

Supplementary Materials for

**A potential explanation for the anomalously low nitrate to phosphate ratio
in the well-oxygenated East/Japan Sea**

Hyo-Ryeon Kim¹, Jae-Hyun Lim², Hae-Kun Jung³, Jeong-Min Shim⁴, Ju-Hyoung Kim⁵, Seo-Young Kim¹, and Il-Nam Kim^{1,*}

¹Department of Marine Science, Incheon National University, Incheon, South Korea.

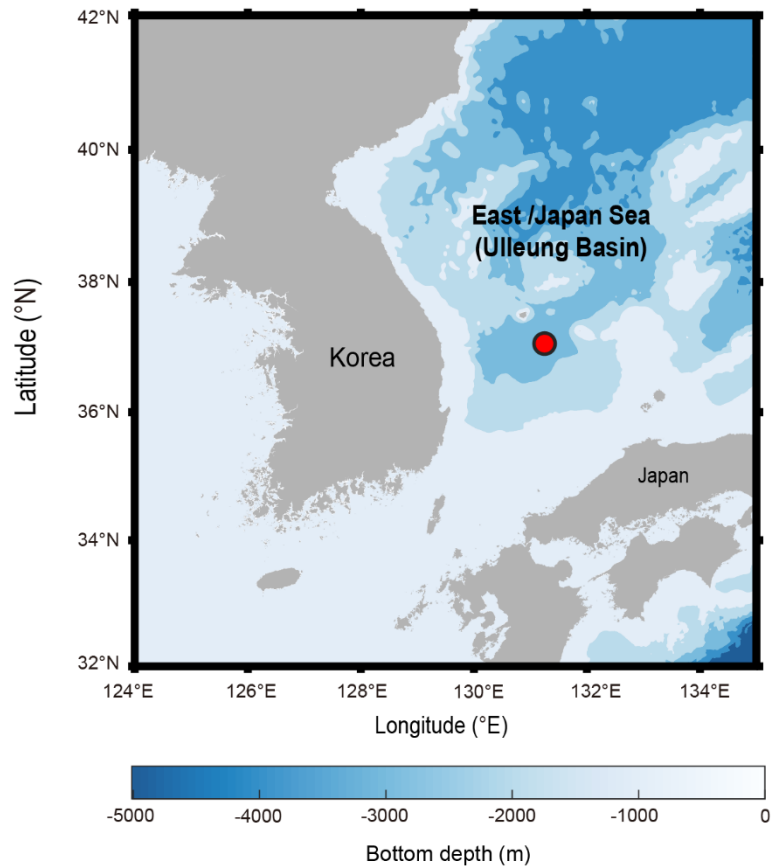
²Marine Environmental Research Division, National Institute of Fisheries Science, Busan, South Korea.

³Ocean climate and Ecology Research Division, National Institute of Fisheries Science, Busan 46083, South Korea.

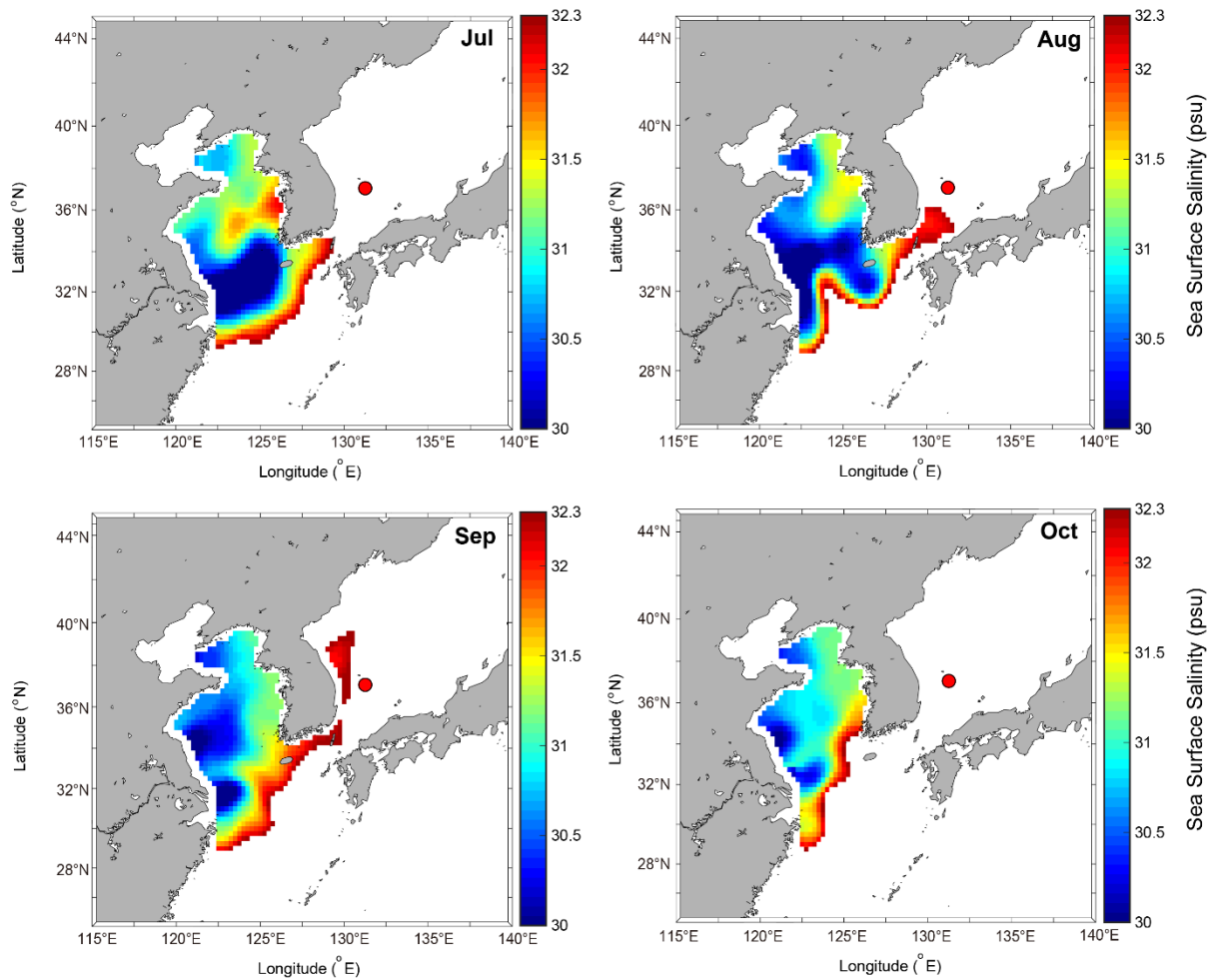
⁴Fisheries Resources and Environment Division, East Sea Fisheries Research Institute, National Institute of Fisheries Science, Gangneung 25435, South Korea.

⁵Department of Aquaculture and Aquatic Science, Kunsan National University, Gunsan, South Korea.

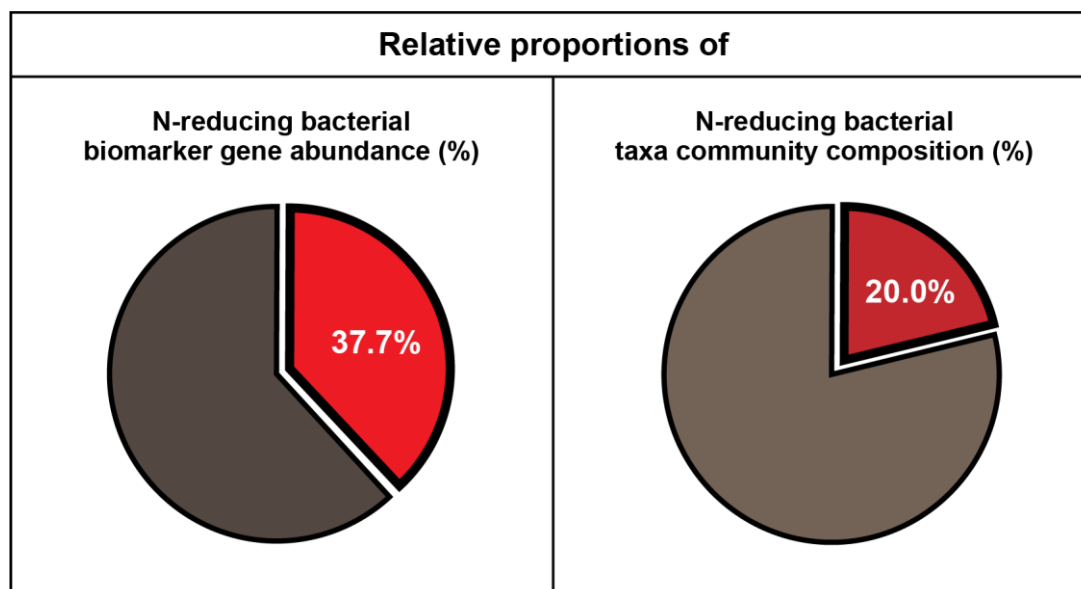
*Correspondence to Il-Nam Kim (ilnamkim@inu.ac.kr)



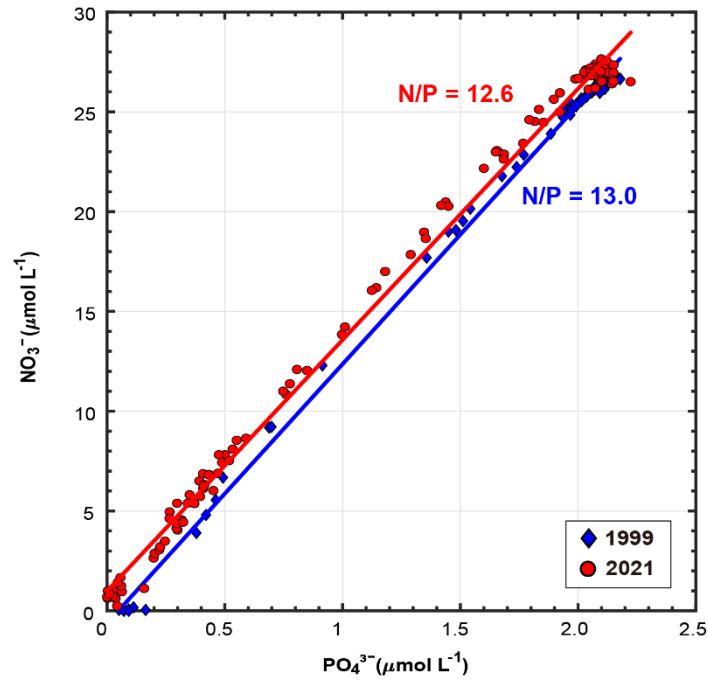
Supplementary Figure 1. Map of the sampling station in the Ulleung Basin, East/Japan Sea (EJS). Geographic location of the sampling site in the Ulleung Basin (UB), southwestern East/Japan Sea (EJS). The sampling station (37.056°N, 131.251°E), marked by a red circle with a black edge, is located in the central part of the UB—a deep semi-enclosed subregion of the ES.



Supplementary Figure 2. Satellite-based detection of seasonal Changjiang Diluted Water inflow to the East/Japan Sea (EJS). Seasonal distribution of Changjiang Diluted Water (CDW) inferred from satellite-derived sea surface salinity (SSS) data during July–October 2021. Monthly SSS values for the surface layer were obtained from the NASA Ocean Salinity project and visualized using a fixed color scale of 30–32.3 psu. Sampling stations are marked by red circles. Data were derived from Aquarius, SMAP (RSS V5.0), and SMOS MIRAS sensors and provided as Level-4 gridded products with a spatial resolution of 0.25° (~40 km). This figure highlights the seasonal inflow of Yangtze River freshwater, identified as a major source of phosphorus to the surface layer.



Supplementary Figure 3. Proportional composition of N-reducing bacterial biomarker genes and taxa integrated across all depths and sampling months. Proportion composition of nitrogen (N)-reducing genes and associated bacterial taxa across five depths (0–1000m) during the sampling period (February, April, June, August, and October). The left panel shows the relative abundance of genes involved in nitrate reduction (*nap* and *nar*) and denitrification (*nap*, *nar*, *nir*, *nor*, and *nos*), calculated as a percentage of total N-transformation genes. The right panel illustrates the composition of bacterial communities predicted to perform these N-reducing functions. Proportions were computed by dividing the abundance of N-reducing genes (or bacterial taxa) by the total abundance of all N-transformation genes (or the entire bacterial community), then multiplying by 100. Corresponding depth- and month-specific profiles for each gene and taxon are shown in Fig. 2 and Fig. 3.



Supplementary Figure 4. Decadal shift in N:P stoichiometry near the East/Japan Sea (EJS) study site. Nitrate-to-phosphate ($\text{NO}_3^-:\text{PO}_4^{3-}$) ratios at the 2021 sampling station (red circle) and three nearby stations from the 1999 CREAMS survey (blue diamonds; Station 1: 37.05°N, 130.93°E; Station 2: 37.41°N, 131.41°E; Station 3: 37.05°N, 131.68°E). This figure compares local N:P ratios between 1999 and 2021, capturing decadal changes in nutrient stoichiometry (Linear regressions of PO_4^{3-} (x-axis) versus NO_3^- (y-axis) show strong correlations in both years, with $R^2 = 0.95$ and $p < 0.05$ for 1999, and $R^2 = 0.92$ and $p < 0.05$ for 2021).

Supplementary Table 1. Summary of N-transformation gene abundance across five depths and sampling months.

month	depth	<i>gdh2+ureC</i>	<i>pmo-amo</i>	<i>hao</i>	<i>nxr</i>	<i>nar+nap</i>	<i>nir</i>	<i>nor</i>	<i>nos</i>
Feb	0	1.81×10^{-4}	3.15×10^{-4}	7.48×10^{-8}	6.50×10^{-6}	1.18×10^{-5}	3.74×10^{-4}	7.56×10^{-6}	1.90×10^{-6}
	150	3.33×10^{-4}	4.07×10^{-4}	5.33×10^{-8}	1.33×10^{-5}	2.50×10^{-5}	4.86×10^{-4}	1.93×10^{-5}	4.01×10^{-6}
	300	2.60×10^{-4}	2.77×10^{-4}	2.33×10^{-7}	2.55×10^{-5}	5.18×10^{-5}	3.41×10^{-4}	2.14×10^{-5}	5.62×10^{-6}
	750	1.66×10^{-4}	6.85×10^{-5}	8.78×10^{-8}	3.22×10^{-5}	7.54×10^{-5}	1.01×10^{-4}	2.27×10^{-5}	9.71×10^{-6}
	1000	1.82×10^{-4}	4.09×10^{-5}	4.29×10^{-8}	1.81×10^{-5}	4.38×10^{-5}	6.21×10^{-5}	1.81×10^{-5}	7.77×10^{-6}
Apr	0	3.64×10^{-5}	2.99×10^{-5}	0	6.40×10^{-6}	8.48×10^{-6}	5.59×10^{-5}	1.05×10^{-5}	1.67×10^{-6}
	150	2.59×10^{-4}	4.36×10^{-4}	9.28×10^{-9}	9.18×10^{-6}	1.28×10^{-5}	5.21×10^{-4}	1.91×10^{-5}	2.77×10^{-6}
	300	2.67×10^{-4}	4.17×10^{-4}	5.77×10^{-8}	1.12×10^{-5}	2.13×10^{-5}	4.98×10^{-4}	1.65×10^{-5}	3.08×10^{-6}
	750	2.12×10^{-4}	7.96×10^{-5}	1.53×10^{-7}	2.20×10^{-5}	5.81×10^{-5}	1.21×10^{-4}	2.17×10^{-5}	8.81×10^{-6}
	1000	1.65×10^{-4}	6.33×10^{-5}	5.42×10^{-8}	3.96×10^{-5}	9.45×10^{-5}	9.36×10^{-5}	3.51×10^{-5}	1.14×10^{-5}
Jun	0	1.36×10^{-5}	1.24×10^{-7}	2.30×10^{-8}	4.4×10^{-6}	7.41×10^{-6}	7.64×10^{-6}	6.93×10^{-6}	1.18×10^{-6}
	150	2.86×10^{-4}	4.80×10^{-4}	6.20×10^{-9}	1.02×10^{-5}	1.45×10^{-5}	5.76×10^{-4}	2.97×10^{-5}	3.43×10^{-6}
	300	2.80×10^{-4}	3.46×10^{-4}	6.24×10^{-8}	3.08×10^{-5}	5.05×10^{-5}	4.29×10^{-4}	3.18×10^{-5}	4.04×10^{-6}
	750	1.58×10^{-4}	1.73×10^{-4}	4.09×10^{-8}	1.81×10^{-5}	3.67×10^{-5}	2.10×10^{-4}	1.17×10^{-5}	4.48×10^{-6}
	1000	3.11×10^{-4}	2.23×10^{-5}	1.87×10^{-8}	4.68×10^{-5}	8.07×10^{-5}	4.41×10^{-5}	3.06×10^{-5}	1.42×10^{-5}
Aug	0	2.48×10^{-4}	3.28×10^{-7}	1.46×10^{-7}	5.53×10^{-6}	7.47×10^{-5}	4.37×10^{-6}	3.04×10^{-6}	1.12×10^{-6}
	150	3.54×10^{-4}	5.06×10^{-4}	6.21×10^{-8}	1.49×10^{-5}	2.39×10^{-5}	6.14×10^{-4}	3.88×10^{-5}	7.35×10^{-6}
	300	3.21×10^{-4}	3.80×10^{-4}	1.83×10^{-7}	1.18×10^{-5}	3.66×10^{-5}	4.75×10^{-4}	4.25×10^{-5}	1.22×10^{-5}
	750	3.46×10^{-4}	9.32×10^{-5}	2.12×10^{-7}	1.67×10^{-5}	5.10×10^{-5}	1.33×10^{-4}	2.63×10^{-5}	1.13×10^{-5}
	1000	4.52×10^{-4}	4.08×10^{-5}	5.32×10^{-8}	2.67×10^{-5}	7.44×10^{-5}	8.78×10^{-5}	4.09×10^{-5}	1.92×10^{-5}
Oct	0	3.09×10^{-5}	3.48×10^{-6}	1.58×10^{-8}	1.76×10^{-6}	8.89×10^{-6}	4.37×10^{-7}	1.70×10^{-6}	8.51×10^{-7}
	150	3.60×10^{-4}	5.04×10^{-4}	1.52×10^{-8}	1.57×10^{-5}	3.22×10^{-5}	6.57×10^{-6}	2.65×10^{-5}	8.21×10^{-6}
	300	3.11×10^{-4}	4.00×10^{-4}	4.98×10^{-8}	1.26×10^{-5}	3.31×10^{-5}	7.38×10^{-6}	2.40×10^{-5}	9.06×10^{-6}
	750	2.90×10^{-4}	9.05×10^{-5}	9.29×10^{-8}	1.37×10^{-5}	5.20×10^{-5}	1.14×10^{-5}	3.34×10^{-5}	1.60×10^{-5}
	1000	1.47×10^{-4}	6.05×10^{-5}	2.77×10^{-7}	1.79×10^{-5}	4.33×10^{-5}	4.41×10^{-6}	1.91×10^{-5}	8.48×10^{-6}

73 **Supplementary Table 2. Class and phylum-level classification of 42 bacterial orders**
74 **identified during bimonthly surveys in the East/Japan Sea in 2021.**

Phylum	Class	Order
Proteobacteria	Gammaproteobacteria	<i>Xanthomonadales</i>
		<i>Thiotrichales</i>
		<i>Nevskiales</i>
		<i>Cellvibrionales</i>
		<i>Vibrionales</i>
		<i>Enterobacterales</i>
		<i>Oceanospirillales</i>
		<i>Alteromonadales</i>
		<i>Pseudomonadales</i>
		<i>unclassified</i>
		<i>Salinisphaerales</i>
	Alphaproteobacteria	<i>Pelagibacterales</i>
		<i>Maricaulales</i>
		<i>Rhizobiales</i>
		<i>Rhodobacterales</i>
		<i>Caulobacterales</i>
		<i>Sphingomonadales</i>
		<i>Hyphomonadales</i>
		<i>Kordiimonadales</i>
		<i>Rhodospirillales</i>
	Betaproteobacteria	<i>Burkholderiales</i>
	Deltaproteobacteria	<i>Myxococcales</i>
Bacteroidetes	Saprospira	<i>Saprospirales</i>
	Cytophagia	<i>Cytophagales</i>
	Flavobacteriia	<i>Flavobacteriales</i>
	Bacteroidia	<i>Bacteroidales</i>
	Sphingobacteriia	<i>Sphingobacteriales</i>
	Chitinophagia	<i>Chitinophagales</i>
Actinobacteria	Actinomycetia	<i>Corynebacteriales</i>
		<i>Propionibacteriales</i>
		<i>Micrococcales</i>
		<i>Geodermatophilales</i>
Balneolaeota	Balneolia	<i>Balneolales</i>
Cyanobacteria	unclassified	<i>Synechococcales</i>
Fusobacteria	Fusobacteriia	<i>Fusobacteriales</i>
Firmicutes	Bacilli	<i>Bacillales</i>
		<i>Lactobacillales</i>
Planctomycetes	Planctomycetia	<i>Pirellulales</i>
		<i>Planctomycetales</i>
Verrucomicrobia	Verrucomicrobiae	<i>Verrucomicrobiales</i>
Lentisphaerae	Lentisphaeria	<i>Lentisphaerales</i>
Thaumarchaeota	unclassified	<i>Nitrosopumilales</i>

Supplementary Table 3. Bacterial community composition (%) by depth and sampling month. Bacterial community composition (%) is presented for five depths (0, 150, 300, 750 and 1000 m) across five sampling months (February, April, June, August and October). A total of 42 bacterial orders were identified, and relative abundance values at each depth are denoted by labels **a–e**, respectively.

a

Order	Feb (0m)	Apr (0m)	Jun (0m)	Aug (0m)	Oct (0m)
<i>Oceanospirillales</i>	0.318	0.065	0.039	0.231	0.186
<i>Pelagibacterales</i>	67.537	75.064	86.269	58.607	93.267
<i>Flavobacteriales</i>	2.212	8.025	1.363	1.283	1.792
<i>Maricaulales</i>	0.032	0.173	0.019	0.007	0.000
<i>Rhizobiales</i>	0.030	0.022	0.014	0.076	0.049
<i>Rhodobacterales</i>	14.198	14.364	11.696	5.426	1.198
<i>Alteromonadales</i>	1.475	0.232	0.235	2.151	0.571
<i>Pseudomonadales</i>	0.000	0.032	0.006	0.000	0.000
<i>Nitrosopumilales</i>	12.477	1.245	0.008	0.014	0.145
<i>Caulobacteriales</i>	0.005	0.000	0.002	0.000	0.000
<i>Corynebacteriales</i>	0.005	0.078	0.006	0.007	0.000
<i>Balneolales</i>	0.000	0.000	0.002	0.000	0.003
<i>Micrococcales</i>	0.002	0.000	0.000	0.000	0.005
<i>unclassified</i>	0.037	0.013	0.008	0.000	0.000
<i>Synechococcales</i>	0.005	0.002	0.044	30.596	2.244
<i>Burkholderiales</i>	0.016	0.004	0.000	0.000	0.000
<i>Geodermatophilales</i>	0.002	0.000	0.002	0.007	0.015
<i>Salinisphaerales</i>	0.000	0.000	0.052	0.003	0.000
<i>Fusobacteriales</i>	0.021	0.015	0.009	0.007	0.010
<i>Bacillales</i>	0.014	0.000	0.003	0.000	0.000
<i>Thiotrichales</i>	0.103	0.002	0.002	0.000	0.000
<i>Hyphomonadales</i>	0.011	0.420	0.038	0.083	0.101
<i>Sphingomonadales</i>	0.018	0.006	0.013	0.169	0.080
<i>Pirellulales</i>	0.082	0.019	0.008	0.000	0.124
<i>Vibrionales</i>	0.005	0.011	0.022	1.074	0.072
<i>Propionibacteriales</i>	0.014	0.067	0.017	0.014	0.013
<i>Verrucomicrobiales</i>	0.385	0.102	0.038	0.014	0.000
<i>Cytophagales</i>	0.000	0.000	0.023	0.114	0.005
<i>Cellvibrionales</i>	0.000	0.000	0.000	0.003	0.000
<i>Kordiimonadales</i>	0.005	0.006	0.000	0.007	0.010
<i>Rhodospirillales</i>	0.018	0.013	0.008	0.041	0.065
<i>Lentisphaerales</i>	0.962	0.009	0.055	0.062	0.018
<i>Lactobacillales</i>	0.005	0.002	0.002	0.007	0.003
<i>Bacteroidales</i>	0.005	0.006	0.000	0.000	0.023
<i>Sphingobacteriales</i>	0.005	0.000	0.000	0.000	0.000

Order	Feb (150m)	Apr (150m)	Jun (150m)	Aug (150m)	Oct (150m)
<i>Oceanospirillales</i>	0.662	0.128	0.290	0.662	1.340
<i>Pelagibacterales</i>	45.304	63.973	63.677	52.732	52.303
<i>Flavobacteriales</i>	1.294	1.038	0.856	2.337	1.421
<i>Maricaulales</i>	0.042	0.013	0.026	0.000	0.003
<i>Rhizobiales</i>	0.279	0.088	0.120	0.305	0.492
<i>Rhodobacterales</i>	8.594	11.386	9.346	12.366	8.150
<i>Alteromonadales</i>	12.843	0.807	1.144	4.918	2.686
<i>Chitinophagales</i>	0.000	0.002	0.000	0.000	0.000
<i>Pseudomonadales</i>	0.058	0.002	0.041	0.006	0.000
<i>Nitrosopumilales</i>	25.235	20.374	22.712	23.959	30.663
<i>Caulobacterales</i>	0.053	0.025	0.000	0.017	0.010
<i>Corynebacteriales</i>	0.132	0.065	0.054	0.026	0.201
<i>Balneolales</i>	0.005	0.000	0.002	0.000	0.010
<i>Micrococcales</i>	0.000	0.000	0.004	0.009	0.010
<i>unclassified</i>	0.013	0.061	0.021	0.023	0.019
<i>Synechococcales</i>	0.003	0.002	0.002	0.081	0.013
<i>Burkholderiales</i>	0.061	0.055	0.054	0.046	0.000
<i>Geodermatophilales</i>	0.000	0.000	0.079	0.000	0.026
<i>Salinisphaerales</i>	0.000	0.000	0.006	0.009	0.003
<i>Fusobacteriales</i>	0.003	0.010	0.036	0.015	0.019
<i>Bacillales</i>	0.074	0.036	0.051	0.105	0.016
<i>Thiotrichales</i>	1.218	0.000	0.000	0.026	0.006
<i>Hyphomonadales</i>	0.324	0.648	0.272	0.636	0.450
<i>Sphingomonadales</i>	0.058	0.034	0.103	0.221	0.317
<i>Enterobacterales</i>	0.003	0.000	0.002	0.009	0.000
<i>Pirellulales</i>	0.211	0.153	0.079	0.218	0.395
<i>Vibrionales</i>	0.235	0.078	0.103	0.139	0.223
<i>Propionibacteriales</i>	0.224	0.080	0.144	0.253	0.236
<i>Verrucomicrobiales</i>	1.885	0.614	0.182	0.017	0.013
<i>Cytophagales</i>	0.013	0.002	0.051	0.017	0.003
<i>Cellvibrionales</i>	0.018	0.004	0.006	0.070	0.016
<i>Saprospirales</i>	0.029	0.000	0.000	0.000	0.000
<i>Kordiimonadales</i>	0.026	0.015	0.011	0.000	0.074
<i>Rhodospirillales</i>	0.214	0.023	0.051	0.235	0.809
<i>Lentisphaerales</i>	0.849	0.275	0.463	0.537	0.045
<i>Lactobacillales</i>	0.011	0.008	0.004	0.000	0.023
<i>Bacteroidales</i>	0.016	0.002	0.002	0.006	0.003
<i>Xanthomonadales</i>	0.003	0.000	0.002	0.000	0.000
<i>Sphingobacteriales</i>	0.011	0.000	0.000	0.000	0.000

Order	Feb (300m)	Apr (300m)	Jun (300m)	Aug (300m)	Oct (300m)
<i>Oceanospirillales</i>	0.637	0.182	0.688	0.983	1.888
<i>Pelagibacterales</i>	46.886	49.597	49.239	43.153	52.195
<i>Flavobacteriales</i>	4.928	3.550	3.828	9.556	1.968
<i>Maricaulales</i>	0.086	0.000	0.000	0.032	0.018
<i>Rhizobiales</i>	0.763	0.273	2.878	0.444	0.618
<i>Rhodobacterales</i>	6.732	5.599	7.736	7.027	5.500
<i>Alteromonadales</i>	9.091	2.441	1.601	7.007	2.932
<i>Chitinophagales</i>	0.000	0.005	0.514	0.000	0.000
<i>Pseudomonadales</i>	0.199	0.051	0.282	0.011	0.004
<i>Nitrosopumilales</i>	20.457	28.856	24.814	27.504	31.709
<i>Caulobacterales</i>	0.184	0.008	2.146	0.000	0.004
<i>Corynebacteriales</i>	0.128	0.230	0.146	0.080	0.133
<i>Balneolales</i>	0.000	0.000	0.000	0.000	0.004
<i>Micrococcales</i>	0.031	0.003	0.600	0.000	0.000
<i>unclassified</i>	0.015	0.011	0.022	0.011	0.031
<i>Synechococcales</i>	0.002	0.008	0.000	0.550	0.000
<i>Burkholderiales</i>	0.325	0.080	0.097	0.109	0.018
<i>Geodermatophilales</i>	0.144	0.000	0.029	0.000	0.013
<i>Salinisphaerales</i>	0.000	0.000	0.042	0.000	0.000
<i>Fusobacteriales</i>	0.095	0.003	0.011	0.037	0.004
<i>Bacillales</i>	2.237	0.046	0.077	0.209	0.049
<i>Thiotrichales</i>	1.603	0.000	0.044	0.040	0.036
<i>Hyphomonadales</i>	0.745	1.380	0.137	0.803	0.564
<i>Sphingomonadales</i>	0.489	0.059	1.171	0.209	0.280
<i>Enterobacterales</i>	0.042	0.013	0.000	0.003	0.000
<i>Pirellulales</i>	0.102	0.311	0.262	0.333	0.333
<i>Vibrionales</i>	0.097	0.091	0.079	0.198	0.142
<i>Propionibacteriales</i>	0.694	0.319	0.452	0.232	0.173
<i>Verrucomicrobiales</i>	0.780	5.599	0.505	0.361	0.120
<i>Cytophagales</i>	0.000	0.000	0.013	0.092	0.004
<i>Cellvibrionales</i>	0.027	0.008	0.004	0.000	0.000
<i>Saprospirales</i>	0.188	0.000	0.000	0.000	0.076
<i>Kordiimonadales</i>	0.471	0.005	0.864	0.000	1.137
<i>Rhodospirillales</i>	1.114	0.021	0.697	0.327	0.018
<i>Lentisphaerales</i>	0.004	1.248	0.000	0.674	0.018
<i>Lactobacillales</i>	0.049	0.000	0.000	0.003	0.000
<i>Myxococcales</i>	0.102	0.000	0.002	0.000	0.000
<i>Bacteroidales</i>	0.000	0.003	1.019	0.009	0.000
<i>Nevskiales</i>	0.013	0.000	0.000	0.000	0.000
<i>Xanthomonadales</i>	0.539	0.000	0.000	0.000	0.000
<i>Planctomycetales</i>	0.000	0.000	0.000	0.000	0.009
<i>Sphingobacteriales</i>	0.000	0.000	0.000	0.000	0.009

Order	Feb (750m)	Apr (750m)	Jun (750m)	Aug (750m)	Oct (750m)
<i>Oceanospirillales</i>	1.526	1.811	2.290	2.454	3.361
<i>Pelagibacterales</i>	68.162	58.310	65.389	44.747	65.707
<i>Flavobacteriales</i>	1.206	5.526	2.488	4.483	2.145
<i>Maricaulales</i>	0.223	0.000	0.048	0.069	0.024
<i>Rhizobiales</i>	1.500	2.812	0.718	1.299	1.007
<i>Rhodobacterales</i>	1.459	2.175	3.100	2.842	1.503
<i>Alteromonadales</i>	7.007	6.003	2.599	28.745	9.364
<i>Chitinophagales</i>	0.000	0.640	0.000	0.000	0.000
<i>Pseudomonadales</i>	0.208	0.804	0.945	0.023	0.019
<i>Nitrosopumilales</i>	5.889	8.110	14.083	6.782	8.264
<i>Caulobacterales</i>	0.602	0.372	0.376	0.240	0.073
<i>Corynebacteriales</i>	0.220	0.288	0.096	0.178	0.341
<i>Balneolales</i>	0.191	0.000	0.005	0.000	0.141
<i>Micrococcales</i>	0.000	0.155	0.010	0.007	0.005
<i>unclassified</i>	0.276	0.073	0.092	0.112	0.277
<i>Synechococcales</i>	0.003	0.003	0.024	0.760	0.024
<i>Burkholderiales</i>	0.537	0.220	0.010	0.187	0.156
<i>Geodermatophilales</i>	0.000	0.000	0.053	0.030	0.010
<i>Salinisphaerales</i>	0.000	0.000	0.010	0.039	0.000
<i>Fusobacteriales</i>	0.038	0.017	0.101	0.026	0.010
<i>Bacillales</i>	0.660	0.652	0.000	0.164	0.078
<i>Thiotrichales</i>	1.741	0.068	0.000	0.007	0.049
<i>Hyphomonadales</i>	2.498	8.212	1.046	0.905	1.445
<i>Sphingomonadales</i>	0.572	0.680	1.162	0.651	0.336
<i>Enterobacterales</i>	0.141	0.116	0.000	0.010	0.019
<i>Pirellulales</i>	0.000	0.118	0.391	0.599	0.204
<i>Vibrionales</i>	0.346	0.319	0.318	0.191	0.491
<i>Propionibacteriales</i>	1.723	0.739	0.241	0.191	0.540
<i>Verrucomicrobiales</i>	0.713	0.260	3.442	1.789	0.978
<i>Cytophagales</i>	0.200	0.093	0.039	0.095	0.000
<i>Cellvibrionales</i>	0.029	0.000	0.024	0.020	0.024
<i>Saprospirales</i>	0.144	0.000	0.000	0.000	0.000
<i>Kordiimonadales</i>	0.402	0.214	0.024	0.043	0.233
<i>Rhodospirillales</i>	1.383	0.310	0.159	0.862	2.617
<i>Lentisphaerales</i>	0.000	0.700	0.627	1.414	0.472
<i>Lactobacillales</i>	0.194	0.003	0.063	0.010	0.034
<i>Myxococcales</i>	0.000	0.090	0.000	0.000	0.000
<i>Bacteroidales</i>	0.205	0.000	0.029	0.003	0.010
<i>Nevskiales</i>	0.000	0.000	0.000	0.000	0.039
<i>Xanthomonadales</i>	0.000	0.000	0.000	0.007	0.000
<i>Planctomycetales</i>	0.000	0.000	0.000	0.000	0.000
<i>Sphingobacteriales</i>	0.000	0.107	0.000	0.016	0.000

Order	Feb (1000m)	Apr (1000m)	Jun (1000m)	Aug (1000m)	Oct (1000m)
<i>Oceanospirillales</i>	1.894	0.390	2.257	3.650	2.370
<i>Pelagibacterales</i>	68.690	60.112	52.751	30.453	74.110
<i>Flavobacteriales</i>	1.634	4.596	3.407	4.191	3.280
<i>Maricaulales</i>	0.000	0.000	0.143	0.226	0.000
<i>Rhizobiales</i>	0.720	0.744	1.333	1.177	0.936
<i>Rhodobacterales</i>	1.809	2.675	4.404	1.185	1.017
<i>Alteromonadales</i>	7.211	7.136	18.795	44.891	4.887
<i>Chitinophagales</i>	0.000	0.000	0.010	0.132	0.000
<i>Pseudomonadales</i>	0.109	0.394	0.670	0.144	0.046
<i>Nitrosopumilales</i>	3.563	5.121	2.105	2.358	4.938
<i>Caulobacterales</i>	0.035	0.040	0.194	0.409	0.025
<i>Corynebacteriales</i>	0.113	0.784	0.140	0.093	0.178
<i>Balneolales</i>	0.000	0.000	0.098	0.000	0.000
<i>Micrococcales</i>	0.957	0.033	0.441	0.165	1.088
<i>unclassified</i>	0.012	0.652	0.006	0.496	0.010
<i>Synechococcales</i>	0.311	0.004	1.019	0.459	0.122
<i>Burkholderiales</i>	0.070	2.486	0.130	0.953	0.137
<i>Geodermatophilales</i>	0.000	0.029	4.845	0.000	0.203
<i>Salinisphaerales</i>	0.016	0.000	0.010	0.368	0.010
<i>Fusobacteriales</i>	0.825	0.098	0.873	0.502	0.163
<i>Bacillales</i>	6.250	1.057	1.486	1.307	0.010
<i>Thiotrichales</i>	1.241	0.095	0.203	0.002	1.312
<i>Hyphomonadales</i>	0.420	3.568	1.448	0.236	0.870
<i>Sphingomonadales</i>	0.047	0.973	0.086	1.990	0.025
<i>Enterobacterales</i>	0.148	0.036	0.000	0.195	0.356
<i>Pirellulales</i>	0.039	0.160	0.251	0.116	0.483
<i>Vibrionales</i>	0.432	0.230	0.797	0.280	0.285
<i>Propionibacteriales</i>	1.462	1.225	1.718	0.791	1.449
<i>Verrucomicrobiales</i>	0.062	6.801	0.000	1.750	0.031
<i>Cytophagales</i>	0.027	0.000	0.000	0.230	0.137
<i>Cellvibrionales</i>	0.000	0.047	0.003	0.083	0.005
<i>Saprospirales</i>	0.296	0.000	0.000	0.000	0.041
<i>Kordiimonadales</i>	1.342	0.000	0.000	0.154	0.748
<i>Rhodospirillales</i>	0.202	0.102	0.308	0.595	0.488
<i>Lentisphaerales</i>	0.004	0.168	0.013	0.000	0.173
<i>Lactobacillales</i>	0.004	0.098	0.006	0.183	0.015
<i>Myxococcales</i>	0.000	0.000	0.051	0.000	0.005
<i>Bacteroidales</i>	0.058	0.055	0.000	0.000	0.046
<i>Nevskiales</i>	0.000	0.000	0.000	0.000	0.000
<i>Xanthomonadales</i>	0.000	0.000	0.051	0.110	0.005
<i>Planctomycetales</i>	0.000	0.000	0.000	0.000	0.000
<i>Sphingobacteriales</i>	0.058	0.091	0.000	0.128	0.046