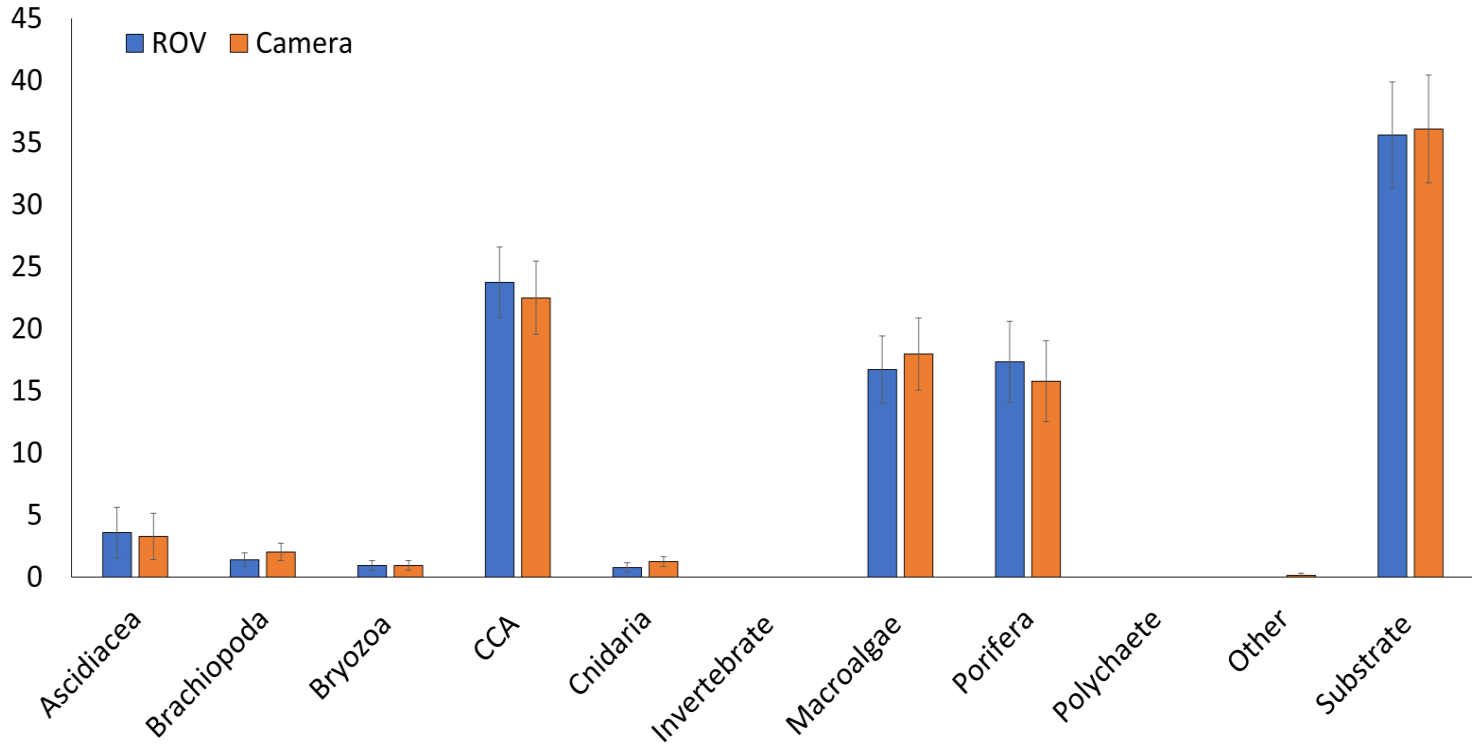


Figure S1. Comparison of benthic community abundance data collected from ROV video stills and photographs from Nikon D800 of 16 quadrats. CPC points were randomised explaining the small, non-significant differences between the two techniques

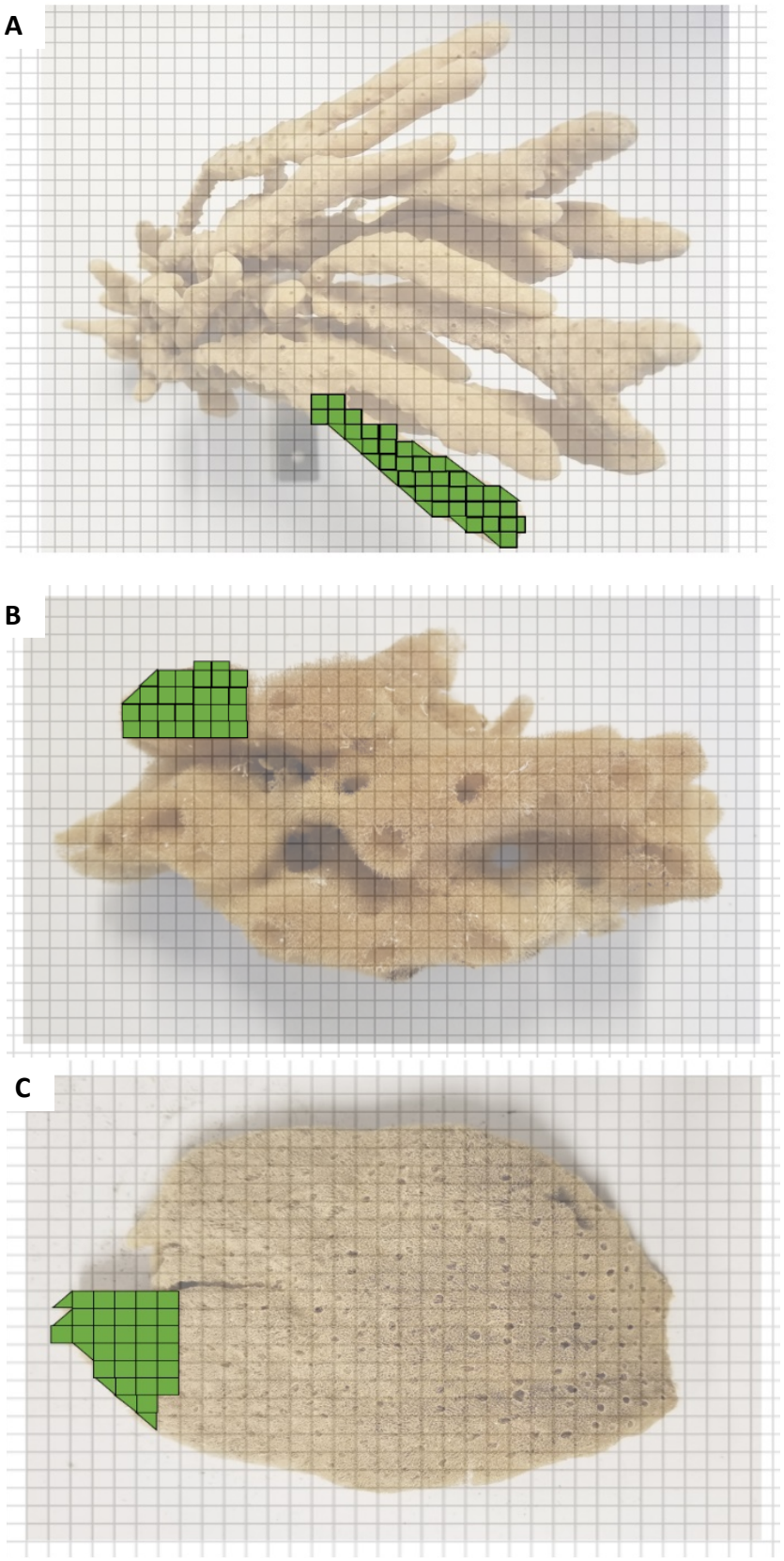
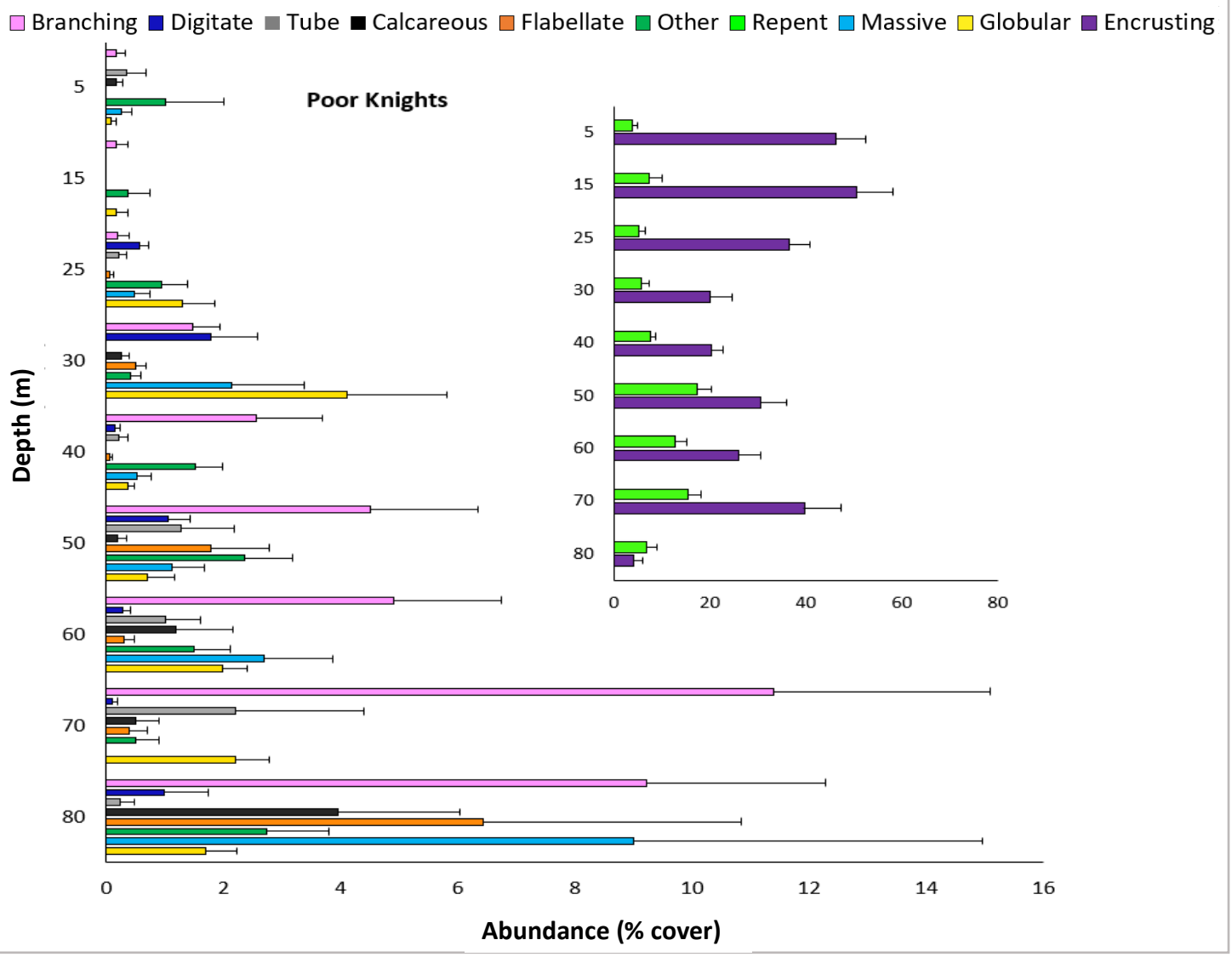
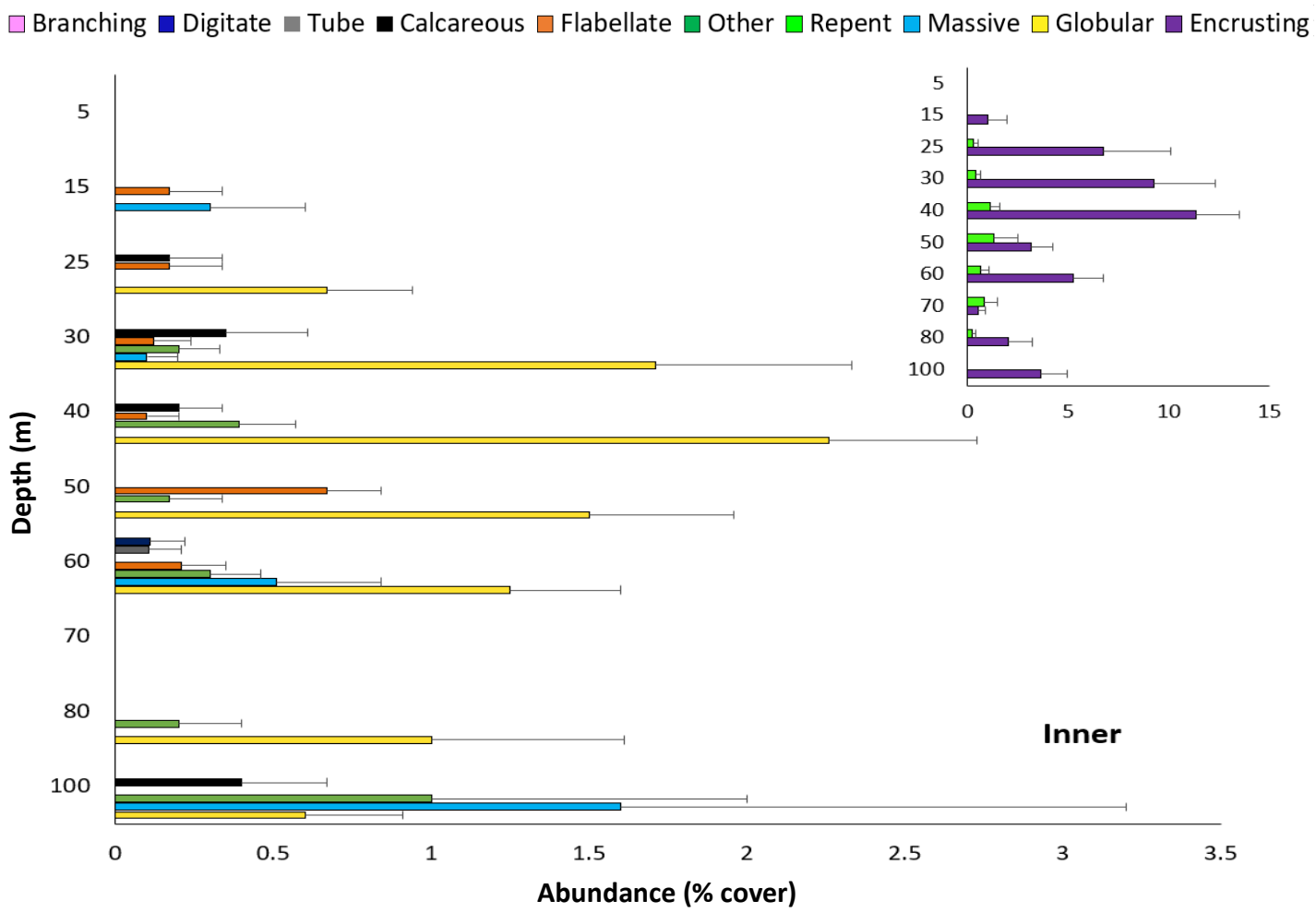


Figure S2. Image to demonstrate the calculation of image cover (number of squares) /surface area (true surface area) ratios of high (A), medium (B), and low (C) complexity morphologies.

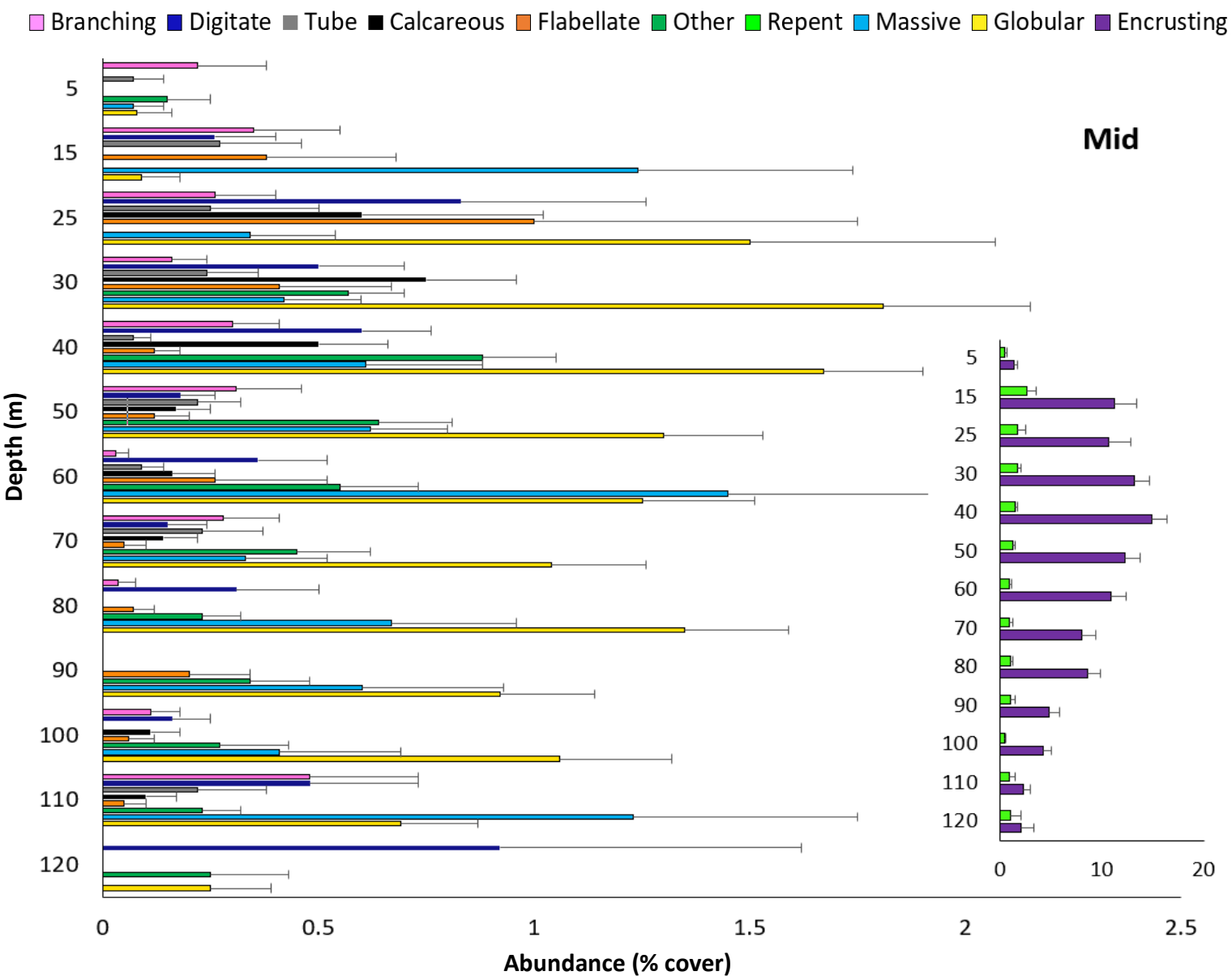
S3A


Branching
Digitate
Tube
Calcareous
Flabellate
Other
Repent
Massive
Globular
Encrusting
Poor Knights
Depth (m)
5
15
25
30
40
50
60
70
80
0
2
4
6
8
10
12
14
16
Abundance (% cover)
0
20
40
60
80

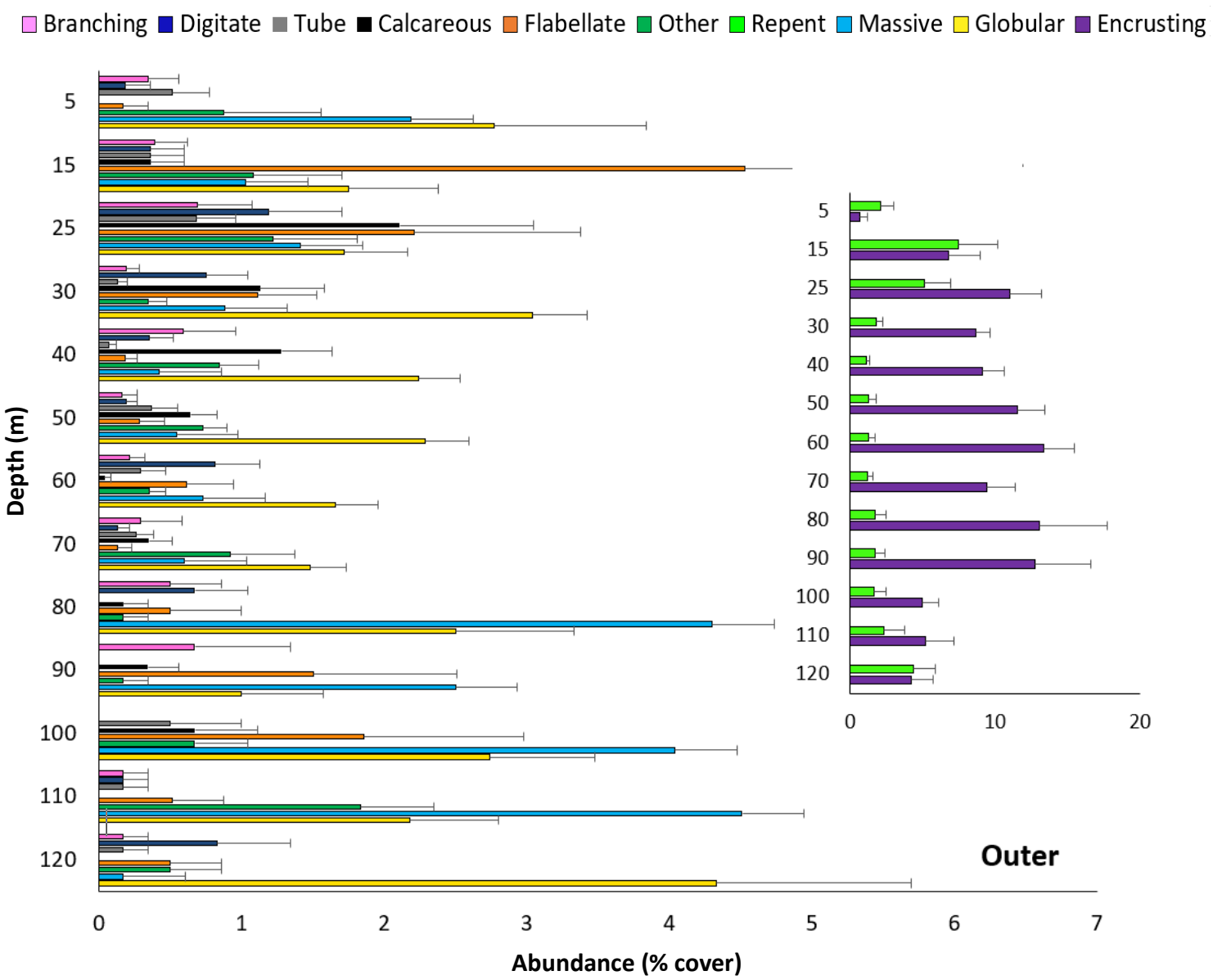
S3B


Branching
Digitate
Tube
Calcareous
Flabellate
Other
Repent
Massive
Globular
Encrusting
Depth (m)
5
15
25
30
40
50
60
70
80
100
0
0.5
1
1.5
2
2.5
3
3.5
Abundance (% cover)
Inner
0
5
10
15

S3C


Branching
Digitate
Tube
Calcareous
Flabellate
Other
Repent
Massive
Globular
Encrusting
Mid
Depth (m)
5
15
25
30
40
50
60
70
80
90
100
110
120
0
0.5
1
1.5
2
2.5
Abundance (% cover)
0
10
20

S3D


Branching
Digitate
Tube
Calcareous
Flabellate
Other
Repent
Massive
Globular
Encrusting
Depth (m)
5
15
25
30
40
50
60
70
80
90
100
110
120
0
1
2
3
4
5
6
7
Abundance (% cover)
Outer
0
10
20

S3E

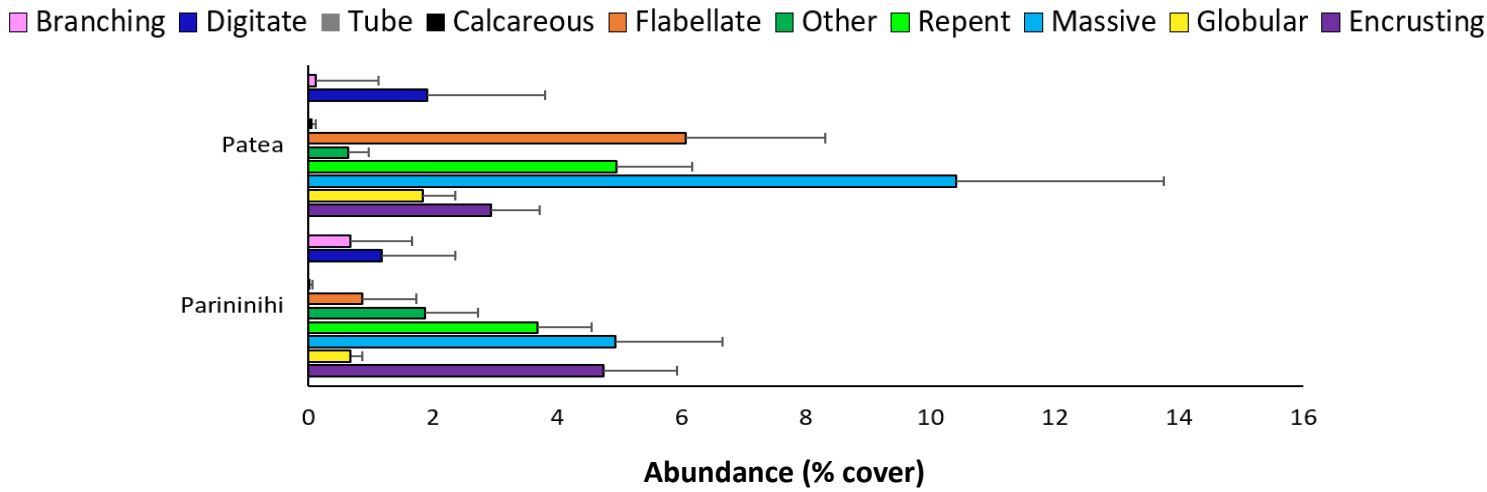

Branching
Digitate
Tube
Calcareous
Flabellate
Other
Repent
Massive
Globular
Encrusting
Patea
Parininihi
0
2
4
6
8
10
12
14
16
Abundance (% cover)

Figure S3. Abundance (% coverage) of sponge morphological types across 10 m depth increments at Poor Knights (S3A), inner (S3B), mid (S3C), and outer Fiordland (S3D), Patea, and Parininihi marine reserve (S3E). Repent and Encrusting forms have been separated to maintain easier visualization of less abundant groups.

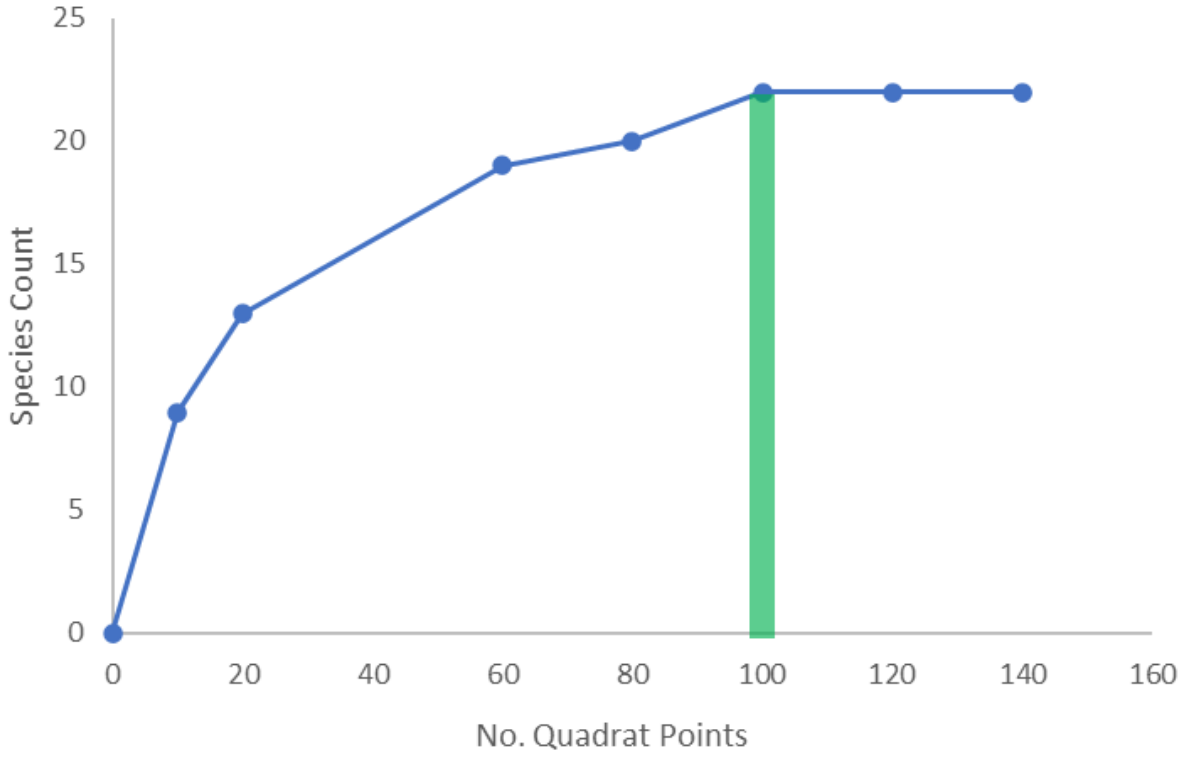


Figure S4. Species accumulation curve showing the number of points assigned to randomised frame-grabs to determine the optimal number of points to be assigned to quadrats in CPC analyses

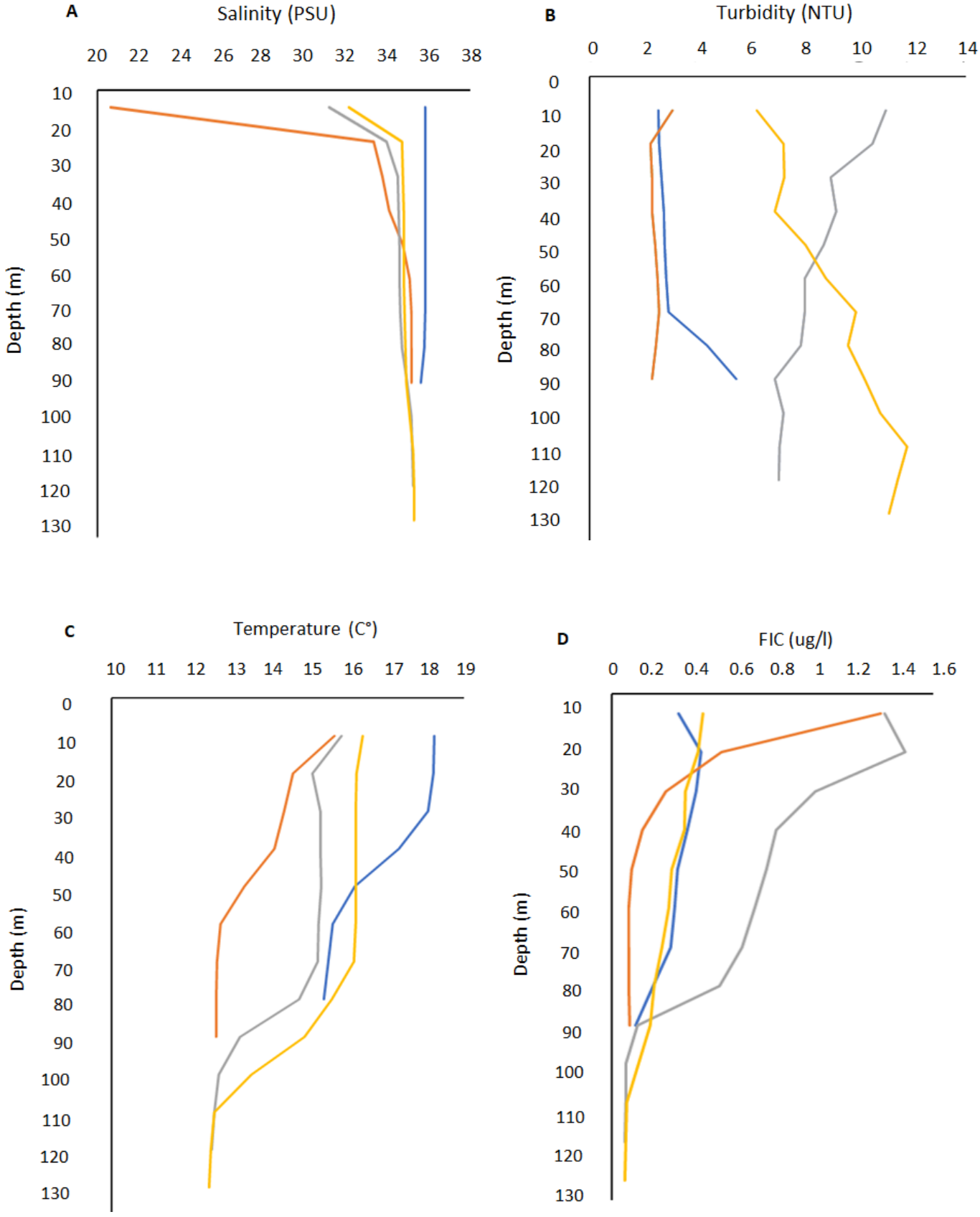


Figure S5. Depth changes in salinity (A), turbidity(B), temperature (C), FlC (fluorescence as chlorophyll *a*) (D) from CTD deployments at the Poor Knights (blue), inner Fiordland (orange), mid Fiordland (grey), outer Fiordland (yellow).

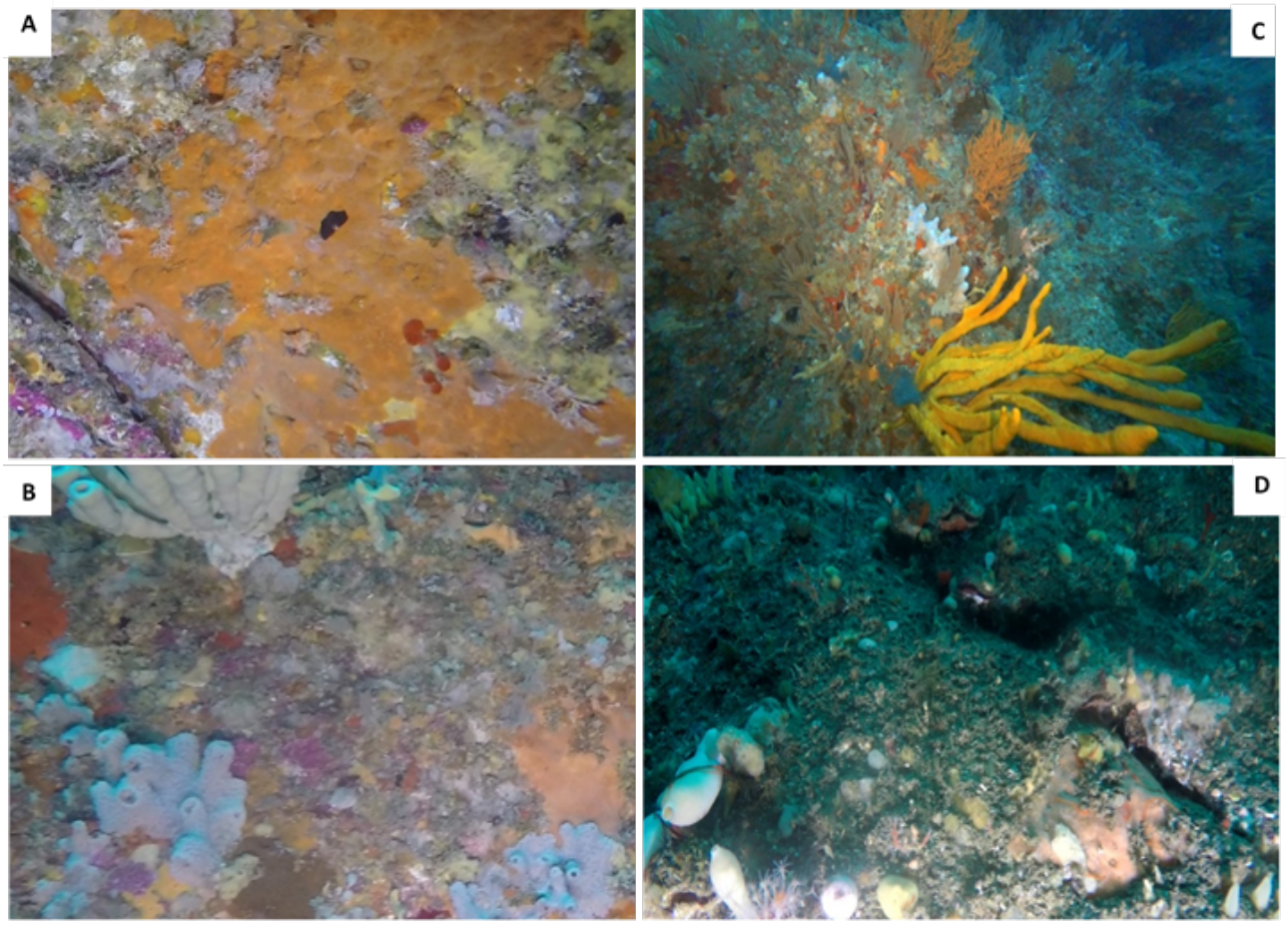


Figure S6. Quadrats with high abundance of low (A), medium and high sponge complexity (B) at Poor knights from 40 m and 60 m respectively. Images C and D show wide angle perspectives of high overall abundance of a range of low, medium and high complexity forms at 70 m at Poor knights and 40 m at outer Fiordland respectively.

Table S1. All transects undertaken using ROV and SCUBA at all locations.

YEAR	LOCATION	SOUND/SITE	SITE /DISTANCE FROM OPEN SEA (KM)	COORDINATES	TRANSECT DEPTHS (M)	ROV/ SCUBA
2018	**Fiordland**	Breaksea	Mid / 10.2	45° 33.401 S 166° 53.649 E	40 50 70 80	ROV
			Mid / 10.2	45° 31.835 S 166° 52.770 E	30 40 50 60	ROV
			Mid / 11.6	45° 31.352 S 166° 55.457 E	30 40 50 60 70 80 90 100 110	ROV
			Mid / 8.1	45° 34.134 S 166° 46.133 E	N/A	Abort
			Mid / 10.2	45° 31.320 S 166° 55.594 E	N/A	Abort
			Mid / 10.4	45° 31.726 S 166° 53.766 E	40 50 70	ROV
			Outer / 2.1	45° 36.146 S 166° 42.577 E	40 50	ROV
			Outer / 3.6	45° 37.573 S 166° 43.017 E	30	ROV
			Outer / 3.7	45° 37.575 S 166° 43.017 E	40	ROV
			Outer / 4	45° 38.120 S 166° 52.183 E	N/A	Abort
			Outer /1.9	45° 35.985 S 166° 42.809 E	80	ROV
			Outer / 2	45° 34.926 S 166° 42.824 E	30 40 50 60 70	ROV
			Inner / >20	45° 33.503 S 166° 57.472 E	N/A	Abort
		Dusky	Inner / 16.9	45° 44.861 S 166° 50.981 E	30	ROV
			Inner / 18	45° 43.439 S 166° 51.822 E	40 60 80 100	ROV
			Inner / 17.8	45° 43.439 S 166° 51.820 E	N/A	Abort
			Mid / 10	45° 44.928 S 166° 40.936 E	30 40	ROV
			Mid / 10.2	45° 44.930 S 166° 40.935 E	50 60	ROV
			Outer / 5.1	45° 47.366 S 166° 34.360 E	30 40 50	ROV
			Outer/ 6.8	45° 45.418 S 166° 36.417 E	40 50 60 70	ROV
			Mid / 12.5	45° 42.899 S 166° 43.207 E	40 50 60 70 80	ROV
		Doubtfull	Outer / 5.8	45° 19.291 S 166° 57.610 E	60 70	ROV
			Outer / 6.8	45° 14.910 S 166° 58.770 E	60	ROV
			Outer / 3.3	45° 11.363 S 166° 58.185 E	60	ROV
			Mid / 8.1	45° 17.752 S 167° 01.757 E	60	ROV
			Mid / 8.6	45° 17.093 S 167° 02.058 E	30 40 50 60 70	ROV
			Mid / 8.5	45° 17.093 S 167° 02.056 E	80 90 100 110	ROV
			Mid / 7.8	45° 17.750 S 167° 02.055 E	N/A	Abort
	Poor Knights	Northern Arch	N/A 0.1	35°26'53.9"S 174°43'52.3"E	5 15 25	SCUBA
					30 40 50 60 70 80	ROV
	Poor Knights	Motu Kapiti	N/A 0.1	35°28'10.6"S 174°43'55.2"E	30 40 50 60 70 80	ROV
	Parininihi		N/A 0.1	38°52'10.2"S 174°30'59.4"E	25	Both
			N/A 0.1	38°53'07.1"S 174°30'44.6"E	25	Both
			N/A 0.1	38°51'34.9"S 174°29'48.8"E	25	Both
			N/A 0.1	38°53'04.6"S 174°30'40.0"E	25	Both
	Patea		N/A 0.1	39°49'37.9"S 174°23'53.2"E	25	ROV
			N/A 0.1	39°49'50.5"S 174°24'54.4"E	25	ROV
			N/A 0.1	39°50'06.0"S 174°23'48.8"E	25	ROV
2019	**Fiordland**	Hall Arm	Inner / 20.2	45°29'03.6"S 167°04'33.0"E	5 15 25	SCUBA
					30 40 50 60 70	ROV
		Crooked Arm	Mid / 9.9	45°21'19.9"S 167°01'26.0"E	5 15 25	SCUBA
					30 40 50 60 70 80 90 100 110 120	ROV
		Bradshaw	Mid / 9.2	45°17'04.1"S 167°02'10.2"E	5 15 25	SCUBA
					30 40 50 60 70 80 90 100 110 120	ROV
		Thompson	Outer / 0.8	45°09'20.9"S 166°58'07.0"E	5 15 25	SCUBA
					30 40 50 60 70 80 90 100 110 120	ROV
	Poor Knights	Northern Arch	N/A 0.1	35°26'53.9"S 174°43'52.3"E	5 15 25	SCUBA
					30 40 50 60 70 80	ROV
	Poor Knights	Motu Kapiti	N/A 0.1	35°28'10.6"S 174°43'55.2"E	30 40 50 60 70 80	ROV
	Parininihi		N/A 0.1		25	Both

Table S2. Comparison of sponge morphologies based

MORPHOLOGY	COMPLEXITY RANK	COMPLEXITY SCORE
ENCRUSTING	Low	1
GLOBULAR	Low	2
REPENT	Low	2
MASSIVE	Medium	3
FLABELLATE	Medium	3
OTHER	Medium	3
CALCAREOUS	Medium	3
TUBE	High	4
DIGITATE	High	4
BRANCHING	High	5

Table S3. *Post-hoc* pairwise t-tests comparing differences in benthic community composition at 10 m intervals from 5 to 80 m at the Poor Knights.

Groups	t	P(perm)	perms
5m, 15m	1.3896	0.126	999
5m, 25m	2.3445	0.001	999
5m, 30m	2.6718	0.001	999
5m, 40m	3.6309	0.001	997
5m, 50m	2.939	0.001	998
5m, 60m	3.0494	0.001	998
5m, 70m	2.9478	0.001	999
5m, 80m	2.7835	0.001	999
15m, 25m	1.7338	0.031	999
15m, 30m	2.486	0.001	998
15m, 40m	3.4678	0.001	999
15m, 50m	2.5302	0.001	999
15m, 60m	2.4508	0.002	996
15m, 70m	2.5681	0.001	998
15m, 80m	2.549	0.001	957
25m, 30m	1.9821	0.011	998
25m, 40m	2.7086	0.001	999
25m, 50m	2.4887	0.001	998
25m, 60m	2.0049	0.003	999
25m, 70m	2.7474	0.001	999
25m, 80m	2.4892	0.002	997
30m, 40m	3.8472	0.001	998
30m, 50m	3.7815	0.001	998
30m, 60m	3.0548	0.001	999
30m, 70m	3.7979	0.001	999
30m, 80m	3.49	0.001	999
40m, 50m	2.3416	0.001	998
40m, 60m	2.127	0.002	998
40m, 70m	3.2773	0.001	999
40m, 80m	3.0569	0.001	998
50m, 60m	1.0767	0.368	999
50m, 70m	1.3474	0.13	999
50m, 80m	1.7764	0.02	997
60m, 70m	1.6404	0.03	999
60m, 80m	1.6889	0.022	999
70m, 80m	2.3384	0.001	975

Table S4. SIMPER results to compare differences in benthic community composition across 10 m intervals from 5-80 m at the Poor Knights.

Group 5m
Average similarity: 66.46

Species	Av.Abund	Av.Sim	Sim/SD	Contrib%	Cum.%
PORIFERA	6.99	28.54	2.24	42.93	42.93
BRYOZOAN	2.50	9.07	2.66	13.65	56.59
CND	3.25	8.86	1.19	13.33	69.92
MACROALGAE	3.02	8.81	1.56	13.26	83.18
CCA	1.72	5.00	1.04	7.53	90.71

Group 15m
Average similarity: 68.24

Species	Av.Abund	Av.Sim	Sim/SD	Contrib%	Cum.%
PORIFERA	7.57	34.73	3.17	50.88	50.88
CCA	2.99	11.26	2.74	16.50	67.38
BRYOZOAN	2.81	10.56	1.89	15.48	82.86
CND	1.93	5.40	1.06	7.91	90.77

Group 25m
Average similarity: 65.49

Species	Av.Abund	Av.Sim	Sim/SD	Contrib%	Cum.%
PORIFERA	6.67	29.70	3.89	45.35	45.35
BRYOZOAN	4.76	17.30	1.44	26.42	71.77
CCA	2.19	4.96	0.91	7.57	79.34
MACROALGAE	2.16	4.65	0.83	7.10	86.44
ASCIDIAN	1.57	3.63	0.81	5.54	91.98

Group 30m
Average similarity: 67.92

Species	Av.Abund	Av.Sim	Sim/SD	Contrib%	Cum.%
PORIFERA	5.80	21.19	2.86	31.19	31.19
MACROALGAE	3.26	10.42	2.37	15.34	46.53
BRYOZOAN	3.29	10.30	1.66	15.17	61.70
CCA	3.07	9.26	1.80	13.64	75.33
ASCIDIAN	2.19	7.11	2.17	10.48	85.81
OTHER	1.68	5.20	1.47	7.65	93.46

Group 40m
Average similarity: 76.61

Species	Av.Abund	Av.Sim	Sim/SD	Contrib%	Cum.%
PORIFERA	6.37	27.14	6.19	35.42	35.42
BRYOZOAN	4.64	17.40	2.21	22.71	58.13
CND	4.14	15.88	2.72	20.73	78.86
ASCIDIAN	2.68	8.84	1.88	11.54	90.40

Group 50m
Average similarity: 70.98

Species	Av.Abund	Av.Sim	Sim/SD	Contrib%	Cum.%
PORIFERA	7.76	37.83	4.63	53.29	53.29
BRYOZOAN	3.49	12.24	1.67	17.24	70.53
CND	2.94	9.50	1.14	13.38	83.91
ASCIDIAN	1.75	5.85	1.24	8.25	92.16

Group 60m
Average similarity: 69.42

Species	Av.Abund	Av.Sim	Sim/SD	Contrib%	Cum.%
PORIFERA	7.15	33.52	4.56	48.28	48.28
BRYOZOAN	3.67	14.14	2.46	20.37	68.65
CND	2.36	7.41	1.09	10.68	79.33
OTHER	1.63	5.36	1.18	7.72	87.04
ASCIDIAN	1.84	5.22	0.99	7.52	94.56

Group 70m
Average similarity: 78.18

Species	Av.Abund	Av.Sim	Sim/SD	Contrib%	Cum.%
PORIFERA	8.45	43.76	5.74	55.97	55.97
CND	2.73	11.08	3.03	14.18	70.15
BRYOZOAN	2.84	9.89	1.76	12.65	82.80
CCA	1.00	5.53	10.56	7.07	89.87
OTHER	1.07	3.80	1.24	4.86	94.73

Group 80m
Average similarity: 70.61

Species	Av.Abund	Av.Sim	Sim/SD	Contrib%	Cum.%
PORIFERA	6.74	41.24	3.74	58.41	58.41
BRYOZOAN	3.20	14.93	2.90	21.15	79.56
CND	3.13	7.46	0.76	10.56	90.12

Table S5. *Post-hoc* pairwise t-tests comparing differences in benthic community composition at 10 m intervals from 5 to 100 m at inner Fiordland.

Groups	t	P(perm)	perms
30m, 100m	3.4772	0.001	999
30m, 40m	1.4542	0.103	999
30m, 60m	2.7797	0.001	998
30m, 80m	4.0027	0.001	998
30m, 5m	4.6724	0.001	999
30m, 15m	3.2289	0.001	998
30m, 25m	1.6819	0.061	998
30m, 50m	3.5159	0.001	999
30m, 70m	3.7836	0.001	999
100m, 40m	2.7804	0.002	999
100m, 60m	1.8452	0.016	998
100m, 80m	1.1256	0.296	988
100m, 5m	3.2731	0.001	993
100m, 15m	6.1302	0.001	995
100m, 25m	4.4936	0.001	989
100m, 50m	0.97782	0.484	986
100m, 70m	1.3016	0.163	990
40m, 60m	1.9358	0.018	999
40m, 80m	3.5178	0.001	999
40m, 5m	4.9185	0.001	996
40m, 15m	4.429	0.001	999
40m, 25m	2.8742	0.001	999
40m, 50m	2.6675	0.001	998
40m, 70m	3.5648	0.001	997
60m, 80m	2.5246	0.003	999
60m, 5m	4.618	0.001	998
60m, 15m	5.7346	0.001	999
60m, 25m	4.1716	0.001	998
60m, 50m	1.4802	0.082	999
60m, 70m	2.6926	0.001	999
80m, 5m	3.531	0.001	990
80m, 15m	6.7789	0.001	993
80m, 25m	5.0714	0.001	988
80m, 50m	1.6364	0.054	993
80m, 70m	1.1921	0.235	990
5m, 15m	5.7954	0.001	991
5m, 25m	4.7275	0.001	995
5m, 50m	3.8785	0.001	994
5m, 70m	2.8249	0.001	995
15m, 25m	2.5082	0.001	994
15m, 50m	7.2695	0.001	991
15m, 70m	5.6102	0.001	991
25m, 50m	5.0146	0.001	994
25m, 70m	4.4902	0.001	992
50m, 70m	1.853	0.013	994

Table S6. SIMPER results to compare differences in benthic community composition across 10 m intervals from 5-100 m at inner Fiordland. Dummy variable added in Av.Abundance.

Group 30m
Average similarity: 58.45

Species	Av.Abund	Av.Sim	Sim/SD	Contrib%	Cum.%
CCA	5.07	26.47	1.52	45.29	45.29
PORIFERA	3.14	15.42	2.05	26.39	71.68
BRYOZOAN	1.64	9.46	2.71	16.19	87.87
POLYCHAETE	1.38	4.79	0.79	8.20	96.07

Group 100m
Average similarity: 56.51

Species	Av.Abund	Av.Sim	Sim/SD	Contrib%	Cum.%
PORIFERA	2.46	25.61	2.06	45.32	45.32
BRYOZOAN	2.04	23.38	3.25	41.37	86.70
POLYCHAETE	1.07	6.68	0.69	11.83	98.53

Group 40m
Average similarity: 59.16

Species	Av.Abund	Av.Sim	Sim/SD	Contrib%	Cum.%
PORIFERA	3.86	22.97	2.54	38.84	38.84
CCA	4.19	12.56	0.85	21.23	60.07
BRYOZOAN	2.02	11.73	3.17	19.83	79.90
POLYCHAETE	1.46	7.94	0.95	13.42	93.31

Group 60m
Average similarity: 58.86

Species	Av.Abund	Av.Sim	Sim/SD	Contrib%	Cum.%
PORIFERA	2.78	19.43	2.85	33.01	33.01
BRYOZOAN	2.11	17.53	1.93	29.79	62.80
POLYCHAETE	2.20	15.31	1.59	26.02	88.82
CCA	1.71	4.30	0.48	7.30	96.12

Group 80m
Average similarity: 60.58

Species	Av.Abund	Av.Sim	Sim/SD	Contrib%	Cum.%
BRYOZOAN	2.68	36.41	2.19	60.11	60.11
PORIFERA	1.74	18.92	2.86	31.24	91.34

Group 5m
Average similarity: 55.68

Species	Av.Abund	Av.Sim	Sim/SD	Contrib%	Cum.%
MACROALGAE	3.19	23.26	1.00	41.78	41.78
PORIFERA	1.00	13.56	5.73	24.35	66.13
BRYOZOAN	1.00	13.56	5.73	24.35	90.48

Group 15m
Average similarity: 86.29

Species	Av.Abund	Av.Sim	Sim/SD	Contrib%	Cum.%
CCA	9.44	70.31	8.74	81.48	81.48
PORIFERA	1.40	8.00	4.85	9.28	90.76

Group 25m
Average similarity: 69.38

Species	Av.Abund	Av.Sim	Sim/SD	Contrib%	Cum.%
CCA	6.80	46.52	3.13	67.05	67.05
PORIFERA	2.53	11.29	2.22	16.28	83.33
BRYOZOAN	1.24	7.97	5.97	11.49	94.81

Group 50m
Average similarity: 61.80

Species	Av.Abund	Av.Sim	Sim/SD	Contrib%	Cum.%
PORIFERA	2.46	24.04	3.28	38.90	38.90
BRYOZOAN	2.04	21.10	2.36	34.14	73.04

POLYCHAETE	1.67	12.01	1.19	19.44	92.47

Group 70m
Average similarity: 51.35

Species	Av.Abund	Av.Sim	Sim/SD	Contrib%	Cum.%
BRYOZOAN	2.49	26.00	2.32	50.63	50.63
PORIFERA	1.36	18.77	4.65	36.55	87.18
POLYCHAETE	0.72	3.31	0.38	6.45	93.64

Table S7. *Post-hoc* pairwise t-tests comparing differences in benthic community composition at 10 m intervals from 5 to 120 m at mid Fiordland.

Groups	t	P(perm)	perms
100m,110m	0.75583	0.683	998
100m,120m	1.5129	0.056	999
100m, 15m	6.5371	0.001	998
100m, 25m	5.3589	0.001	999
100m, 30m	5.7998	0.001	999
100m, 40m	5.3204	0.001	998
100m, 5m	8.3185	0.001	999
100m, 50m	3.8251	0.001	998
100m, 60m	2.6147	0.001	998
100m, 80m	1.6335	0.024	999
100m, 90m	0.91337	0.56	998
100m, 70m	1.7016	0.019	999
110m,120m	1.0404	0.378	999
110m, 15m	6.0008	0.001	999
110m, 25m	4.9249	0.001	997
110m, 30m	5.736	0.001	997
110m, 40m	5.4241	0.001	999
110m, 5m	7.6184	0.001	999
110m, 50m	3.8837	0.001	999
110m, 60m	2.6734	0.001	997
110m, 80m	1.8883	0.008	997
110m, 90m	1.2069	0.198	997
110m, 70m	2.1955	0.001	996
120m, 15m	5.9127	0.001	999
120m, 25m	4.9367	0.001	999
120m, 30m	5.0333	0.001	998
120m, 40m	4.8745	0.001	997
120m, 5m	6.5154	0.001	999
120m, 50m	3.7218	0.001	999
120m, 60m	2.728	0.001	999
120m, 80m	2.2079	0.001	999
120m, 90m	1.4228	0.09	998
120m, 70m	2.6611	0.001	999
15m, 25m	2.4453	0.001	999
15m, 30m	3.1412	0.001	998
15m, 40m	3.8506	0.001	998
15m, 5m	3.986	0.001	999
15m, 50m	3.7223	0.001	999
15m, 60m	4.6236	0.001	998
15m, 80m	5.8657	0.001	999
15m, 90m	6.3544	0.001	999
15m, 70m	6.1959	0.001	997
25m, 30m	1.849	0.009	999
25m, 40m	2.1014	0.002	997
25m, 5m	5.1113	0.001	999
25m, 50m	2.3577	0.001	999
25m, 60m	3.3275	0.001	998
25m, 80m	4.8137	0.001	999
25m, 90m	5.2855	0.001	999
25m, 70m	4.9236	0.001	999
30m, 40m	1.7502	0.018	999

30m, 5m			
30m, 50m	2.5364	0.002	999
30m, 60m	3.862	0.001	999
30m, 80m	5.6648	0.001	999
30m, 90m	5.7651	0.001	999
30m, 70m	5.1729	0.001	998
40m, 5m	6.4513	0.001	999
40m, 50m	1.8703	0.007	999
40m, 60m	3.0236	0.001	998
40m, 80m	4.9617	0.001	998
40m, 90m	5.2146	0.001	999
40m, 70m	4.4775	0.001	998
5m, 50m	6.3874	0.001	998
5m, 60m	7.1402	0.001	999
5m, 80m	7.9405	0.001	999
5m, 90m	7.8056	0.001	998
5m, 70m	8.2951	0.001	998
50m, 60m	1.8598	0.005	998
50m, 80m	3.6034	0.001	999
50m, 90m	3.8791	0.001	999
50m, 70m	3.1631	0.001	999
60m, 80m	2.2486	0.002	999
60m, 90m	2.7126	0.001	999
60m, 70m	2.3708	0.001	997
80m, 90m	1.401	0.091	999
80m, 70m	1.3792	0.103	998
90m, 70m	1.814	0.003	998

Table S8. SIMPER results to compare differences in benthic community composition across 10 m intervals from 5-120 m at mid Fiordland.

Group 100m
Average similarity: 61.19

Species	Av.Abund	Av.Sim	Sim/SD	Contrib%	Cum.%
POR	2.60	22.18	2.52	36.25	36.25
POLY	2.68	18.69	1.63	30.54	66.79
BRYO	2.04	16.34	2.22	26.70	93.49

Group 110m
Average similarity: 56.06

Species	Av.Abund	Av.Sim	Sim/SD	Contrib%	Cum.%
POR	2.46	20.41	2.57	36.40	36.40
BRYO	1.77	16.52	2.12	29.47	65.87
POLY	2.44	14.91	1.17	26.60	92.47

Group 120m
Average similarity: 53.72

Species	Av.Abund	Av.Sim	Sim/SD	Contrib%	Cum.%
POR	1.99	20.38	1.84	37.94	37.94
BRYO	1.87	19.32	2.51	35.96	73.90
POLY	2.16	13.45	0.99	25.04	98.94

Group 15m
Average similarity: 66.96

Species	Av.Abund	Av.Sim	Sim/SD	Contrib%	Cum.%
CCA0	4.33	15.48	2.83	23.12	23.12
POR	3.92	14.45	3.38	21.59	44.70
ASC	3.30	11.75	2.12	17.54	62.25
CND	2.10	7.77	3.65	11.61	73.85
BRYO	2.20	7.41	2.51	11.06	84.92
ALG	1.47	4.56	1.15	6.81	91.73

Group 25m
Average similarity: 68.37

Species	Av.Abund	Av.Sim	Sim/SD	Contrib%	Cum.%
CCA0	4.52	20.39	2.42	29.82	29.82
POR	3.97	17.83	2.74	26.08	55.90
BRYO	2.10	9.18	3.04	13.43	69.33
CND	1.75	7.34	1.69	10.74	80.06
ASC	1.77	6.65	1.38	9.73	89.80
POLY	1.56	5.91	1.08	8.65	98.45

Group 30m
Average similarity: 57.14

Species	Av.Abund	Av.Sim	Sim/SD	Contrib%	Cum.%
POR	4.29	20.93	2.83	36.63	36.63
CCA0	3.44	14.00	1.10	24.51	61.14
BRYO	1.87	7.82	2.60	13.69	74.83
POLY	1.91	6.12	0.93	10.72	85.55
CND	1.79	4.96	0.81	8.69	94.24

Group 40m
Average similarity: 60.55

Species	Av.Abund	Av.Sim	Sim/SD	Contrib%	Cum.%
POR	4.44	23.70	3.58	39.15	39.15
CCA0	3.09	11.26	0.94	18.60	57.75
BRYO	2.13	10.48	2.59	17.31	75.06
POLY	2.21	8.76	1.16	14.46	89.53
CND	1.31	3.85	0.73	6.36	95.88

Group 5m
Average similarity: 62.39

Species	Av.Abund	Av.Sim	Sim/SD	Contrib%	Cum.%
CCA0	5.74	24.92	3.89	39.95	39.95
COR	3.60	9.40	0.75	15.07	55.01
ALG	2.69	8.60	1.41	13.78	68.80
BRYO	2.73	8.18	1.64	13.11	81.90
POR	1.68	6.47	2.88	10.37	92.28

Group 50m
Average similarity: 54.75

Species	Av.Abund	Av.Sim	Sim/SD	Contrib%	Cum.%
POR	3.88	20.79	2.40	37.97	37.97
BRYO	2.06	10.81	2.48	19.75	57.71
POLY	1.97	8.84	1.02	16.15	73.87
CND	1.83	6.46	0.88	11.80	85.67
CCA0	1.85	5.00	0.53	9.13	94.80

Group 60m
Average similarity: 55.60

Species	Av.Abund	Av.Sim	Sim/SD	Contrib%	Cum.%
POR	3.81	26.31	2.22	47.32	47.32
BRYO	1.87	12.62	2.73	22.70	70.02
POLY	2.10	9.94	1.04	17.88	87.90
CND	1.04	2.73	0.43	4.91	92.81

Group 80m
Average similarity: 58.02

Species	Av.Abund	Av.Sim	Sim/SD	Contrib%	Cum.%
POR	3.30	22.93	2.42	39.53	39.53
BRYO	2.54	18.21	2.38	31.39	70.91
POLY	2.63	12.85	0.92	22.15	93.07

Group 90m
Average similarity: 60.36

Species	Av.Abund	Av.Sim	Sim/SD	Contrib%	Cum.%
POR	2.68	21.01	2.87	34.80	34.80
BRYO	2.30	20.38	2.74	33.76	68.56
POLY	2.46	15.96	1.30	26.44	95.00

Group 70m
Average similarity: 62.29

Species	Av.Abund	Av.Sim	Sim/SD	Contrib%	Cum.%

POR	3.30	20.88	2.83	33.52	33.52
POLY	3.11	19.66	2.61	31.57	65.09
BRYO	2.59	16.47	2.16	26.44	91.52

Table S9. *Post-hoc* pairwise t-tests comparing difference in benthic community composition at 10 m intervals from 5 to 120 m at outer Fiordland.

30m, 15m	3.817	0.001	998
30m, 25m	1.8357	0.005	999
30m, 5m	5.109	0.001	998
30m, 80m	2.1712	0.001	999
30m, 90m	2.4455	0.001	999
60m, 70m	1.3026	0.129	999
60m, 100m	0.51793	0.906	999
60m, 110m	0.91301	0.525	999
60m, 120m	1.0839	0.316	999
60m, 15m	4.2884	0.001	998
60m, 25m	2.8959	0.001	999
60m, 5m	4.878	0.001	998
60m, 80m	0.98311	0.452	998
60m, 90m	1.5279	0.055	999
70m, 100m	0.94943	0.505	998
70m, 110m	0.99925	0.449	997
70m, 120m	1.3895	0.093	999
70m, 15m	4.7067	0.001	999
70m, 25m	3.4254	0.001	998
70m, 5m	5.0585	0.001	999
70m, 80m	1.3289	0.132	998
70m, 90m	1.43	0.077	997
100m, 110m	0.73873	0.691	991
100m, 120m	0.85829	0.638	992
100m, 15m	4.3563	0.001	993
100m, 25m	2.9043	0.001	990
100m, 5m	4.9339	0.001	996
100m, 80m	0.47811	0.892	991
100m, 90m	1.0129	0.364	993
110m, 120m	0.411	0.918	990
110m, 15m	5.8927	0.001	993
110m, 25m	4.0755	0.001	993
110m, 5m	6.5322	0.001	989
110m, 80m	0.79663	0.697	991
110m, 90m	1.2459	0.195	989
120m, 15m	5.7534	0.001	992
120m, 25m	4.2702	0.001	994
120m, 5m	6.265	0.001	995
120m, 80m	1.0341	0.387	995
120m, 90m	1.3999	0.113	994
15m, 25m	2.323	0.001	990
15m, 5m	3.2768	0.001	996
15m, 80m	5.1016	0.001	987
15m, 90m	4.9989	0.001	992
25m, 5m	4.3448	0.001	990
25m, 80m	3.3869	0.001	993
25m, 90m	3.3596	0.001	997
5m, 80m	5.8209	0.002	995
5m, 90m	5.4808	0.001	991
80m, 90m	0.54028	0.894	993

Groups	t	P(perm)	perms
40m, 50m	1.3198	0.118	999
40m, 30m	2.117	0.001	999
40m, 60m	1.8322	0.008	996
40m, 70m	2.1027	0.002	999
40m, 100m	1.2059	0.192	998
40m, 110m	1.5709	0.038	999
40m, 120m	1.9704	0.004	999
40m, 15m	3.9774	0.001	999
40m, 25m	2.6145	0.001	999
40m, 5m	4.8125	0.001	999
40m, 80m	1.48	0.052	999
40m, 90m	1.6284	0.023	999
50m, 30m	1.2816	0.138	996
50m, 60m	1.9296	0.003	999
50m, 70m	2.2567	0.001	999
50m, 100m	1.3962	0.103	998
50m, 110m	1.8241	0.008	998
50m, 120m	2.1796	0.001	998
50m, 15m	3.5529	0.001	999
50m, 25m	2.0474	0.002	998
50m, 5m	4.581	0.001	998
50m, 80m	1.7403	0.009	999
50m, 90m	2.04	0.007	998
30m, 60m	2.5311	0.001	998
30m, 70m	3.316	0.001	999
30m, 100m	1.9128	0.001	999
30m, 110m	2.4698	0.001	998
30m, 120m	2.8494	0.001	999

Table S10. SIMPER results to compare differences in benthic community composition across 10 m intervals from 5-120 m at outer Fiordland

Group 40m
Average similarity: 56.08

Species	Av.Abund	Av.Sim	Sim/SD	Contrib%	Cum.%
PORIFERA	3.84	25.56	2.85	45.58	45.58
BRYOZOAN	2.06	12.84	2.19	22.90	68.47
CNIDARIA	1.92	8.36	0.91	14.91	83.39
POLYCHAETE	1.32	5.27	0.76	9.40	92.79

Group 50m
Average similarity: 55.66

Species	Av.Abund	Av.Sim	Sim/SD	Contrib%	Cum.%
PORIFERA	4.08	22.90	3.27	41.13	41.13
BRYOZOAN	2.47	13.11	2.34	23.55	64.69
POLYCHAETE	2.13	7.40	0.93	13.29	77.98
CNIDARIA	1.77	6.36	0.77	11.43	89.41
CCA	1.49	2.92	0.42	5.25	94.65

Group 30m
Average similarity: 61.55

Species	Av.Abund	Av.Sim	Sim/SD	Contrib%	Cum.%
PORIFERA	4.26	24.97	4.66	40.56	40.56
BRYOZOAN	2.00	9.40	2.62	15.27	55.83
POLYCHAETE	2.00	8.45	1.31	13.72	69.55
CNIDARIA	2.03	7.35	1.06	11.94	81.50
CCA	1.74	6.35	0.84	10.32	91.82

Group 60m
Average similarity: 56.87

Species	Av.Abund	Av.Sim	Sim/SD	Contrib%	Cum.%
PORIFERA	4.16	28.88	2.74	50.78	50.78
BRYOZOAN	1.75	12.27	2.51	21.58	72.36
POLYCHAETE	2.02	9.71	1.06	17.08	89.44
CNIDARIA	0.98	2.84	0.49	5.00	94.44

Group 70m
Average similarity: 57.19

Species	Av.Abund	Av.Sim	Sim/SD	Contrib%	Cum.%
PORIFERA	3.56	23.57	2.50	41.22	41.22
BRYOZOAN	1.98	14.47	2.25	25.31	66.53
POLYCHAETE	2.16	11.91	1.25	20.83	87.36
CNIDARIA	1.41	5.24	0.68	9.17	96.53

Group 100m
Average similarity: 61.27

Species	Av.Abund	Av.Sim	Sim/SD	Contrib%	Cum.%
PORIFERA	4.11	33.93	2.81	55.38	55.38
BRYOZOAN	1.66	12.03	2.83	19.63	75.01
POLYCHAETE	2.27	9.26	1.13	15.12	90.13

Group 110m
Average similarity: 69.70

Species	Av.Abund	Av.Sim	Sim/SD	Contrib%	Cum.%
PORIFERA	4.09	37.39	5.55	53.64	53.64
POLYCHAETE	2.04	15.11	1.74	21.67	75.31
BRYOZOAN	1.69	13.59	2.29	19.50	94.82

Group 120m
Average similarity: 66.81

Species	Av.Abund	Av.Sim	Sim/SD	Contrib%	Cum.%
PORIFERA	3.92	41.21	5.39	61.68	61.68
BRYOZOAN	1.47	14.29	3.37	21.39	83.07
POLYCHAETE	1.76	10.30	0.82	15.41	98.49

Group 15m
Average similarity: 74.48

Species	Av.Abund	Av.Sim	Sim/SD	Contrib%	Cum.%
PORIFERA	4.96	19.60	8.02	26.32	26.32
MACROALGAE	4.37	15.43	3.95	20.72	47.04
BRYOZOAN	4.16	13.90	4.10	18.67	65.71
ASCIDIAN	2.85	10.11	4.75	13.58	79.29
CCA	2.69	8.18	1.81	10.99	90.28

Group 25m
Average similarity: 70.02

Species	Av.Abund	Av.Sim	Sim/SD	Contrib%	Cum.%
PORIFERA	5.19	21.57	5.72	30.80	30.80
ASCIDIAN	2.82	10.53	5.11	15.04	45.84
CCA	2.59	9.67	2.32	13.80	59.65
BRYOZOAN	2.74	9.25	2.42	13.21	72.85
CNIDARIA	2.23	8.36	3.12	11.94	84.79
MACROALGAE	1.58	4.27	1.13	6.10	90.89

Group 5m
Average similarity: 76.78

Species	Av.Abund	Av.Sim	Sim/SD	Contrib%	Cum.%
MACROALGAE	7.64	33.53	6.85	43.67	43.67
ASCIDIAN	2.93	12.09	6.36	15.74	59.41
PORIFERA	3.08	10.94	2.84	14.25	73.66
BRYOZOAN	2.57	9.37	7.06	12.20	85.85
CORALLINE	2.00	5.96	1.72	7.76	93.62

Group 80m
Average similarity: 65.06

Species	Av.Abund	Av.Sim	Sim/SD	Contrib%	Cum.%
PORIFERA	4.78	36.40	4.19	55.95	55.95
POLYCHAETE	2.11	11.10	1.22	17.06	73.01
BRYOZOAN	1.38	9.93	4.77	15.26	88.28
CNIDARIA	1.85	6.68	0.83	10.26	98.54

Group 90m
Average similarity: 61.42

Species	Av.Abund	Av.Sim	Sim/SD	Contrib%	Cum.%
PORIFERA	4.22	27.78	2.98	45.23	45.23
CNIDARIA	2.48	12.30	1.01	20.03	65.26
POLYCHAETE	2.21	10.84	1.08	17.64	82.90
BRYOZOAN	1.06	10.28	3.34	16.73	99.63

Table S11. Single factor PERMANOVA results for change in sponge assemblage morphological composition with depth at Poor Knights

PERMANOVA table of results

Source	df	SS	MS	Pseudo-F	P(perm)	Unique perms
De	8	30697	3837.1	5.6504	0.001	9893
Res	133	90320	679.1			
Total	141		1.2102E5			

Table S12. Single factor PERMANOVA results for change in sponge assemblage morphological composition at inner Fiordland

PERMANOVA table of results

Source	df	SS	MS	Pseudo-F	P(perm)	Unique perms
De	9	40633	4514.8	4.5296	0.001	9912
Res	116	1.1562E5	996.73			
Total	125		1.5625E5			

Table S13. Single factor PERMANOVA results for change in sponge assemblage morphological composition at mid Fiordland

PERMANOVA table of results

Source	df	SS	MS	Pseudo-F	P(perm)	Unique perms
De	12	99695	8307.9	6.9921	0.001	9882
Res	577	6.8559E5	1188.2			
Total	589		7.8528E5			

Table S14. Single factor PERMANOVA results for change in sponge assemblage morphological composition at outer Fiordland

PERMANOVA table of results

Source	df	SS	MS	Pseudo-F	P(perm)	Unique perms
De	12	48806	4067.2	3.3687	0.001	9854
Res	293	3.5375E5	1207.3			
Total	305		4.0256E5			