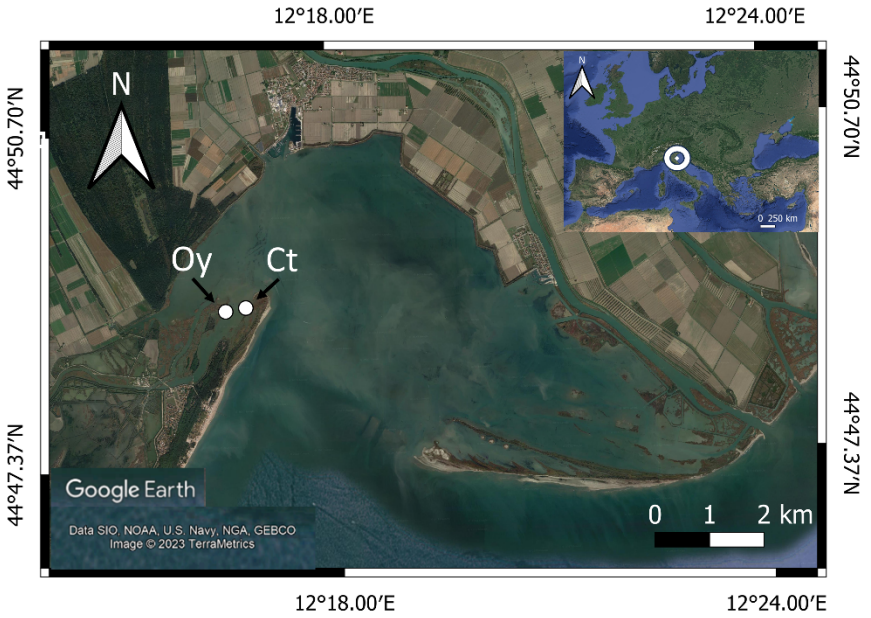

Figure S1. Map representing the Goro Lagoon (northern Italy); white dots indicate sampling sites (Oy and Ct, in proximity and far from the oyster reef, respectively).

Figure S2. Picture of oyster holobiont covered by biofilm (Db and Lb treatments) used in Expts 1 and 2.

Figure S3. Picture of oyster holobiont cleaned from biofilm (Dc treatment) used in Expts 1 and 2.

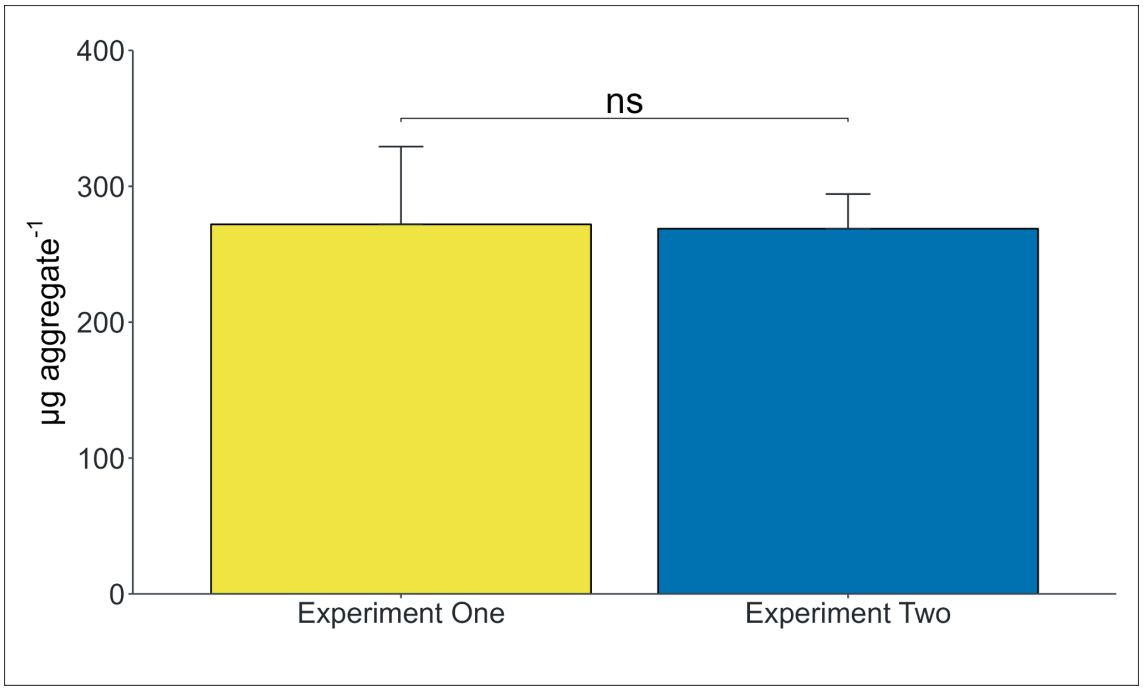

Figure S4. Chlorophyll a concentration within biofilms covering the outer shells of oyster aggregates used in the experiments (experiment one refers to $^{15}NH_4^+$ addition whereas experiment two refers to the $^{15}NO_3^-$ addition). Average ± standard errors (n=3) are reported. A not statistically significant difference (ns) emerged between them.

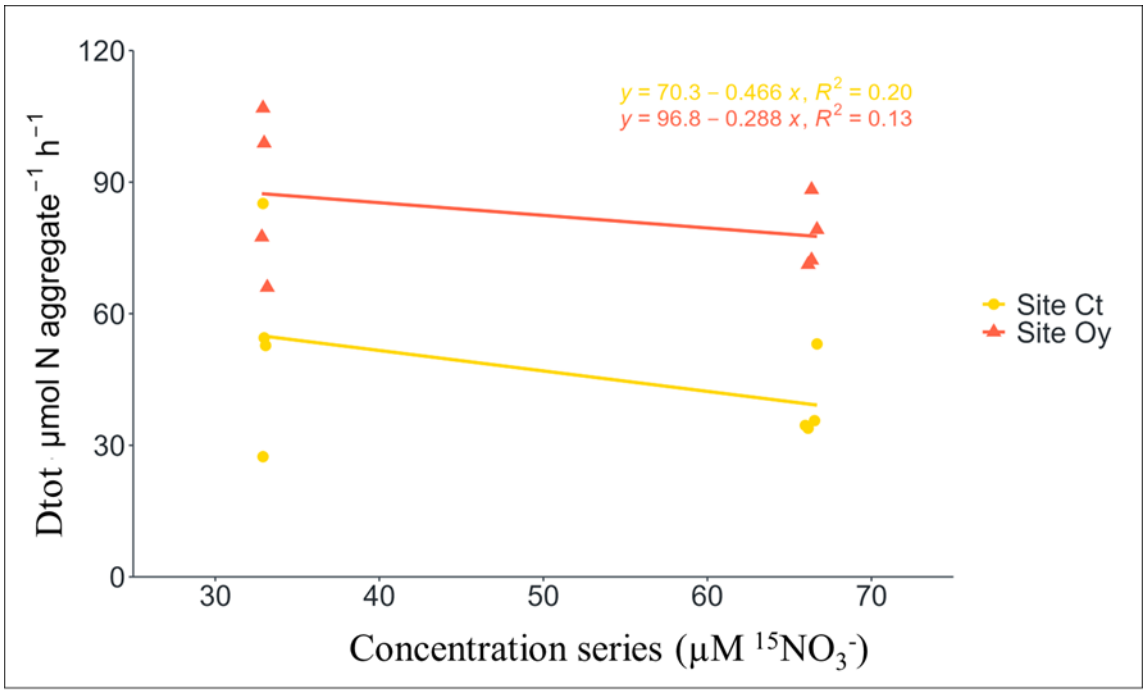

Figure S5. Sediment anammox assay (n= 8 per site) measured at both investigated sites (Oy and Ct, in proximity and far from the oyster reef, respectively). Equations of linear regressions and R-squared are reported.

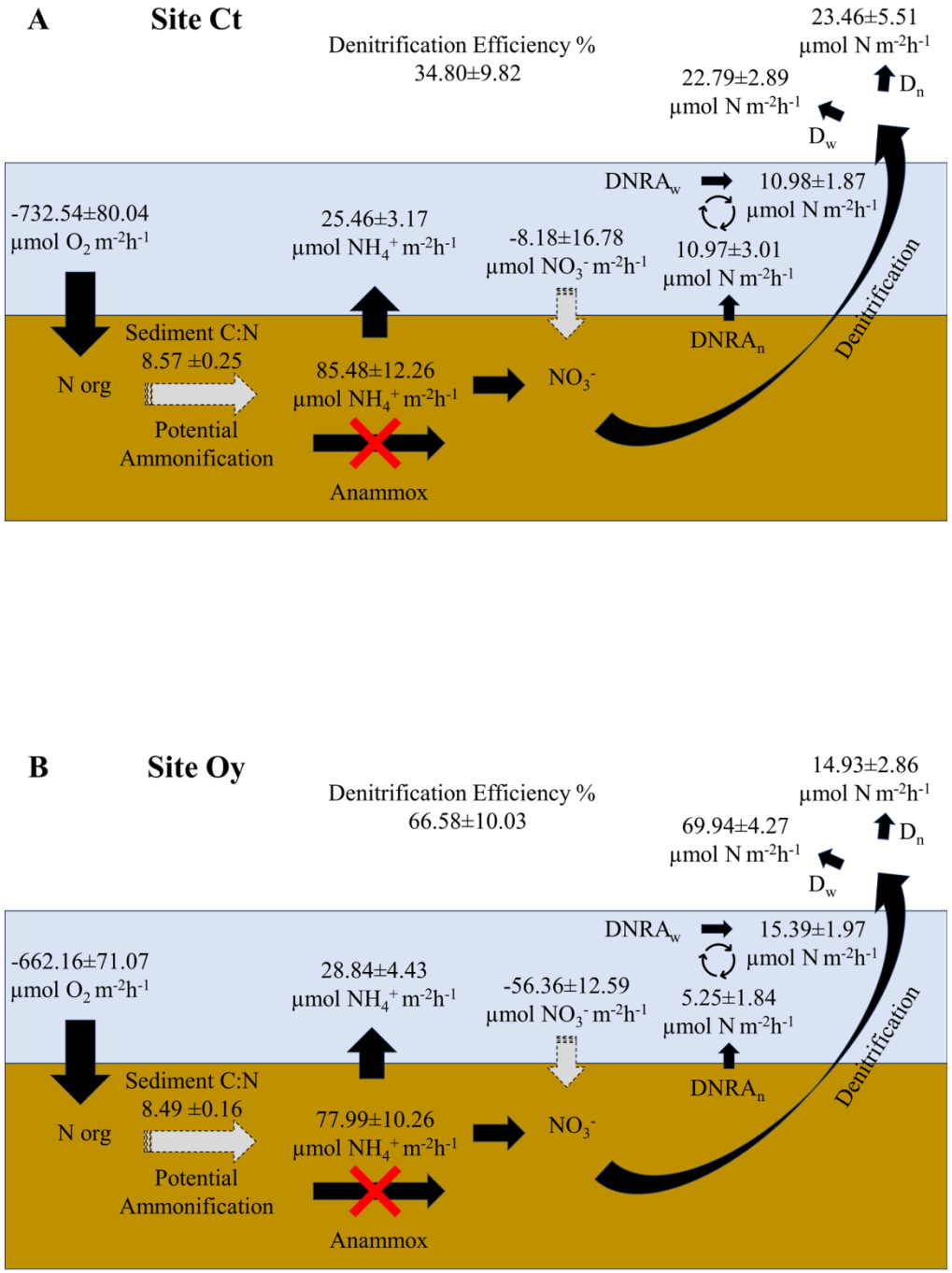

Figure S6. Schematic summary of the nitrogen cycle at the two sampling sites (Ct and Oy, far from and underneath the oyster reef, panel A and B respectively). Arrows represent measured (black) or calculated (dashed grey) processes. Averages ± standard errors are reported (n=8).

Table S1. In situ water physico-chemical features during the sampling period at the two sampling sites (Oy and Ct, in proximity and far from the oyster reef, respectively). Dissolved inorganic nutrient values reported as averages ± standard errors (n=4).

Water features			
	$N\text{-}NH_4^+$	$P\text{-}PO_4^{3-}$	$Si\text{-}SiO_2$
	µM	µM	µM
Site Ct	7.6±0.8	0.3±0.1	158.0±1.8
Site Oy	8.8±0.2	0.2±0.0	164.0±1.6