1 Supplementary data

Appendix 1: Upstream concentration and water-sediment flux used to estimate characteristic time for each solute due to sediment influence. Loire discharge was estimated thanks to Hydrofrance data. NA non available.

	LD	HD	MD1	MD2
O_2 (mmol.m^{-3})	234	303	211	248
NO_3^- (mmol.m^{-3})		248	159	158
$\sum NH_3$ (mmol.m^{-3})		2.5	7.2	17.6
P_d (mmol.m^{-3})		0.45	1.53	1.9
Water discharge (m^{-3}. s^{-1})	133	2700	422	288
Depth water (m)	3.8	4.7	3.9	3.8
Water residence time (d)	18.7	0.92	5.90	8.65

Appendix 2: Measured fluxes, calculated characteristic times of sediment influence for each solute and fraction of solute stock affected. NA non available.

Sediment	LD	HD	MD1	MD2
Flux O_2 (mmol.m^{-2}.d^{-1})	24	94	47	17
τ_{sed} O_2 (d)	30	12.0	14.0	43.7
$f_{sed,O2}$ (%)	31	3.8	21	9.9
Flux $\sum NH_3+NO_x$ (mmol.m^{-2}.d^{-1})		-57	-11	1.1
τ_{sed} $\sum NH_3+NO_x$ (d)		16.4	47.4	487
$f_{sed\ \sum NH3+NOx}$ (%)		2.8	6.2	0.9
Flux P_d (mmol.m^{-2}.d^{-1})		-1.1	0.1	1.0
τ_{sed} P_d (d)		1.53	33.8	5.79
$f_{sed,Pd}$ (%)		30	8.7	75

Appendix 3: Water column oxygen demands and derived nutrient releases, calculated characteristic times of water column influence for each solute and fraction of solute stock affected.

Water column	LD	HD	MD	MD2
BOD (µmol.L^{-1}.d^{-1})	6.25	9.00	1.40	6.25
τ_{water} O_2 (d)	18.7	16.8	7.5	19.8
$f_{water,O2}$ (%)	50	3	39	22
N Production (µmol.L^{-1}.d^{-1})	0.98	1.40	2.18	0.98
τ_{water} $\sum NH_3+NO_3$ (d)	NA	89.2	38.0	90.2
$f_{water,\ \sum NH3+NO3}$ (%)	NA	1	8	5

P_d **Production (µmol.L^{-1}.d^{-1})**	0.06	0.08	0.01	0.02
t_{water} P_d (d)	NA	2.7	5.8	16.2
Stock P_d affected (%)	NA	17	51	27

Appendix 4: Diagram of P_{asc} vs. Fe_{asc} concentration (in µmol.g^{-1}) along sediment cores for each campaign.