

Table S1. All macrofauna taxonomic groupings (n = 76) observed at each study site. Some taxa were binned together or omitted for the calculation of diversity indices (see Appendix 1).

Scientific name	Aphia ID	SP	NH	NS	Phylum	Class	Order	Family	Binned	Omitted
Enchytraeidae indet.	2038	X			Annelida	Clitellata	Enchytraeida	Enchytraeidae		
<i>Amphichaeta</i> sp.	137355	X	X	X	Annelida	Clitellata	Tubificida	Naididae	X	
Naididae indet.	2039	X	X	X	Annelida	Clitellata	Tubificida	Naididae		
<i>Paranais litoralis</i>	137485	X	X	X	Annelida	Clitellata	Tubificida	Naididae	X	
<i>Paranais</i> sp.	137358	X		X	Annelida	Clitellata	Tubificida	Naididae	X	
Capitellidae indet.	921	X		X	Annelida	Polychaeta		Capitellidae		X
<i>Heteromastus filiformis</i>	129884	X	X	X	Annelida	Polychaeta		Capitellidae	X	
<i>Heteromastus</i> sp.	129214			X	Annelida	Polychaeta		Capitellidae		
<i>Mediomastus</i> sp.	129218	X		X	Annelida	Polychaeta		Capitellidae		
<i>Notomastus</i> sp.	129220			X	Annelida	Polychaeta		Capitellidae		
Orbiniidae indet.	902			X	Annelida	Polychaeta		Orbiniidae		
<i>Microphthalmus</i> sp.	129313			X	Annelida	Polychaeta	Phyllodocida	Microphthalmidae		
<i>Alitta</i> sp.	234848	X	X		Annelida	Polychaeta	Phyllodocida	Nereididae		
<i>Alitta virens</i>	234851	X	X		Annelida	Polychaeta	Phyllodocida	Nereididae		
Nereididae indet.	22496		X		Annelida	Polychaeta	Phyllodocida	Nereididae		X
<i>Eteone longa</i> complex	130616	X	X	X	Annelida	Polychaeta	Phyllodocida	Phyllodocidae		
<i>Eteone</i> sp.	129443	X	X	X	Annelida	Polychaeta	Phyllodocida	Phyllodocidae		
<i>Hypereteone heteropoda</i>	333652			X	Annelida	Polychaeta	Phyllodocida	Phyllodocidae		
<i>Hypereteone lactea</i>	146984			X	Annelida	Polychaeta	Phyllodocida	Phyllodocidae		
<i>Phyllodoce maculata</i>	334510			X	Annelida	Polychaeta	Phyllodocida	Phyllodocidae		
<i>Phyllodoce mucosa</i>	334512			X	Annelida	Polychaeta	Phyllodocida	Phyllodocidae		
<i>Phyllodoce</i> sp.	129455			X	Annelida	Polychaeta	Phyllodocida	Phyllodocidae		
<i>Pholoe minuta</i>	130603	X		X	Annelida	Polychaeta	Phyllodocida	Sigalionidae		

<i>Sthenelais limicola</i>	131077	X			Annelida	Polychaeta	Phyllodocida	Sigalionidae		
<i>Parexogone hebes</i>	757970	X			Annelida	Polychaeta	Phyllodocida	Syllidae		
<i>Fabricia stellaris</i>	130913	X			Annelida	Polychaeta	Sabellida	Fabriciidae		
<i>Manayunkia aestuarina</i>	130926		X		Annelida	Polychaeta	Sabellida	Fabriciidae		
<i>Marenzelleria</i> sp.	129615		X		Annelida	Polychaeta	Spionida	Spionidae		
<i>Marenzelleria viridis</i>	131135		X		Annelida	Polychaeta	Spionida	Spionidae		
<i>Polydora cornuta</i>	131143	X	X	X	Annelida	Polychaeta	Spionida	Spionidae		
<i>Pygospio elegans</i>	131170	X	X	X	Annelida	Polychaeta	Spionida	Spionidae		
<i>Scolelepis</i> sp.	129623	X			Annelida	Polychaeta	Spionida	Spionidae		
<i>Spio setosa</i>	157573	X	X	X	Annelida	Polychaeta	Spionida	Spionidae	X	
<i>Spio</i> sp.	129625	X		X	Annelida	Polychaeta	Spionida	Spionidae		
Spionidae indet.	913			X	Annelida	Polychaeta	Spionida	Spionidae		X
<i>Spiophanes bombyx</i>	131187			X	Annelida	Polychaeta	Spionida	Spionidae		
<i>Hobsonia</i> sp.	325206			X	Annelida	Polychaeta	Terebellida	Ampharetidae		
Cirratulidae indet.	919	X			Annelida	Polychaeta	Terebellida	Cirratulidae		
<i>Pectinaria gouldii</i>	334421	X			Annelida	Polychaeta	Terebellida	Pectinariidae	X	
Pectinariidae indet.	980	X	X		Annelida	Polychaeta	Terebellida	Pectinariidae		
Siphonostomatoida indet.	1104	X			Arthropoda	Copepoda	Siphonostomatoida	NA		
Orthocladiinae indet.	150868			X	Arthropoda	Hexapoda	Diptera	Chironomidae		
Corophiidae indet.	101376	X		X	Arthropoda	Malacostraca	Amphipoda	Corophiidae		X
<i>Monocorophium acherusicum</i>	225814	X		X	Arthropoda	Malacostraca	Amphipoda	Corophiidae	X	
<i>Monocorophium insidiosum</i>	148592		X		Arthropoda	Malacostraca	Amphipoda	Corophiidae	X	
<i>Monocorophium</i> sp.	148591	X	X	X	Arthropoda	Malacostraca	Amphipoda	Corophiidae		
<i>Gammarus</i> sp.	101537	X	X	X	Arthropoda	Malacostraca	Amphipoda	Gammaridae		
Amphipoda indet.	1135	X			Arthropoda	Malacostraca	Amphipoda	NA		X

Gammaroidea indet.	720708	X			Arthropoda	Malacostraca	Amphipoda	NA		X
<i>Crangon septemspinosa</i>	158355	X		X	Arthropoda	Malacostraca	Decapoda	Crangonidae		
Crangonidae indet.	106782	X		X	Arthropoda	Malacostraca	Decapoda	Crangonidae		
Brachyura indet.	106673		X		Arthropoda	Malacostraca	Decapoda	NA		
<i>Idotea balthica</i>	119039			X	Arthropoda	Malacostraca	Isopoda	Idoteidae		
<i>Jaera</i> sp.	118364	X	X		Arthropoda	Malacostraca	Isopoda	Janiridae		
Crustacea indet.	1066		X		Arthropoda					X
Enteropneusta indet.	1820		X		Hemichordata	Enteropneusta				X
<i>Macoma balthica</i>	141579	X	X		Mollusca	Bivalvia	Cardiida	Tellinidae	X	
<i>Macoma</i> sp.	138531			X	Mollusca	Bivalvia	Cardiida	Tellinidae		
Macominae indet.	225471		X		Mollusca	Bivalvia	Cardiida	Tellinidae		X
<i>Tellina</i> sp.	138533	X			Mollusca	Bivalvia	Cardiida	Tellinidae	X	
Tellinidae indet.	235	X		X	Mollusca	Bivalvia	Cardiida	Tellinidae		
<i>Mya arenaria</i>	140430		X		Mollusca	Bivalvia	Myida	Myidae	X	
<i>Mya</i> sp.	138211	X	X	X	Mollusca	Bivalvia	Myida	Myidae		
Mytilidae indet.	211		X	X	Mollusca	Bivalvia	Mytilida	Mytilidae		
Bivalvia indet.	105	X	X	X	Mollusca	Bivalvia				X
<i>Gemma gemma</i>	156803	X			Mollusca	Bivalvia	Venerida	Veneridae		
<i>Ecrobia truncata</i>	574096		X		Mollusca	Gastropoda	Littorinimorpha	Hydrobiidae		
<i>Lacuna</i> sp.	138099		X		Mollusca	Gastropoda	Littorinimorpha	Littorinidae		
<i>Littorina</i> sp.	138135	X	X	X	Mollusca	Gastropoda	Littorinimorpha	Littorinidae		
Rissooidea indet.	14767			X	Mollusca	Gastropoda	Littorinimorpha			
Naticidae indet.	145		X		Mollusca	Gastropoda	Littorinimorpha	Naticidae		
Lottiidae indet.	7173			X	Mollusca	Gastropoda		Lottiidae		
Gastropoda indet.	101	X	X	X	Mollusca	Gastropoda				X
<i>Odostomia</i> sp.	138413	X			Mollusca	Gastropoda		Pyramidellidae		
Nemertea indet.	152391		X		Nemertea					
Lineidae indet.	122314		X		Nemertea	Pilidiophora	Heteronemertea	Lineidae	X	

Table S2. Analysis of similarities (ANOSIM) examining community composition among collection dates within each study site. R values close to 1.0 suggest collection date has an important effect on community composition, as inter-group differences are greater than intra-group differences. R values close to 0 suggest collection date has a small or negligible effect on community composition.

Site	R-statistic	p-value
Neddie’s Harbour	0.315	0.0024
Newman Sound	0.165	0.0053
St. Paul’s	0.112	0.027

Table S3. Summary table for Permutational Analyses of Variance (PERMANOVAs) performed on taxonomic composition, and taxonomic diversity (TD) and functional diversity (FD) indices. Pseudo-F statistics and associated p-values are also provided on the relevant nMDS plots (Fig. 3). For each PERMANOVA, 9999 permutations were performed.

PERMANOVA	Term	df	SumOfSqs	R ²	pseudo-F	p-value
Taxonomic composition	Site	2	11.055	0.596	64.211	< 0.001
	Residual	87	7.490	0.404		
	Total	89	18.545	1.000		
TD indices	Site	2	0.125	0.146	7.412	< 0.001
	Residual	87	0.737	0.854		
	Total	89	0.862	1.000		
FD indices	Site	2	0.309	0.386	27.335	< 0.001
	Residual	87	0.492	0.614		
	Total	89	0.801	1.000		
TD & FD indices	Site	2	0.136	0.166	8.673	< 0.001
	Residual	87	0.684	0.834		
	Total	89	0.820	1.000		

Table S4. Community weighted means (CWM) and standard errors for macrofauna at each site.

Trait	Trait modality	Neddie's Harbour		Newman Sound		St. Paul's	
		CWM	SE	CWM	SE	CWM	SE
Diet	Carnivore (C)	0.039	0.003	0.040	0.006	0.123	0.007
	Detritivore (Dt)	0.213	0.009	0.348	0.012	0.256	0.010
	Herbivore (Hb)	0.747	0.010	0.611	0.012	0.619	0.012
Feeding guild	Suspension feeder (Ff)	0.272	0.016	0.337	0.013	0.530	0.025
	Grazer (Gr)	0.493	0.018	0.239	0.023	0.361	0.021
	Predator (Pr)	0.010	0.001	0.031	0.005	0.041	0.005
	Surface deposit feeder (SD)	0.173	0.011	0.350	0.013	0.052	0.006
	Sub-surface deposit feeder (SSD)	0.044	0.004	0.040	0.007	0.011	0.002
	Scavenger (Sc)	0.008	0.002	0.003	0.001	0.005	0.001
	Body size*	N/A	0.448	0.005	0.383	0.005	0.446
Mobility	N/A	0.505	0.012	0.256	0.017	0.399	0.006
Sediment reworking	Biodiffusor (bd)	0.083	0.009	0.202	0.021	0.197	0.022
	Epifauna (epi)	0.000	0.000	0.000	0.000	0.005	0.002
	Surficial modifier (sm)	0.754	0.015	0.280	0.025	0.704	0.027
	Up/down conveyor (updown)	0.163	0.015	0.517	0.033	0.094	0.012

* log scale

Table S5. Summary table for linear mixed effects model of taxonomic richness as a function of site and depth layer.

Random effects, ~1 coreID		SD			
	Core ID	0.647			
	Residual	2.040			
Term	Chi Sq.	df	p-value		
Site	14.715	2	0.001		
Depth layer	130.839	1	< 0.001		
Fixed effects		Estimate	SE	t-statistic	p-value
	(Intercept)	9.697	0.357	27.189	< 0.001
	Site (Newman Sound)	-1.625	0.424	-3.832	< 0.001
	Site (St. Paul's)	-0.883	0.424	-2.081	0.039
	Depth layer (2-10 cm)	-3.478	0.304	-11.438	< 0.001

Table S6. Summary table for linear mixed effects models of Shannon-Wiener index as a function of site and depth layer.

Random effects, ~1 coreID		SD			
Core ID		0.056			
Residual		0.321			
Term	Chi Sq.	df	p-value		
Site	56.185	2	< 0.001		
Depth layer	9.442	1	0.002		
Fixed effects		Estimate	SE	t-statistic	p-value
(Intercept)		1.751	0.053	32.786	< 0.001
Site (Newman Sound)		-0.410	0.063	-6.535	< 0.001
Site (St. Paul's)		-0.426	0.063	-6.777	< 0.001
Depth layer (2-10 cm)		-0.147	0.048	-3.073	0.003

Table S7. Summary table for linear mixed effects model of Pielou's evenness as a function of site and depth layer.

Random effects, ~1 coreID		SD			
Core ID		0.007			
Residual		0.058			
Term	Chi Sq.	df	p-value		
Depth layer	101.612	1	< 0.001		
Site	6.463	2	0.039		
Site × Depth Layer	6.182	2	0.045		
Fixed effects		Estimate	SE	t-statistic	p-value
(Intercept)		0.194	0.012	16.238	< 0.001
Depth layer (2-10)		0.061	0.017	3.639	< 0.001
Site (Newman Sound)		-0.029	0.016	-1.857	0.065
Site (St. Paul's)		-0.034	0.016	-2.167	0.032
Newman Sound × 2-10		0.053	0.022	2.389	0.018
St. Paul's × 2-10		0.019	0.022	0.852	0.395

Table S8. Summary table for beta mixed effects model of Simpson’s index as a function of site and depth layer.

Random effects, ~1 coreID		SD			
Core ID		0			
Term	Chi Sq.	df	p-value		
Site	52.197	2	< 0.001		
Depth layer	0.146	1	0.702		
Fixed effects		Estimate	SE	t-statistic	p-value
(Intercept)		1.097	0.087	12.652	< 0.001
Site (Newman Sound)		-0.542	0.101	-5.386	< 0.001
Site (St. Paul’s)		-0.708	0.099	-7.124	< 0.001
Depth layer (2-10)		0.029	0.076	0.382	0.702

Table S9. Summary table for beta mixed effects model of functional richness (FRic) as a function of site and depth layer.

Random effects, ~1 coreID		SD			
Core ID		0.153			
Term	Chi Sq.	df	p-value		
Depth layer	27.984	1	< 0.001		
Site	12.781	2	0.002		
Depth layer × Site	10.798	2	0.005		
Fixed effects		Estimate	SE	t-statistic	p-value
(Intercept)		-1.846	0.151	-12.208	< 0.001
Depth layer (2-10)		-0.254	0.226	-1.124	0.261
Site (Newman Sound)		-0.024	0.197	-0.122	0.903
Site (St. Paul’s)		-0.311	0.203	-1.534	0.125
Newman Sound × 2-10		-1.142	0.374	-3.052	0.002
St. Paul’s × 2-10		-0.836	0.347	-2.409	0.016

Table S10. Summary table for beta mixed effects model of functional evenness (FEve) as a function of site and depth layer.

Random effects, ~1 coreID		SD			
Core ID		0			
Term	Chi Sq.	df	p-value		
Depth layer	4.433	1	0.035		
Site	33.621	2	< 0.001		
Depth layer × Site	9.704	2	0.008		
Fixed effects		Estimate	SE	t-statistic	p-value
(Intercept)		0.328	0.128	2.552	0.011
Depth layer (2-10)		0.668	0.191	3.489	< 0.001
Site (Newman Sound)		-0.008	0.169	-0.048	0.962
Site (St. Paul's)		-0.322	0.168	-1.914	0.056
Newman Sound × 2-10		-0.465	0.251	-1.851	0.064
St. Paul's × 2-10		-0.769	0.247	-3.115	0.002

Table S11. Summary table for beta mixed effects model of functional divergence (FDiv) as a function of site and depth layer.

Random effects, ~1 coreID		SD			
Core ID		0			
Term	Chi Sq.	df	p-value		
Depth layer	4.965	1	0.026		
Site	52.365	2	< 0.001		
Depth layer × Site	27.776	2	< 0.001		
Fixed effects		Estimate	SE	t-statistic	p-value
(Intercept)		1.086	0.093	11.741	< 0.001
Depth layer (2-10)		0.592	0.152	3.891	< 0.001
Site (Newman Sound)		1.119	0.145	7.725	< 0.001
Site (St. Paul's)		0.758	0.136	5.582	< 0.001
Newman Sound × 2-10		-1.179	0.237	-4.974	< 0.001
St. Paul's × 2-10		-0.114	0.233	-0.489	0.625

Table S12. Wilcoxon signed-rank test comparing diversity indices between depth layers (0-2 and 2-10 cm) at each site. Significant p-values (< 0.05, bolded) indicate differences between depth layers. Mean values and standard deviations for the following indices can be found in Table 6: Taxon richness (S), Shannon-Wiener index (H'), Simpson's diversity index (d), Pielou's evenness (J'), functional richness (FRic), functional evenness (FEve), and functional divergence (FDiv).

Index	Neddie's Harbour		Newman Sound		St. Paul's	
	statistic	p-value	statistic	p-value	statistic	p-value
S	475.5	< 0.001	994.5	< 0.001	930.5	< 0.001
H'	395.0	0.027	631.0	0.270	634.0	0.256
d	385.0	0.046	459.0	0.276	497.0	0.547
J'	78.0	< 0.001	109.0	< 0.001	182.0	< 0.001
FRic	254.0	0.537	336.0	< 0.001	504.0	< 0.001
FEve	152.0	0.008	424.0	0.590	530.0	0.810
FDiv	66.0	< 0.001	296.0	0.014	160.0	0.007

Table S13. Community weighted means (CWM) and standard errors for macrofauna in each sediment depth layer at each site.

0-2 cm		Neddie's Harbour		Newman Sound		St. Paul's	
Trait	Trait modality	CWM	SE	CWM	SE	CWM	SE
Diet	Carnivore (C)	0.038	0.003	0.032	0.007	0.125	0.007
	Detritivore (Dt)	0.206	0.010	0.359	0.011	0.266	0.010
	Herbivore (Hb)	0.755	0.011	0.609	0.012	0.606	0.013
Feeding guild	Suspension feeder (Ff)	0.287	0.016	0.356	0.012	0.572	0.024
	Grazer (Gr)	0.509	0.020	0.224	0.023	0.337	0.022
	Predator (Pr)	0.008	0.001	0.028	0.007	0.038	0.006
	Surface deposit feeder (SD)	0.159	0.012	0.363	0.013	0.041	0.005
	Sub-surface deposit feeder (SSD)	0.030	0.003	0.028	0.006	0.009	0.002
	Scavenger (Sc)	0.007	0.002	0.002	0.001	0.003	0.001
Body size*	N/A	0.443	0.005	0.372	0.005	0.448	0.009
Mobility	N/A	0.497	0.014	0.246	0.017	0.398	0.006
Sediment reworking	Biodiffusor (bd)	0.076	0.008	0.194	0.020	0.141	0.019
	Epifauna (epi)	0.000	0.000	0.000	0.000	0.001	0.000
	Surficial modifier (sm)	0.776	0.016	0.288	0.028	0.783	0.020
	Up/down conveyor (updown)	0.148	0.016	0.518	0.034	0.075	0.009
2-10 cm		Neddie's Harbour		Newman Sound		St. Paul's	
Trait	Trait modality	CWM	SE	CWM	SE	CWM	SE
Diet	Carnivore (C)	0.054	0.009	0.105	0.017	0.118	0.014
	Detritivore (Dt)	0.274	0.018	0.297	0.021	0.202	0.012
	Herbivore (Hb)	0.672	0.021	0.597	0.024	0.677	0.020
Feeding guild	Suspension feeder (Ff)	0.118	0.026	0.210	0.027	0.272	0.022
	Grazer (Gr)	0.377	0.039	0.296	0.042	0.491	0.030
	Predator (Pr)	0.035	0.009	0.060	0.013	0.058	0.011
	Surface deposit feeder (SD)	0.286	0.041	0.275	0.028	0.139	0.016
	Sub-surface deposit feeder (SSD)	0.176	0.022	0.145	0.031	0.023	0.004
	Scavenger (Sc)	0.008	0.002	0.014	0.008	0.016	0.003
Body size*	N/A	0.514	0.018	0.480	0.015	0.465	0.012
Mobility	N/A	0.544	0.016	0.323	0.023	0.396	0.013
Sediment reworking	Biodiffusor (bd)	0.137	0.027	0.249	0.040	0.481	0.032
	Epifauna (epi)	0.000	0.000	0.000	0.000	0.021	0.007
	Surficial modifier (sm)	0.531	0.033	0.254	0.034	0.246	0.031
	Up/down conveyor (updown)	0.333	0.032	0.496	0.047	0.252	0.027

* log scale

Table S14. Wilcoxon signed-rank test comparing community weighted means between depth layers (0-2 and 2-10 cm) at each site. Significant p-values (< 0.05) indicate differences between depth layers.

Trait	Trait modality	Neddie's Harbour		Newman Sound		St. Paul's	
		statistic	p-value	statistic	p-value	statistic	p-value
Diet	Herbivore (Hb)	443.0	0.001	586.0	0.599	268.0	< 0.001
	Carnivore (C)	228.0	0.220	302.5	0.002	659.0	0.145
	Detritivore (Dt)	151.0	0.004	720.5	0.024	866.0	< 0.001
Feeding guild	Predator (Pr)	242.0	0.343	509.0	0.652	444.0	0.200
	Grazer (Gr)	398.0	0.024	444.5	0.201	209.0	< 0.001
	Scavenger (Sc)	350.0	0.190	552.0	0.880	272.5	< 0.001
	Suspension feeder (Ff)	525.0	< 0.001	964.0	< 0.001	1,018.0	< 0.001
	Surface deposit feeder (SD)	180.0	0.026	766.0	0.005	161.0	< 0.001
	Sub-surface deposit feeder (SSD)	37.5	< 0.001	406.0	0.068	336.5	0.007
Sediment reworking	Biodiffusor (bd)	219.0	0.158	501.5	0.585	44.0	< 0.001
	Epifauna (epi)	288.0		544.5		385.0	0.003
	Surficial modifier (sm)	530.0	< 0.001	600.0	0.480	1,058.0	< 0.001
	Up/down conveyor (updown)	79.0	< 0.001	582.5	0.631	133.0	< 0.001
Mobility	N/A	180.0	0.026	347.5	0.012	511.5	0.677
Body size*	N/A	136.0	0.001	128.0	< 0.001	462.0	0.295

* log scale

Table S15. Mean and standard deviations for all diversity indices, calculated from 10,000 iteration of sub-sampling a predetermined number of cores. “Subset” indicates the number of cores randomly selected from each site.

Subset	Site	Shannon	Simpson	Richness	Pielou's	FRic	FEve	FDiv
3	Neddie's Harbour	1.96 +/- 0.079	0.802 +/- 0.028	13.475 +/- 0.999	0.147 +/- 0.01	0.335 +/- 0.081	0.499 +/- 0.068	0.768 +/- 0.027
	Newman Sound	1.649 +/- 0.149	0.713 +/- 0.05	11.201 +/- 1.373	0.151 +/- 0.015	0.176 +/- 0.056	0.587 +/- 0.054	0.881 +/- 0.034
	St. Paul's	1.523 +/- 0.136	0.682 +/- 0.055	12.257 +/- 1.241	0.126 +/- 0.009	0.132 +/- 0.033	0.433 +/- 0.053	0.903 +/- 0.033
5	Neddie's Harbour	1.961 +/- 0.058	0.802 +/- 0.02	13.467 +/- 0.742	0.148 +/- 0.007	0.335 +/- 0.060	0.499 +/- 0.049	0.768 +/- 0.02
	Newman Sound	1.652 +/- 0.110	0.714 +/- 0.037	11.224 +/- 1.019	0.151 +/- 0.011	0.176 +/- 0.041	0.587 +/- 0.040	0.882 +/- 0.026
	St. Paul's	1.525 +/- 0.101	0.683 +/- 0.041	12.284 +/- 0.946	0.126 +/- 0.007	0.133 +/- 0.025	0.433 +/- 0.039	0.903 +/- 0.025
10	Neddie's Harbour	1.96 +/- 0.035	0.802 +/- 0.012	13.459 +/- 0.442	0.148 +/- 0.004	0.334 +/- 0.036	0.500 +/- 0.030	0.768 +/- 0.012
	Newman Sound	1.650 +/- 0.070	0.714 +/- 0.023	11.215 +/- 0.643	0.151 +/- 0.007	0.176 +/- 0.026	0.588 +/- 0.026	0.881 +/- 0.017
	St. Paul's	1.523 +/- 0.065	0.682 +/- 0.026	12.263 +/- 0.609	0.126 +/- 0.005	0.133 +/- 0.016	0.433 +/- 0.025	0.903 +/- 0.016
15	Neddie's Harbour	1.960 +/- 0.023	0.802 +/- 0.008	13.455 +/- 0.293	0.148 +/- 0.003	0.333 +/- 0.024	0.501 +/- 0.02	0.768 +/- 0.008
	Newman Sound	1.651 +/- 0.051	0.714 +/- 0.017	11.221 +/- 0.471	0.151 +/- 0.005	0.176 +/- 0.019	0.588 +/- 0.019	0.881 +/- 0.012
	St. Paul's	1.524 +/- 0.047	0.683 +/- 0.019	12.278 +/- 0.430	0.126 +/- 0.003	0.133 +/- 0.012	0.433 +/- 0.018	0.903 +/- 0.011
20	Neddie's Harbour	1.960 +/- 0.013	0.802 +/- 0.005	13.457 +/- 0.168	0.148 +/- 0.002	0.334 +/- 0.014	0.500 +/- 0.012	0.768 +/- 0.005
	Newman Sound	1.651 +/- 0.037	0.714 +/- 0.012	11.213 +/- 0.348	0.151 +/- 0.004	0.176 +/- 0.014	0.588 +/- 0.014	0.881 +/- 0.009
	St. Paul's	1.524 +/- 0.035	0.683 +/- 0.014	12.273 +/- 0.322	0.126 +/- 0.002	0.133 +/- 0.009	0.433 +/- 0.013	0.903 +/- 0.008

Table S16. Results of post-hoc power analysis. Number of cores indicates the total number of samples subset from the full data set for each iteration of each model, for the following diversity indices: functional divergence (FDiv), functional evenness (FEve), functional richness (FRic), Pielou’s evenness (J'), taxonomic richness (S), Shannon-Wiener index (H') and Simpson’s diversity index (d). The columns “Non-significant” and “Significant” indicate the power for each model term (i.e., the percentage of model iterations in which the p-value for each model term was > 0.05 and < 0.05 , respectively.) Powers of 80% or greater are indicated in bold.

Number of cores	Diversity index	Model term	Non-significant	Significant
3	FDiv	Depth layer	73.9	26.1
		Depth layer \times Site	24.5	75.5
		Site	34.4	65.6
	FEve	Depth layer	74.4	25.6
		Depth layer \times Site	66.7	33.3
		Site	52.1	47.9
	FRic	Depth layer	37.1	62.9
		Depth layer \times Site	63.6	36.4
		Site	68.6	31.4
	J'	Depth layer	10.5	89.5
		Depth layer \times Site	58.4	41.6
		Site	73.0	27.0
	S	Depth layer	8.9	91.1
		Site	80.1	19.9
	H'	Depth layer	72.9	27.1
		Site	26.2	73.8
	d	Depth layer	86.9	13.1
		Site	20.2	79.8
5	FDiv	Depth layer	75.1	24.9
		Depth layer \times Site	13.2	86.8
		Site	12.7	87.3
	FEve	Depth layer	75.9	24.1
		Depth layer \times Site	73.5	26.5
		Site	34.2	65.8
	FRic	Depth layer	17.5	82.5
		Depth layer \times Site	63.5	36.5
		Site	61.1	38.9
	J'	Depth layer	3.0	97.0
		Depth layer \times Site	67.5	32.5
		Site	75.9	24.1
	S	Depth layer	0.4	99.6
		Site	74.1	25.9
	H'	Depth layer	67.0	33.0
		Site	13.2	86.8

	d	Depth layer	91.2	8.8
		Site	15.9	84.1
10	FDiv	Depth layer	72.5	27.5
		Depth layer × Site	0.0	100.0
		Site	0.0	100.0
	FEve	Depth layer	69.0	31.0
		Depth layer × Site	66.7	33.3
		Site	3.2	96.8
	FRic	Depth layer	0.1	99.9
		Depth layer × Site	43.0	57.0
		Site	24.0	76.0
	J'	Depth layer	0.0	100.0
		Depth layer × Site	67.1	32.9
		Site	75.5	24.5
	S	Depth layer	0.0	100.0
		Site	51.4	48.6
	H'	Depth layer	52.4	47.6
		Site	0.0	100.0
	d	Depth layer	95.5	4.5
		Site	0.0	100.0
15	FDiv	Depth layer	37.8	62.2
		Depth layer × Site	0.0	100.0
		Site	0.0	100.0
	FEve	Depth layer	57.8	42.2
		Depth layer × Site	53.2	46.8
		Site	0.0	100.0
	FRic	Depth layer	0.0	100.0
		Depth layer × Site	16.5	83.5
		Site	0.2	99.8
	J'	Depth layer	0.0	100.0
		Depth layer × Site	66.7	33.3
		Site	73.2	26.8
	S	Depth layer	0.0	100.0
		Site	28.3	71.7
	H'	Depth layer	28.2	71.8
		Site	0.0	100.0
	d	Depth layer	98.3	1.7
		Site	0.0	100.0
20	FDiv	Depth layer	0.0	100.0
		Depth layer × Site	0.0	100.0
		Site	0.0	100.0
	FEve	Depth layer	46.1	53.9
		Depth layer × Site	29.0	71.0

	Site	0.0	100.0
FRic	Depth layer	0.0	100.0
	Depth layer × Site	0.0	100.0
	Site	0.0	100.0
J'	Depth layer	0.0	100.0
	Depth layer × Site	59.0	41.0
	Site	65.8	34.2
S	Depth layer	0.0	100.0
	Site	4.2	95.8
H'	Depth layer	11.3	88.7
	Site	0.0	100.0
d	Depth layer	99.2	0.8
	Site	0.0	100.0

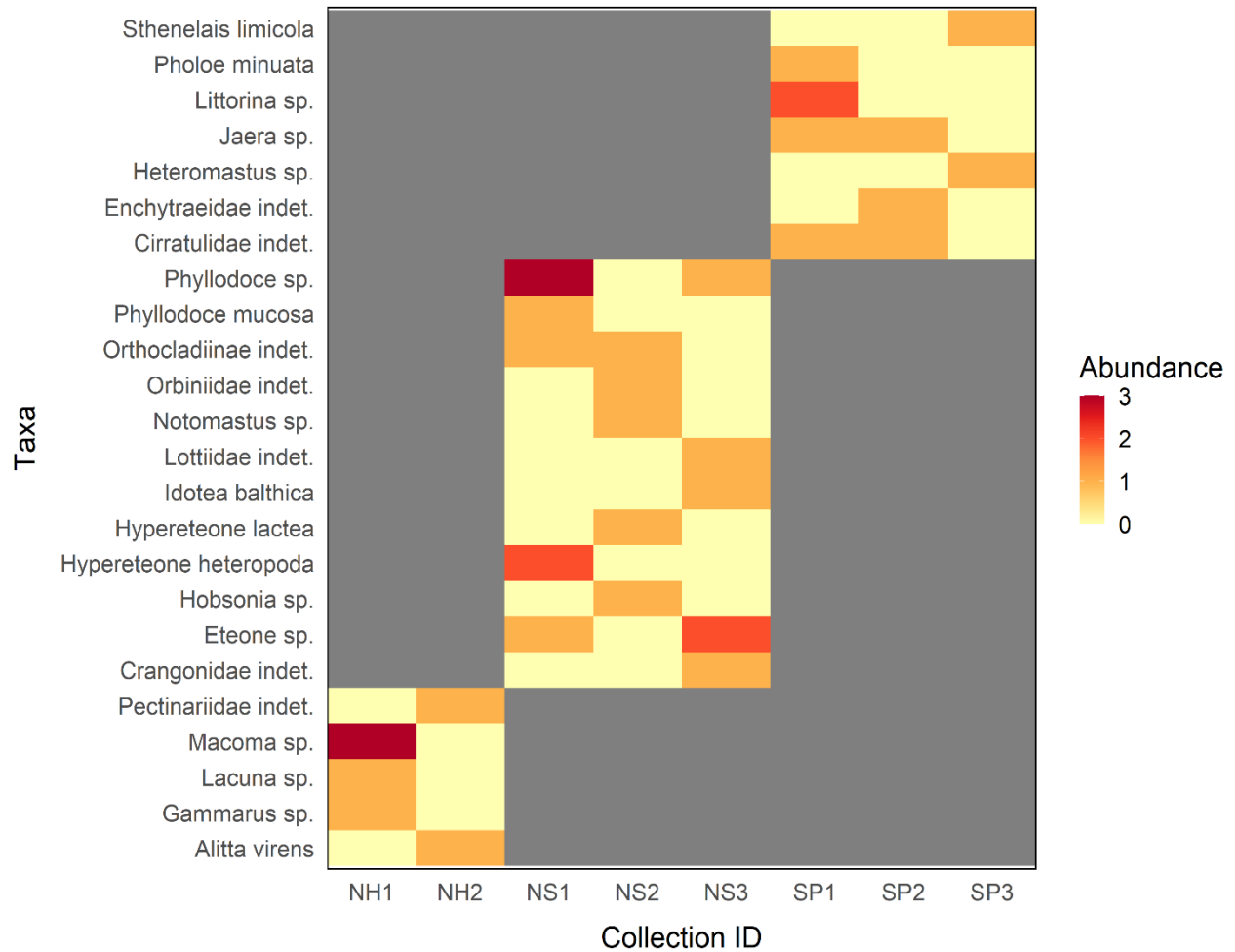


Figure S1. Heatmap of rare taxa observed at each site. During each collection event, 12 sediment cores were collected from each site with the exception of collections NS3 and SP3, in which only nine sediment cores were collected. Rare taxa are those represented by no more than five individuals in total across all replicates from that site, and which were observed in < 10% of cores at that site. Dark grey boxes indicate that a given taxa was not rare or was entirely absent at that site.

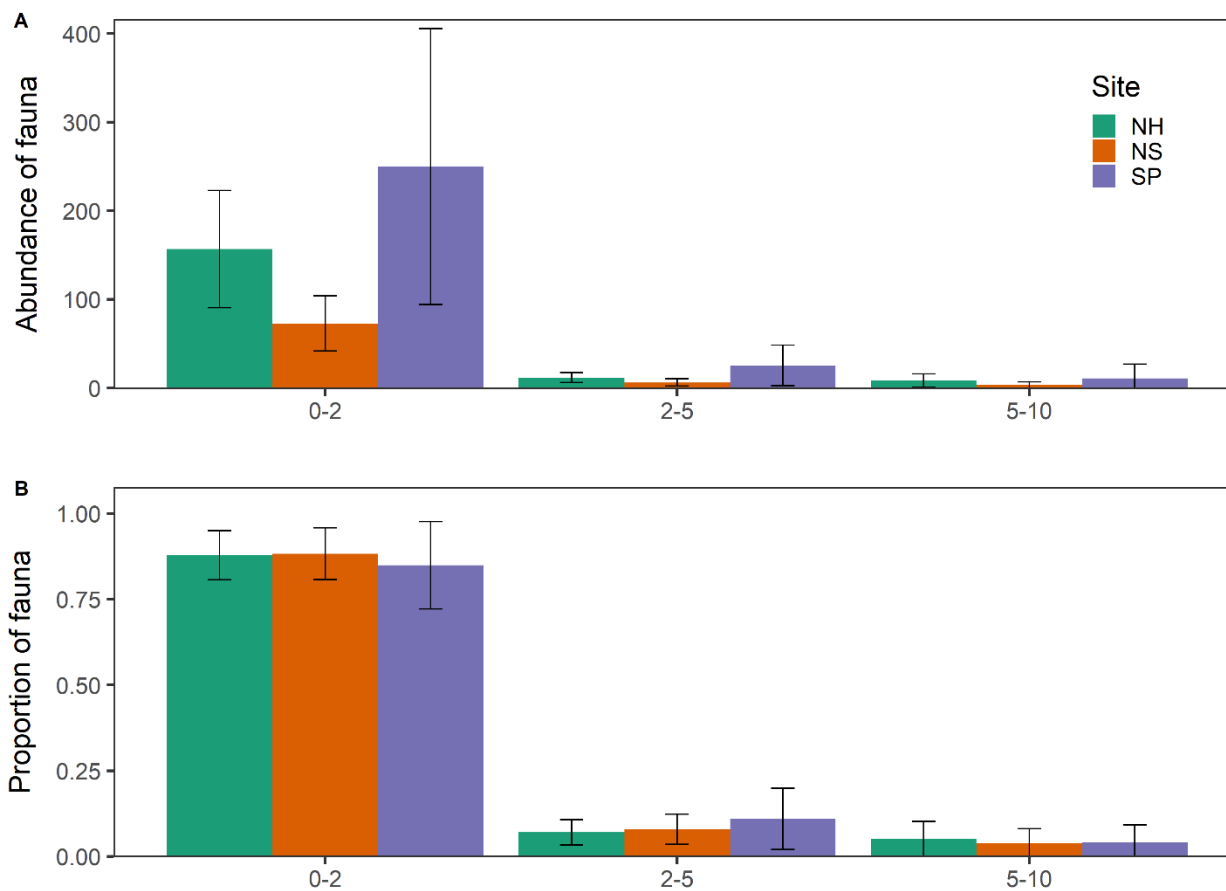


Figure S2. Vertical distribution of all macrofauna at each study site. Mean abundance (A) and mean proportion (B) of fauna per core, for each depth layer (cm). Green, orange, and purple bars represent the macrofaunal communities at Neddie's Harbour (NH), Newman Sound (NS), and St. Paul's (SP), respectively. Error bars represent standard deviation around the mean.

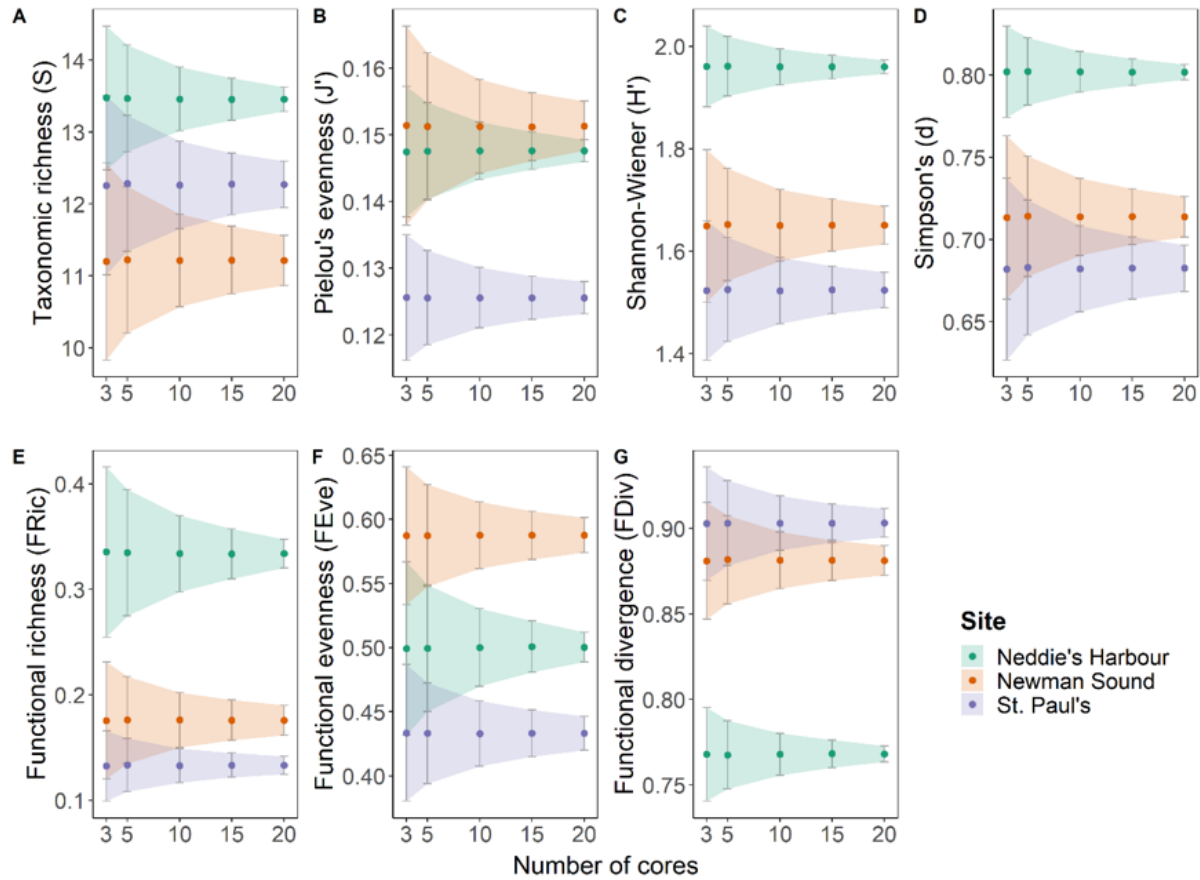


Fig. S3. Post-hoc power analysis illustrating mean (dark points) and standard deviation (shaded ribbons) for each diversity index at each site, based on 10,000 iterations of subset cores. Number of cores subset from each site are indicated on the x-axis.

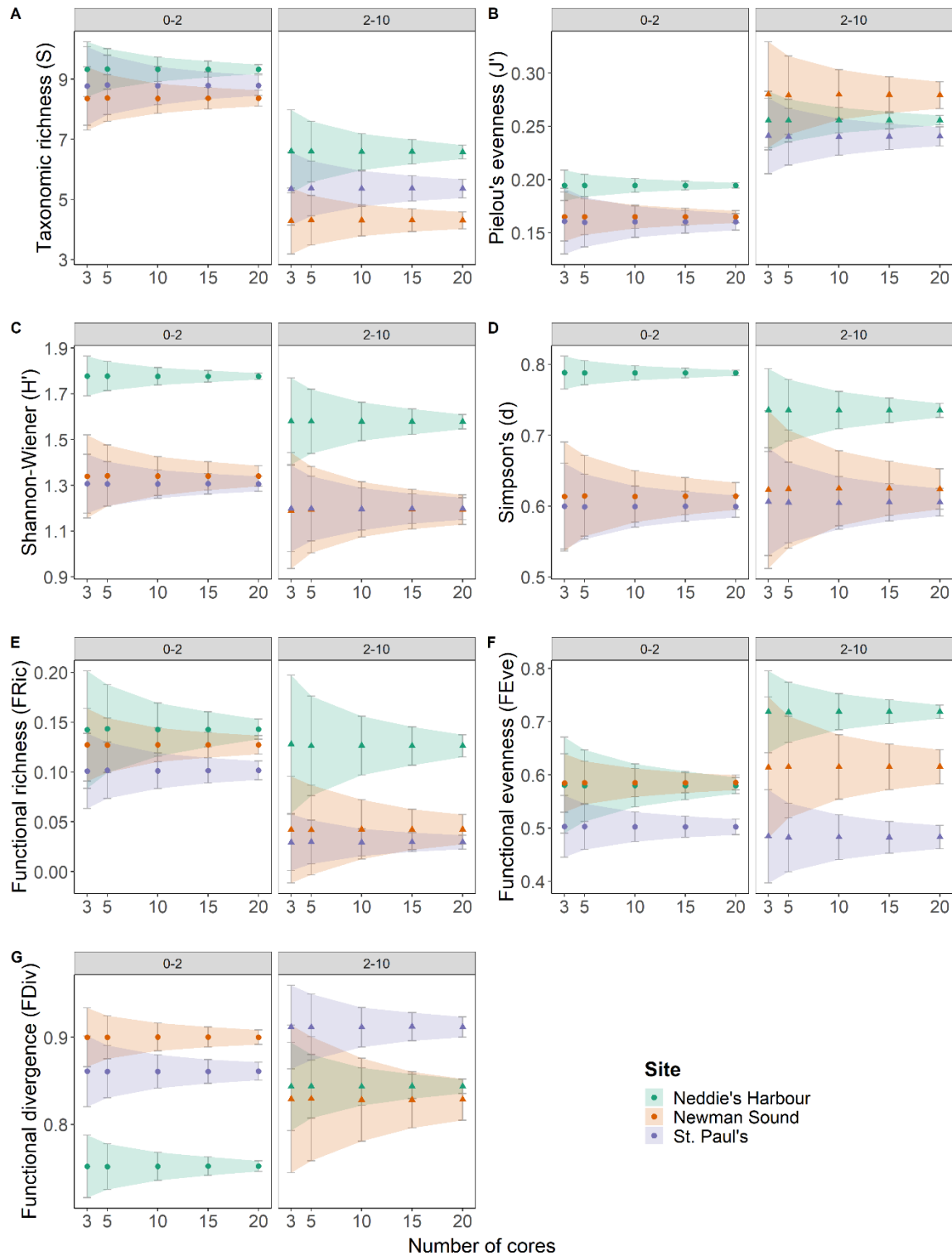


Figure S4. Post-hoc power analysis illustrating mean (dark points) and standard deviation (shaded ribbons) for each diversity index at each site-depth layer combination, based on 10,000 iterations of subset cores. Number of cores subset from each site are indicated on the x-axis.