiO_2	Density	–62.0	–62.7	–58.5	–59.5	–54.7
	AFDM	–56.5	–58.3	–52.7	–59.5	–54.7
	WM	–57.2	–58.9	–52.7	–59.5	–54.7

Nut	x	full	m2	m1	Tr	null
	BPcAFDM	–55.8	–57.5	–54.4	–59.5	–54.7
	BPcWM	–56.0	–57.8	–53.2	–59.5	–54.7
	IPcAFDM	–65.0	**–66.9**	–66.2	–59.5	–54.7
	IPcWM	–63.8	–65.8	–65.7	–59.5	–54.7
	mIPcAFDM	–64.5	–66.3	–66.1	–59.5	–54.7
	mIPcWM	–64.5	–66.4	–64.3	–59.5	–54.7

Table S12. AIC values of the full-factorial GLMs used to describe phosphate, nitrite, nitrate, ammonium and silicate fluxes in data subset 2 as a function of community descriptor (*x*), the season and interaction between *x* and season. Bold typeface and light grey background indicates the model which has the lowest AIC for the respective nutrient flux. Column names indicate degree of model complexity:

full: flux~ *x* + Community treatment + *x* :Community treatment;
m2: flux~ *x* + Community treatment;
m1: flux~ *x*;
Tr: flux~ Community treatment;
null: flux~1

Nut	x	full	m2	m1	Tr	null
NH_4^+	Density	46.30	45.04	44.14	46.21	54.74
	AFDM	36.59	44.20	56.11	46.21	54.74
	WM	38.85	46.00	56.63	46.21	54.74
	BPcAFDM	36.23	38.86	50.90	46.21	54.74
	BPcWM	35.90	42.86	54.61	46.21	54.74
	IPcAFDM	33.82	32.96	37.31	46.21	54.74
	IPcWM	27.22	**25.48**	27.85	46.21	54.74
	mIPcAFDM	36.78	35.44	37.05	46.21	54.74
	mIPcWM	34.11	32.54	32.74	46.21	54.74
NO_2^-	Density	–147.1	–146.3	–146.3	–144.9	–132.8
	AFDM	–147.0	–142.9	–131.9	–144.9	–132.8
	WM	–145.6	–143.2	–133.0	–144.9	–132.8
	BPcAFDM	–147.6	–143.7	–131.2	–144.9	–132.8
	BPcWM	–149.4	–142.9	–130.9	–144.9	–132.8
	IPcAFDM	–158.9	–160.8	–152.6	–144.9	–132.8
	IPcWM	–160.8	**–162.8**	–156.9	–144.9	–132.8
	mIPcAFDM	–157.9	–159.8	–155.7	–144.9	–132.8
	mIPcWM	–159.8	–161.7	–159.3	–144.9	–132.8
NO_3^-	Density	–37.72	–38.17	–37.89	–30.64	–31.10
	AFDM	–40.94	–32.94	–31.72	–30.64	–31.10
	WM	–36.60	–30.98	–30.31	–30.64	–31.10
	BPcAFDM	–45.91	–42.15	–41.78	–30.64	–31.10
	BPcWM	–43.11	–35.93	–35.15	–30.64	–31.10
	IPcAFDM	–51.41	–53.16	–55.07	–30.64	–31.10
	IPcWM	–57.26	–58.98	**–59.81**	–30.64	–31.10
	mIPcAFDM	–47.82	–49.72	–50.86	–30.64	–31.10
	mIPcWM	–49.26	–51.25	–51.38	–30.64	–31.10
PO_4^-	Density	–182.2	–181.2	–178.3	–183.1	–173.3
	AFDM	–184.2	–182.4	–174.5	–183.1	–173.3
	WM	–184.2	–182.9	–175.4	–183.1	–173.3

Nut	x	full	m2	m1	Tr	null
	BPcAFDM	–182.2	–181.2	–171.3	–183.1	–173.3
	BPcWM	–183.7	–181.5	–172.2	–183.1	–173.3
	IPcAFDM	–185.9	–187.8	–181.9	–183.1	–173.3
	IPcWM	–186.5	–188.3	–183.9	–183.1	–173.3
	mIPcAFDM	–185.8	–187.8	–184.3	–183.1	–173.3
	mIPcWM	–186.7	**–188.7**	–186.5	–183.1	–173.3
SiO_2	Density	–51.76	–48.02	–49.98	–50.02	–51.94
	AFDM	–47.23	–48.41	–50.40	–50.02	–51.94
	WM	–48.47	–48.94	–50.94	–50.02	–51.94
	BPcAFDM	–46.10	–48.04	–49.95	–50.02	–51.94
	BPcWM	–46.47	–48.09	–50.03	–50.02	–51.94
	IPcAFDM	–53.03	–53.17	**–54.89**	–50.02	–51.94
	IPcWM	–52.69	–52.92	–54.47	–50.02	–51.94
	mIPcAFDM	–52.55	–52.09	–53.60	–50.02	–51.94

Table S13. AIC values of the full-factorial GLMs used to describe phosphate, nitrite, nitrate, ammonium and silicate fluxes in data subset 3 as a function of community descriptor (*x*), the sediment type, season and interaction between all variables. Bold typeface and light grey background indicates the model which has the lowest AIC for the respective nutrient flux. Column names indicate degree of model complexity:

full: flux~ *x* + Sediment + Season+ *x*:Sediment + *x*:Season + Season:Sediment;
f6: flux~ *x* + Sediment + Season+ *x*:Sediment + *x*:Season;
f5: flux~ *x* + Sediment + Season+ *x*:Sediment + Season:Sediment;
f4: flux~ *x* + Sediment + Season+ *x*:Season + Season:Sediment;
f3: flux~ *x* + Sediment + Season + *x:*Sediment;
f2: flux~ *x* + Sediment + Season + Sediment:Season;
f1: flux~ *x* + Sediment + Season;
m5: flux~ *x* + Sediment + *x*:Sediment,
m4: flux~ *x* + Season + *x*:Season;
m3: flux~ *x* + Sediment;
m2: flux~ *x* + Season;
m1: flux~ *x*;
Tr1: flux~ Sediment;
Tr2: flux~ Season;
null: flux~1

Nut	x	full	f6	f5	f4	f3	f2	f1	m5	m4	m3	m2	m1	Tr1	Tr2	null
NH_4^+	Density	40.0	40.0	40.2	43.7	40.2	41.7	41.7	46.2	46.5	45.8	44.7	45.7	44.1	46.9	46.1
	AFDM	26.7	26.7	26.0	24.7	26.0	24.0	24.0	24.4	23.2	22.4	22.3	20.5	44.1	46.9	46.1
	WM	21.8	21.8	19.8	19.8	19.8	17.8	17.8	19.5	18.4	17.5	16.4	15.5	44.1	46.9	46.1
	BPcAFDM	42.7	42.7	40.7	40.7	40.7	38.8	38.8	39.6	39.4	37.6	37.4	35.7	44.1	46.9	46.1
	BPcWM	30.8	30.8	28.8	28.9	28.8	26.9	26.9	26.9	26.9	25.0	24.9	23.3	44.1	46.9	46.1
	IPcAFDM	25.9	25.9	24.3	23.9	24.3	22.3	22.3	22.5	21.9	20.5	20.3	18.6	44.1	46.9	46.1
	IPcWM	20.3	20.3	18.3	18.3	18.3	16.3	16.3	17.7	16.5	15.7	14.5	**13.8**	44.1	46.9	46.1
	mIPcAFDM	34.5	34.5	32.5	32.6	32.5	30.7	30.7	30.9	30.6	29.1	28.7	27.2	44.1	46.9	46.1
	mIPcWM	23.9	23.9	22.3	22.1	22.3	20.4	20.4	21.1	20.1	19.3	18.4	17.6	44.1	46.9	46.1
NO_2^-	Density	–468.5	–468.5	–467.3	–468.6	–467.3	–469.2	–469.2	–436.3	–470.2	–437.7	–470.4	–438.2	–439.4	–472.0	–438.6
	AFDM	–557.1	–557.1	–485.9	–558.9	–485.9	–487.7	–487.7	–466.2	–560.8	–467.9	–487.9	–453.2	–439.4	–472.0	–438.6
	WM	–558.1	–558.1	–503.2	–560.0	–503.2	–505.1	–505.1	–472.7	–561.9	–474.6	–503.9	–457.6	–439.4	–472.0	–438.6
	BPcAFDM	–491.3	–491.3	–476.0	–493.2	–476.0	–477.8	–477.8	–463.0	–495.2	–464.5	–478.1	–446.7	–439.4	–472.0	–438.6
	BPcWM	–527.9	–527.9	–493.9	–529.7	–493.9	–495.4	–495.4	–479.3	–531.3	–480.6	–490.5	–453.5	–439.4	–472.0	–438.6
	IPcAFDM	–555.0	–555.0	–491.6	–556.9	–491.6	–493.5	–493.5	–473.3	–558.4	–475.1	–491.3	–454.3	–439.4	–472.0	–438.6
	IPcWM	–562.9	–562.9	–507.3	–564.8	–507.3	–509.2	–509.2	–477.2	**–566.5**	–479.1	–506.0	–458.1	–439.4	–472.0	–438.6
	mIPcAFDM	–515.7	–515.7	–490.6	–517.4	–490.6	–491.9	–491.9	–475.1	–519.3	–476.1	–488.5	–452.0	–439.4	–472.0	–438.6
	mIPcWM	–551.6	–551.6	–509.9	–553.2	–509.9	–511.1	–511.1	–483.9	–554.5	–485.2	–504.3	–457.5	–439.4	–472.0	–438.6
SiO_2	Density	158.5	158.5	158.5	159.6	158.5	157.8	157.8	157.6	159.6	157.5	158.0	159.8	156.0	157.7	161.7
	AFDM	131.6	131.6	145.4	129.6	145.4	143.4	143.4	152.1	127.8	150.1	141.4	151.0	156.0	157.7	161.7
	WM	126.6	126.6	134.1	124.6	134.1	132.2	132.2	141.3	122.8	139.3	130.3	139.1	156.0	157.7	161.7
	BPcAFDM	153.2	153.2	154.5	151.2	154.5	152.5	152.5	158.7	149.4	156.7	150.6	158.2	156.0	157.7	161.7
	BPcWM	137.2	137.2	140.4	135.2	140.4	138.5	138.5	150.9	133.5	148.9	138.5	147.9	156.0	157.7	161.7
	IPcAFDM	131.0	131.0	141.3	129.0	141.3	139.3	139.3	150.1	127.0	148.1	138.0	147.7	156.0	157.7	161.7
	IPcWM	124.4	124.4	130.8	122.5	130.8	128.8	128.8	139.4	**120.5**	137.4	127.5	136.4	156.0	157.7	161.7
	mIPcAFDM	142.8	142.8	144.7	140.8	144.7	142.8	142.8	152.9	138.8	150.9	141.8	150.4	156.0	157.7	161.7
	mIPcWM	128.4	128.4	131.0	126.4	131.0	129.1	129.1	141.3	124.6	139.4	129.0	137.8	156.0	157.7	161.7

Table S14. AIC values of the GLMs used to describe phosphate, nitrite, nitrate, ammonium and silicate fluxes in data subset 4 as a function of community descriptor (*x*), the sediment type, community treatment and interaction between all variables. Bold typeface and light grey background indicates the model which has the lowest AIC for the respective nutrient flux. Column names indicate degree of model complexity:

full: flux~ *x* + Sediment + Community treatment + *x*:Sediment + *x*: Community treatment + Sediment:Community treatment;

f6: flux~ *x* + Sediment + Community treatment + *x*:Sediment + *x*: Community treatment;

f5: flux~ *x* + Sediment + Community treatment + *x*:Sediment + Sediment:Community treatment;

f4: flux~ *x* + Sediment + Community treatment + *x*: Community treatment + Sediment:Community treatment;

f3: flux~ *x* + Sediment + Community treatment + *x*:Sediment;

f2: flux~ *x* + Sediment + Community treatment + Sediment:Community treatment;

f1: flux~ *x* + Sediment + Community treatment;

m5: flux~ *x* * Sediment + *x*:Sediment,

m4: flux~ *x* + Community treatment + *x*:Community treatment;

m3: flux~ *x* + Sediment;

m2: flux~ *x* + Community treatment;

m1: flux~ *x*;

Tr1: flux~ Sediment;

Tr2: flux~Community treatment;

null: flux~1

Nut	x	full	f6	f5	f4	f3	f2	f1	m5	m4	m3	m2	m1	Tr1	Tr2	null
NH_4^+	Density	42.0	40.1	41.5	41.1	39.6	40.2	38.6	38.2	43.0	36.9	45.7	44.3	34.9	44.3	42.4
	AFDM	28.4	26.4	28.6	26.4	27.3	26.6	25.3	25.3	23.2	23.4	24.2	22.3	34.9	44.3	42.4
	WM	21.3	19.3	19.4	19.3	17.5	17.4	15.5	16.4	16.3	14.4	14.4	13.4	34.9	44.3	42.4
	BPcAFDM	41.2	39.2	40.7	39.2	39.7	38.7	37.9	37.8	36.2	35.9	38.9	37.2	34.9	44.3	42.4
	BPcWM	29.1	27.3	27.9	27.5	28.8	26.9	26.9	27.4	23.6	25.7	24.9	23.7	34.9	44.3	42.4
	IPcAFDM	27.3	25.3	27.7	25.3	26.7	25.8	24.7	24.7	21.4	22.7	22.9	20.9	34.9	44.3	42.4
	IPcWM	20.1	18.1	18.3	18.1	16.3	16.3	14.3	15.2	14.3	13.3	12.5	**11.5**	34.9	44.3	42.4
	mIPcAFDM	34.1	32.2	35.3	32.1	35.5	33.3	33.6	33.7	28.2	31.7	32.1	30.4	34.9	44.3	42.4
	mIPcWM	22.5	20.8	20.8	20.8	20.6	19.3	18.8	18.7	17.2	16.9	17.0	15.1	34.9	44.3	42.4
NO_2^-	Density	–615.9	–617.9	–613.6	–614.1	–615.5	–613.1	–611.4	–608.1	–614.3	–607.8	–610.8	–606.7	–609.6	–611.1	–608.7
	AFDM	–641.2	–642.1	–636.7	–643.2	–631.9	–638.7	–633.8	–629.3	–644.6	–630.6	–634.9	–631.7	–609.6	–611.1	–608.7
	WM	–656.6	–656.8	–657.6	–658.5	–656.2	–659.6	–657.9	–646.1	–658.0	–646.5	–657.8	–647.2	–609.6	–611.1	–608.7
	BPcAFDM	–612.5	–614.0	–612.2	–614.5	–609.2	–614.2	–610.3	–608.9	–617.8	–609.0	–611.0	–610.7	–609.6	–611.1	–608.7
	BPcWM	–632.1	–633.3	–631.3	–634.1	–622.5	–632.5	–624.4	–624.0	–633.2	–625.7	–624.4	–624.9	–609.6	–611.1	–608.7
	IPcAFDM	–642.3	–643.7	–637.6	–644.3	–631.7	–639.6	–633.6	–628.9	–644.3	–630.6	–633.3	–630.3	–609.6	–611.1	–608.7
	IPcWM	–658.3	–658.6	–659.1	–660.1	–656.8	**–660.9**	–658.4	–646.3	–657.4	–647.1	–655.9	–645.9	–609.6	–611.1	–608.7
	mIPcAFDM	–624.9	–626.7	–620.5	–626.9	–613.2	–622.5	–615.1	–613.5	–629.2	–615.1	–617.0	–616.8	–609.6	–611.1	–608.7
	mIPcWM	–646.9	–646.7	–647.4	–648.8	–638.3	–648.9	–640.3	–637.4	–644.4	–639.4	–636.5	–634.9	–609.6	–611.1	–608.7
PO_4^-	Density	–615.3	–605.4	–611.3	–613.5	–604.4	–611.0	–605.7	–600.7	–603.9	–600.2	–605.1	–600.5	–585.0	–601.7	–584.4
	AFDM	–616.3	–607.6	**–618.2**	–611.7	–605.1	–613.5	–604.7	–589.5	–602.1	–586.3	–600.0	–582.8	–585.0	–601.7	–584.4
	WM	–612.7	–601.5	–614.7	–611.5	–602.0	–613.5	–603.1	–584.6	–599.6	–583.7	–599.9	–582.4	–585.0	–601.7	–584.4
	BPcAFDM	–615.0	–613.1	–614.9	–610.6	–603.3	–610.0	–604.0	–595.4	–611.6	–593.7	–599.7	–584.3	–585.0	–601.7	–584.4
	BPcWM	–610.9	–608.7	–612.7	–610.1	–602.1	–610.9	–603.7	–590.7	–607.3	–591.2	–599.8	–583.2	–585.0	–601.7	–584.4
	IPcAFDM	–611.8	–606.7	–613.7	–610.2	–603.5	–612.1	–603.8	–586.5	–602.4	–585.7	–599.7	–582.5	–585.0	–601.7	–584.4
	IPcWM	–610.8	–601.8	–612.8	–610.5	–601.5	–612.5	–602.7	–583.6	–599.8	–583.5	–599.7	–582.5	–585.0	–601.7	–584.4
	mIPcAFDM	–610.1	–609.1	–611.3	–609.2	–602.9	–610.4	–604.1	–590.7	–607.1	–590.9	–599.7	–583.1	–585.0	–601.7	–584.4
	mIPcWM	–609.4	–606.3	–611.3	–609.6	–601.8	–611.3	–603.3	–586.1	–603.5	–586.6	–599.8	–582.5	–585.0	–601.7	–584.4
SiO_2	Density	139.9	137.9	138.9	138.7	136.9	137.4	136.0	135.0	137.8	134.3	138.6	136.7	132.8	137.0	135.6
	AFDM	132.6	130.6	132.8	130.6	131.6	130.8	129.6	130.6	126.9	128.6	128.0	127.1	132.8	137.0	135.6
	WM	129.0	127.0	128.5	127.1	126.7	126.5	124.7	125.1	123.4	123.1	123.1	121.4	132.8	137.0	135.6
	BPcAFDM	139.3	137.3	138.3	137.3	137.5	136.3	135.6	136.8	133.6	134.8	135.0	135.1	132.8	137.0	135.6
	BPcWM	131.2	129.2	130.7	129.3	131.1	129.4	129.2	132.0	125.6	130.4	127.3	128.4	132.8	137.0	135.6
	IPcAFDM	131.2	129.2	131.8	129.2	130.8	129.8	128.8	129.9	125.2	127.9	126.9	126.0	132.8	137.0	135.6
	IPcWM	127.4	125.4	127.2	125.4	125.4	125.2	123.5	123.8	121.5	121.8	121.5	**119.8**	132.8	137.0	135.6
	mIPcAFDM	134.4	132.4	134.9	132.4	134.9	132.9	133.0	134.9	128.4	132.9	131.1	131.4	132.8	137.0	135.6
	mIPcWM	127.6	125.6	127.1	125.6	126.7	125.3	124.7	126.6	121.9	124.8	123.1	123.0	132.8	137.0	135.6

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