

Table 5. SCUBA diving effort for *Acropora* corals, stony coral species richness, sea urchins, *Coralliophila* snails, and reef fishes in the Florida Keys National Marine Sanctuary during June-August 2007.

Diver	Affiliation	No. of dives	Depth range (m)	Bottom time
<i>Benthic surveys</i>				
Mark Chiappone	CMS/UNCW	235	0.5-15.9 m	141 hr 48 min
Leanne Rutten	CMS/UNCW	235	0.5-15.6 m	141 hr 48 min
Subtotal		470	0.5-15.9 m	283 hr 36 min
<i>Reef fish surveys</i>				
Doug Harper	NOAA Fisheries	14	2.1-10.5 m	3 hr 32 min
Dave McClellan	NOAA Fisheries	7	2.4-5.7 m	1 hr 47 min
Natalia Zurcher	NOAA Fisheries	7	4.5-9.0 m	1 hr 43 min
Subtotal		28	1.5-13.5 m	7 hr 02 min
Total all divers		498	0.5-15.9 m	291 hr 03 min

Table 6. Presence (P) of staghorn coral (*Acropora cervicornis*) and elkhorn coral (*A. palmata*) in the Florida Keys National Marine Sanctuary, as determined from surveys of 60 m² areas per site at 235 sites during June-August 2007. Values for regional sectors and habitat types are the percentage of sites where each species was observed. Sites are arranged by habitat from northeast to southwest. Asterisk locations (**) are Sanctuary Preservation Areas (SPA), Ecological Reserves (ER), or Research Only Areas (RO).

Site number/site location	<i>Acropora cervicornis</i>		<i>Acropora palmata</i>	
	Transects	Present at site	Transects	Present at site
<i>Mid-channel patch reefs</i>				
Biscayne National Park				
445 - Northern Legare Anchorage				
441 - Bache Shoal				
440 - South of Bache Shoal				
438 - South of Bache Shoal		P		
437 - South of Legare Anchorage				
427 - Margot Fish Shoal				
421 - Margot Fish Shoal				
419 - Inshore of Ajax Reef				
413 - Inshore of Pacific Reef				
410 - Inshore of Pacific Reef	P	P		
408 - Offshore of Broad Creek				
406 - Offshore of Broad Creek	P	P		
Biscayne National Park Total (12)	16.7%	25.0%	0%	0%
Upper Florida Keys NMS				
4 - Basin Hill Shoals	P	P		
2 - Near Cannon Patch Reef				
3 - Near Cannon Patch Reef				
1 - Inshore of Molasses Reef		P		
Upper Florida Keys Total (4)	25.0%	50.0%	0%	0%
Middle Florida Keys NMS				
69 - Tavernier Rocks				
71 - Hen and Chickens SPA**				
70 - Hen and Chickens SPA**				
68 - East of Cheeca Rocks SPA				
72 - Cheeca Rocks SPA**				
73 - Cheeca Rocks SPA**				
66 - East Turtle Shoal				
254 - East Turtle Shoal				
Middle Florida Keys Total (8)	0%	0%	0%	0%
Lower Florida Keys NMS				
122 - North of Big Pine Shoal				
121 - North of Maryland Shoal	P	P		
120 - North of Maryland Shoal	P	P		
119 - North of Pelican Shoal	P	P		
118 - East of Western Sambo ER				
126 - Western Sambo ER**				
125 - Western Sambo ER**	P	P		
124 - Western Sambo ER**	P	P		
123 - Western Sambo ER**	P	P		
117 - NW of Sand Key SPA				
116 - North of Satan Shoal	P	P		
115 - North of Satan Shoal	P	P		
Lower Florida Keys Total (12)	66.7%	75.0%	0%	0%
Mid-channel Patch Reef Total (36)	30.6%	36.1%	0%	0%
<i>Offshore patch reefs</i>				
Biscayne National Park				
471 - Northwest of Triumph Reef	P	P	P	P
461 - NW of Long Reef				

Site number/site location	<i>Acropora cervicornis</i>		<i>Acropora palmata</i>	
	Transects	Present at site	Transects	Present at site
460 - NW of Long Reef	P	P		
459 - NW of Pacific Reef				
458 - Inshore of Pacific Reef	P	P		
456 - Inshore of Pacific Reef	P	P		
454 - Northwest of Whistle Buoy	P	P		
Biscayne National Park Total (7)	71.4%	71.4%	28.6%	71.4%
Upper Florida Keys NMS				
16 - North of Carysfort Reef SPA				
15 - North of Carysfort Reef SPA			P	P
14 - North of Carysfort Reef SPA				
47 - Carysfort Reef SPA**				
345 - Carysfort Reef SPA**				
46 - Carysfort Reef SPA**				
39 - Carysfort Reef SPA**	P	P		
37 - West of Carysfort Reef SPA				
13 - Inshore of Watson's Reef				
55 - Inshore of Watson's Reef				
358 - Inshore of Watson's Reef				
54 - Inshore of Watson's Reef				
347 - Inshore of Watson's Reef		P		
12 - Inshore of Watson's Reef				
9 - White Banks	P	P		
8 - Inshore of French Reef				
7 - Inshore of Molasses Reef		P		
6 - Inshore of Molasses Reef	P	P		
5 - Inshore of Pickles Reef				
Upper Florida Keys Total (19)	15.8%	26.3%	5.3%	5.3%
Middle Florida Keys NMS				
77 - Inshore of Conch Reef SPA	P	P		
76 - Inshore of Conch Reef SPA	P	P		
75 - Inshore of Conch Reef SPA				
74 - Inshore of Conch Reef SPA	P	P		
98 - Coffins Patch SPA**				
277 - Coffins Patch SPA**	P	P		
Middle Florida Keys Total (6)	66.7%	66.7%	0%	0%
Lower Florida Keys NMS				
133 - Looe Key Research Only**		P		
132 - Looe Key Research Only**	P	P		
131 - North of Looe Key SPA**	P	P		
130 - Maryland Shoal	P	P		
129 - North of Maryland Shoal	P	P		
165 - North of Maryland Shoal	P	P		
128 - NE of Eastern Sambo RO				
135 - Western Sambo ER**		P		
168 - Western Sambo ER**				
127 - West of Sand Key SPA				
Lower Florida Keys Total (10)	50.0%	70.0%	0%	0%
Offshore Patch Reef Total (42)	40.5%	50.0%	4.8%	4.8%
<i>Hard-bottom/rubble/sand matrix</i>				
Upper Florida Keys NMS				
40 - Carysfort Reef SPA**				
38 - West of Carysfort Reef SPA				
36 - West of Carysfort Reef SPA				
11 - NW of Dry Rocks SPA				
Upper Florida Keys Total (4)	0%	0%	0%	0%
Hard-bottom Matrix Total (4)	0%	0%	0%	0%

Site number/site location	<i>Acropora cervicornis</i>		<i>Acropora palmata</i>	
	Transects	Present at site	Transects	Present at site
<i>Low-relief hard-bottom (< 6 m)</i>				
Biscayne National Park				
475 - Fowey Rocks	P	P		
469 - South of Ajax Reef				
Biscayne National Park Total (2)	50.0%	50.0%	0%	0%
Upper Florida Keys NMS				
346 - Carysfort Reef SPA**				
35 - West of Carysfort Reef SPA	P	P		
34 - West of Carysfort Reef SPA				
33 - Inshore of Watson's Reef				
17 - Little Pickles Reef				
Upper Florida Keys Total (5)	20.0%	20.0%	0%	0%
Middle Florida Keys NMS				
269 - Conch Reef SPA**				
89 - Conch Reef SPA**				
88 - Little Conch Reef				
352 - Little Conch Reef				
97 - Davis Reef SPA**				
90 - Davis Reef SPA**				
86 - South of Windley Key	P	P		
103 - NE of Alligator Light				
82 - Alligator Reef SPA**				
81 - Alligator Reef SPA**				
350 - Tennessee Light				
85 - East of Coffins Patch SPA				
92 - Coffins Patch SPA**				
91 - Coffins Patch SPA**				
Middle Florida Keys Total (14)	7.1%	7.1%	0%	0%
Lower Florida Keys NMS				
161 - West of American Shoal		P		
140 - Maryland Shoal				
159 - North of Pelican Shoal	P	P		
158 - East of No Name Reef	P	P		
Lower Florida Keys Total (4)	50.0%	75.0%		
Hard-bottom (< 6 m) Total (25)	20.0%	24.0%	0%	0%
<i>Inner line reef tract spur & groove</i>				
Upper Florida Keys NMS				
61 - Turtle Reef	P	P		
60 - Inshore of Elbow Reef SPA	P	P		
59 - Inshore of Elbow Reef SPA	P	P	P	P
58 - Horseshoe Reef	P	P	P	P
62 - Dry Rocks SPA**			P	P
63 - Dry Rocks SPA**				P
65 - Grecian Rocks SPA**				P
64 - Grecian Rocks SPA**				
Upper Florida Keys Total (8)	50.0%	50.0%	37.5%	62.5%
Inner Line Spur & Groove Total (8)	50.0%	50.0%	37.5%	62.5%
<i>High-relief spur & groove</i>				
Biscayne National Park				
474 - Brewster Reef				
472 - Star Reef				
470 - Triumph Reef				
467 - Long Reef			P	P
466 - Ajax Reef				
465 - Ajax Reef				
464 - Pacific Reef				
Biscayne National Park Total (7)	0%	0%	14.3%	14.3%

Site number/site location	<i>Acropora cervicornis</i>		<i>Acropora palmata</i>	
	Transects	Present at site	Transects	Present at site
Upper Florida Keys NMS				
26 - Carysfort Reef SPA**				
25 - Carysfort Reef SPA**				
218 - South Carysfort Reef SPA**				
217 - South Carysfort Reef SPA**			P	P
24 - Maitland Grounding Site				
28 - Elbow Reef SPA**			P	P
27 - Elbow Reef SPA**			P	P
30 - French Reef SPA**			P	P
29 - French Reef SPA**			P	P
23 - SW of French Reef SPA				
357 - Sand Island				
356 - Sand Island			P	P
32 - Molasses Reef SPA**			P	P
31 - Molasses Reef SPA**			P	P
19 - Pickles Reef				
20 - Pickles Reef				
18 - Pickles Reef				
Upper Florida Keys Total (17)	0%	0%	52.9%	52.9%
Middle Florida Keys NMS				
79 - Delta Shoal				
78 - Delta Shoal				
84 - Sombrero Key SPA**			P	P
83 - Sombrero Key SPA**				
Middle Florida Keys Total (4)	0%	0%	25.0%	25.0%
Lower Florida Keys NMS				
148 - Looe Key SPA**			P	P
147 - Looe Key SPA**		P	P	P
145 - American Shoal				
146 - American Shoal				
144 - Maryland Shoal				
141 - Maryland Shoal				
143 - Maryland Shoal	P	P		
139 - Pelican Shoal				
138 - No Name Reef				
137 - No Name Reef	P	P	P	P
150 - Eastern Sambo RO**				
149 - Eastern Sambo RO**				
348 - Middle Sambo Reef				
309 - Middle Sambo Reef	P	P		
152 - Western Sambo ER**				
151 - Western Sambo ER**				
136 - East of Eastern Dry Rocks SPA	P	P		P
154 - Eastern Dry Rocks SPA**			P	P
153 - Eastern Dry Rocks SPA**				
156 - Rock Key SPA**				
155 - Rock Key SPA**				
325 - Sand Key SPA**		P		P
157 - Sand Key SPA**				P
Lower Florida Keys Total (23)	17.4%	26.1%	17.4%	30.4%
High-relief Spur & Groove Total (51)	7.8%	11.8%	27.5%	33.3%
<i>Low-relief hard-bottom (6-15 m)</i>				
Upper Florida Keys NMS				
53 - Carysfort Reef SPA**				
240 - Carysfort Reef SPA**				
57 - Inshore of Watson's Reef				
45 - Offshore of Dry Rocks SPA				
22 - SW of French Reef SPA				

Site number/site location	<i>Acropora cervicornis</i>		<i>Acropora palmata</i>	
	Transects	Present at site	Transects	Present at site
21 - SW of French Reef SPA		P		
Upper Florida Keys Total (6)	0%	16.7%	0%	0%
Middle Florida Keys NMS				
353 - Conch Reef SPA**				
105 - Conch Reef SPA**				
104 - NE of Alligator Light				
351 - South of Indian Key				
101 - South of Lower Matecumbe				
111 - West of Sombrero Key				
Middle Florida Keys Total (6)	0%	0%	0%	0%
Lower Florida Keys NMS				
180 - South of Bahia Honda Key	P	P		
173 - Maryland Shoal				
177 - NE of Satan Shoal				
Lower Florida Keys Total (3)	33.3%	33.3%	0%	0%
Hard-bottom (6-15 m) Total (15)	6.7%	13.3%	0%	0%
<i>Patchy hard-bottom (6-15 m)</i>				
Upper Florida Keys NMS				
56 - Inshore of Watson's Reef				
44 - Dixie Shoal				
43 - Dixie Shoal				
42 - Dixie Shoal				
Upper Florida Keys Total (4)	0%	0%	0%	0%
Middle Florida Keys NMS				
96 - South of Windley Key				
114 - South of Lower Matecumbe				
94 - South of Duck Key				
93 - South of Duck Key				
Middle Florida Keys Total (4)	0%	0%	0%	0%
Lower Florida Keys NMS				
338 - South of Bahia Honda Key				
179 - West of American Shoal				
160 - North of Pelican Shoal				
164 - West of Pelican Shoal				
178 - West of Pelican Shoal				
166 - Eastern Sambo RO**	P	P		
332 - Eastern Sambo RO**				
334 - Western Sambo ER**				
167 - Western Sambo ER**	P	P		
163 - West of Western Sambo ER				
335 - Sand Key SPA**				
169 - Sand Key SPA**				
162 - West of Western Dry Rocks				
Lower Florida Keys Total (13)	15.4%	15.4%	0%	0%
Patchy Hard-bottom Total (21)	9.5%	9.5%	0%	0%
<i>Low-relief spur & groove (6-15 m)</i>				
Upper Florida Keys NMS				
52 - Carysfort Reef SPA**				
241 - Carysfort Reef SPA**				
51 - Offshore of Dry Rocks SPA				
50 - Offshore of Dry Rocks SPA				
49 - Little Pickles Reef				
48 - Little Pickles Reef				
Upper Florida Keys Total (6)	0%	0%	0%	0%
Middle Florida Keys NMS				
355 - NE of Conch Reef				

Site number/site location	<i>Acropora cervicornis</i>		<i>Acropora palmata</i>	
	Transects	Present at site	Transects	Present at site
282 - Conch Reef SPA**				
354 - Conch Reef SPA**				
107 - Conch Reef RO**				
106 - Conch Reef RO**				
276 - Davis Reef SPA**				
80 - Davis Reef SPA**				
102 - South of Lower Matecumbe				
109 - Tennessee Reef RO**				
108 - Tennessee Reef RO**				
113 - NE of Tennessee Light				
349 - South of Conch Key				
100 - South of Conch Key				
99 - East of Delta Shoal				
110 - Sombrero Key SPA**				
287 - Sombrero Key SPA**				
Middle Florida Keys Total (16)	0%	0%	0%	0%
Lower Florida Keys NMS				
337 - South of Bahia Honda Key				
174 - Looe Key SPA**				
339 - Looe Key SPA**				
142 - American Shoal				
172 - East of Eastern Sambo RO				
340 - Eastern Sambo RO**				
175 - Eastern Sambo RO**	P	P		
171 - Middle Sambo Reef	P	P		
170 - Middle Sambo Reef				
341 - Western Sambo ER**				
176 - Western Sambo ER**				
Lower Florida Keys Total (11)	18.2%	18/2%	0%	0%
Low-relief Spur & Groove Total (33)	6.1%	6.1%	0%	0%

Table 7. Mean density (no. colonies/m²), tissue surface area (cm² and % cover), and colony size of staghorn coral (*Acropora cervicornis*) in the Florida Keys National Marine Sanctuary and Biscayne National Park, as determined from four 15-m x 1-m belt transects per site at 235 sites during June-August 2007. Sites are arranged by habitat from NE to SW and asterisked locations (**) are Sanctuary Preservation Areas (SPA), Ecological Reserves (ER), or Research Only Areas (RO). SE = standard error.

Site number/site location	Colony density			Colony size		
	Colonies	No./m ²	SE	Total area (cm ²) (%)	Area (cm ²) per colony	SE
<i>Mid-channel patch reefs</i>						
Biscayne National Park						
445 - Northern Legare Anchorage	0	0	0	0	0	0
441 - Bache Shoal	0	0	0	0	0	0
440 - South of Bache Shoal	0	0	0	0	0	0
438 - South of Bache Shoal	0	0	0	0	0	0
437 - South of Legare Anchorage	0	0	0	0	0	0
427 - Margot Fish Shoal	0	0	0	0	0	0
421 - Margot Fish Shoal	0	0	0	0	0	0
419 - Inshore of Ajax Reef	0	0	0	0	0	0
413 - Inshore of Pacific Reef	0	0	0	0	0	0
410 - Inshore of Pacific Reef	4	0.067	0.133	1,734 (0.3%)	434	335
408 - Offshore of Broad Creek	0	0	0	0	0	0
406 - Offshore of Broad Creek	47	0.783	0.683	10,690 (1.8%)	228	288
Biscayne National Park Total (12)	51	0.071	0.065	12,424 (0.2%)	331	103
Upper Florida Keys NMS						
4 - Basin Hill Shoals	10	0.167	0.333	2,163 (0.4%)	216	141
2 - Near Cannon Patch Reef	0	0	0	0	0	0
3 - Near Cannon Patch Reef	0	0	0	0	0	0
1 - Inshore of Molasses Reef	0	0	0	0	0	0
Upper Florida Keys Total (4)	10	0.042	0.042	2,163 (0.1%)	216	
Middle Florida Keys NMS						
69 - Tavernier Rocks	0	0	0	0	0	0
71 - Hen and Chickens SPA**	0	0	0	0	0	0
70 - Hen and Chickens SPA**	0	0	0	0	0	0
68 - East of Cheeca Rocks SPA	0	0	0	0	0	0
72 - Cheeca Rocks SPA**	0	0	0	0	0	0
73 - Cheeca Rocks SPA**	0	0	0	0	0	0
66 - East Turtle Shoal	0	0	0	0	0	0
254 - East Turtle Shoal	0	0	0	0	0	0
Middle Florida Keys Total (8)	0	0	0	0	0	0
Lower Florida Keys NMS						
122 - North of Big Pine Shoal	0	0	0	0	0	0
121 - North of Maryland Shoal	8	0.133	0.267	1,246 (0.2%)	156	111
120 - North of Maryland Shoal	9	0.150	0.300	1,608 (0.3%)	179	163
119 - North of Pelican Shoal	1	0.017	0.033	121 (< 0.1%)	121	
118 - East of Western Sambo ER	0	0	0	0	0	0
126 - Western Sambo ER**	0	0	0	0	0	0
125 - Western Sambo ER**	2	0.033	0.066	154 (< 0.1%)	77	77
124 - Western Sambo ER**	11	0.183	0.206	1,246 (0.2%)	113	80
123 - Western Sambo ER**	17	0.283	0.337	1,058 (0.2%)	62	111
117 - NW of Sand Key SPA	0	0	0	0	0	0
116 - North of Satan Shoal	3	0.050	0.064	575 (0.1%)	192	96
115 - North of Satan Shoal	1	0.017	0.033	831 (0.1%)	831	0
Lower Florida Keys Total (12)	52	0.072	0.027	6,839 (0.1%)	216	89
Mid-channel Patch Reef Total (36)	113	0.052	0.024	21,426 (0.1%)	216	89
<i>Offshore patch reefs</i>						
Biscayne National Park						
471 - Northwest of Triumph Reef	41	0.683	0.252	4,242 (0.7%)	104	166

Site number/site location	Colony density			Colony size		
	Colonies	No./m ²	SE	Total area (cm ²) (%)	Area (cm ²) per colony	SE
461 - NW of Long Reef	0	0	0.000	0	0	0
460 - NW of Long Reef	0	0	0.000	0	0	0
459 - NW of Pacific Reef	8	0.133	0.267	3535 (0.6%)	44	40
458 - Inshore of Pacific Reef	0	0	0.000	0	0	0
456 - Inshore of Pacific Reef	4	0.067	0.133	5,248 (0.9%)	1,312	1,486
454 - Northwest of Whistle Buoy	7	0.117	0.157	797 (0.1%)	1149	107
Biscayne National Park Total (7)	62	0.148	0.097	10,640 (0.3%)	393	307
Upper Florida Keys NMS						
16 - North of Carysfort Reef SPA	0	0	0	0	0	0
15 - North of Carysfort Reef SPA	0	0	0	0	0	0
14 - North of Carysfort Reef SPA	0	0	0	0	0	0
47 - Carysfort Reef SPA**	0	0	0	0	0	0
345 - Carysfort Reef SPA**	0	0	0	0	0	0
46 - Carysfort Reef SPA**	0	0	0	0	0	0
39 - Carysfort Reef SPA**	3	0.050	0.100	186 (< 0.1%)	62	59
37 - West of Carysfort Reef SPA	0	0	0	0	0	0
13 - Inshore of Watson's Reef	0	0	0	0	0	0
55 - Inshore of Watson's Reef	0	0	0	0	0	0
358 - Inshore of Watson's Reef	0	0	0	0	0	0
54 - Inshore of Watson's Reef	0	0	0	0	0	0
347 - Inshore of Watson's Reef	0	0	0	0	0	0
12 - Inshore of Watson's Reef	0	0	0	0	0	0
9 - White Banks	19	0.317	0.440	1,626 (0.3%)	86	106
8 - Inshore of French Reef	0	0	0	0	0	0
7 - Inshore of Molasses Reef	0	0	0	0	0	0
6 - Inshore of Molasses Reef	13	0.217	0.220	4,684 (0.8%)	360	547
5 - Inshore of Pickles Reef	0	0	0	0	0	0
Upper Florida Keys Total (19)	35	0.031	0.020	6,496 (0.1%)	169	96
Middle Florida Keys NMS						
77 - Inshore of Conch Reef SPA	11	0.183	0.252	443 (0.1%)	44	40
76 - Inshore of Conch Reef SPA	16	0.267	0.349	2,149 (0.4%)	134	227
75 - Inshore of Conch Reef SPA	0	0	0	0	0	0
74 - Inshore of Conch Reef SPA	12	0.200	0.196	1,989 (0.3%)	166	122
98 - Coffins Patch SPA**	0	0	0	0	0	0
277 - Coffins Patch SPA**	4	0.067	0.094	1,713 (0.3%)	428	328
Middle Florida Keys Total (6)	43	0.119	0.046	6,294 (0.2%)	193	83
Lower Florida Keys NMS						
133 - Looe Key Research Only**	0	0	0	0	0	0
132 - Looe Key Research Only**	10	0.167	0.333	1,101 (0.2%)	110	175
131 - North of Looe Key SPA**	73	1.217	1.780	12,247 (2.0%)	168	228
130 - Maryland Shoal	15	0.250	0.319	2,988 (0.5%)	199	254
129 - North of Maryland Shoal	5	0.083	0.167	209 (< 0.1%)	42	26
165 - North of Maryland Shoal	5	0.083	0.167	411 (0.1%)	82	52
128 - NE of Eastern Sambo RO	0	0	0	0	0	0
135 - Western Sambo ER**	0	0	0	0	0	0
168 - Western Sambo ER**	0	0	0	0	0	0
127 - West of Sand Key SPA	0	0	0	0	0	0
Lower Florida Keys Total (10)	108	0.180	0.118	16,956 (0.3%)	120	28
Offshore Patch Reef Total (42)	246	0.098	0.034	40,386 (0.2%)	216	78
<i>Hard-bottom/rubble/sand matrix</i>						
Upper Florida Keys NMS						
40 - Carysfort Reef SPA**	0	0	0	0	0	0
38 - West of Carysfort Reef SPA	0	0	0	0	0	0
36 - West of Carysfort Reef SPA	0	0	0	0	0	0
11 - NW of Dry Rocks SPA	0	0	0	0	0	0
Upper Florida Keys Total (4)	0	0	0	0	0	0
Hard-bottom Matrix Total (4)	0	0	0	0	0	0

Site number/site location	Colony density			Colony size		
	Colonies	No./m ²	SE	Total area (cm ²) (%)	Area (cm ²) per colony	SE
<i>Low-relief hard-bottom (< 6 m)</i>						
Biscayne National Park						
475 - Fowey Rocks	7	0.117	0.233	399 (0.1%)	57	36
469 - South of Ajax Reef	0	0	0	0	0	0.0
Biscayne National Park Total (2)	7	0.058	0.058	399 (< 0.1%)	57	
Upper Florida Keys NMS						
346 - Carysfort Reef SPA**	0	0	0	0	0	0
35 - West of Carysfort Reef SPA	1	0.017	0.033	108 (< 0.1%)	108	
34 - West of Carysfort Reef SPA	0	0	0	0	0	0
33 - Inshore of Watson's Reef	0	0	0	0	0	0
17 - Little Pickles Reef	0	0	0	0	0	0
Upper Florida Keys Total (5)	1	0.003	0.003	108 (< 0.1%)	108	
Middle Florida Keys NMS						
269 - Conch Reef SPA**	0	0	0	0	0	0
89 - Conch Reef SPA**	0	0	0	0	0	0
88 - Little Conch Reef	0	0	0	0	0	0
352 - Little Conch Reef	0	0	0	0	0	0
97 - Davis Reef SPA**	0	0	0	0	0	0
90 - Davis Reef SPA**	0	0	0	0	0	0
86 - South of Windley Key	3	0.050	0.100	163 (< 0.1%)	54	37
103 - NE of Alligator Light	0	0	0	0	0	0
82 - Alligator Reef SPA**	0	0	0	0	0	0
81 - Alligator Reef SPA**	0	0	0	0	0	0
350 - Tennessee Light	0	0	0	0	0	0
85 - East of Coffins Patch SPA	0	0	0	0	0	0
92 - Coffins Patch SPA**	0	0	0	0	0	0
91 - Coffins Patch SPA**	0	0	0	0	0	0
Middle Florida Keys Total (14)	3	0.004	0.004	163 (< 0.1%)	54	
Lower Florida Keys NMS						
161 - West of American Shoal	0	0	0	0	0	0
140 - Maryland Shoal	0	0	0	0	0	0
159 - North of Pelican Shoal	1	0.017	0.033	378 (0.1%)	378	
158 - East of No Name Reef	3	0.050	0.064	677 (0.1%)	226	109
Lower Florida Keys Total (4)	4	0.017	0.012	1055 (< 0.1%)	302	76
Hard-bottom (< 6 m) Total (25)	15	0.010	0.005	1726.0	164.7	61.7
<i>Inner line reef tract spur & groove</i>						
Upper Florida Keys NMS						
61 - Turtle Reef	18	0.300	0.338	2,743 (0.5%)	152	153
60 - Inshore of Elbow Reef SPA	3	0.050	0.100	159 (< 0.1%)	53	32
59 - Inshore of Elbow Reef SPA	7	0.117	0.233	312 (0.1%)	45	30
58 - Horseshoe Reef	1	0.017	0.033	1,973 (0.3%)	1,973	
62 - Dry Rocks SPA**	0	0	0	0	0	0
63 - Dry Rocks SPA**	0	0	0	0	0	0
65 - Grecian Rocks SPA**	0	0	0	0	0	0
64 - Grecian Rocks SPA**	0	0	0	0	0	0
Upper Florida Keys Total (8)	29	0.060	0.037	5,187 (0.1%)	556	473
Inner Line Spur & Groove Total (8)	29	0.060	0.037	5,187 (0.1%)	556	473
<i>High-relief spur & groove</i>						
Biscayne National Park						
474 - Brewster Reef	0	0	0	0	0	0
472 - Star Reef	0	0	0	0	0	0
470 - Triumph Reef	0	0	0	0	0	0
467 - Long Reef	0	0	0	0	0	0
466 - Ajax Reef	0	0	0	0	0	0
465 - Ajax Reef	0	0	0	0	0	0
464 - Pacific Reef	0	0	0	0	0	0

Site number/site location	Colony density			Colony size		
	Colonies	No./m ²	SE	Total area (cm ²) (%)	Area (cm ²) per colony	SE
Biscayne National Park Total (7)	0	0	0	0	0	0
Upper Florida Keys NMS						
26 - Carysfort Reef SPA**	0	0	0	0	0	0
25 - Carysfort Reef SPA**	0	0	0	0	0	0
218 - South Carysfort Reef SPA**	0	0	0	0	0	0
217 - South Carysfort Reef SPA**	0	0	0	0	0	0
24 - Maitland Grounding Site	0	0	0	0	0	0
28 - Elbow Reef SPA**	0	0	0	0	0	0
27 - Elbow Reef SPA**	0	0	0	0	0	0
30 - French Reef SPA**	0	0	0	0	0	0
29 - French Reef SPA**	0	0	0	0	0	0
23 - SW of French Reef SPA	0	0	0	0	0	0
357 - Sand Island	0	0	0	0	0	0
356 - Sand Island	0	0	0	0	0	0
32 - Molasses Reef SPA**	0	0	0	0	0	0
31 - Molasses Reef SPA**	0	0	0	0	0	0
19 - Pickles Reef	0	0	0	0	0	0
20 - Pickles Reef	0	0	0	0	0	0
18 - Pickles Reef	0	0	0	0	0	0
Upper Florida Keys Total (17)	0	0	0	0	0	0
Middle Florida Keys NMS						
79 - Delta Shoal	0	0	0	0	0	0
78 - Delta Shoal	0	0	0	0	0	0
84 - Sombrero Key SPA**	0	0	0	0	0	0
83 - Sombrero Key SPA**	0	0	0	0	0	0
Middle Florida Keys Total (4)	0	0	0	0	0	0
Lower Florida Keys NMS						
148 - Looe Key SPA**	0	0	0	0	0	0
147 - Looe Key SPA**	0	0	0	0	0	0
145 - American Shoal	0	0	0	0	0	0
146 - American Shoal	0	0	0	0	0	0
144 - Maryland Shoal	0	0	0	0	0	0
141 - Maryland Shoal	0	0	0	0	0	0
143 - Maryland Shoal	21	0.350	0.305	3,588 (0.6%)	171	183
139 - Pelican Shoal	0	0	0	0	0	0
138 - No Name Reef	0	0	0	0	0	0
137 - No Name Reef	6	0.100	0.128	8,955 (1.5%)	1,492	2,808
150 - Eastern Sambo RO**	0	0	0	0	0	0
149 - Eastern Sambo RO**	0	0	0	0	0	0
348 - Middle Sambo Reef	0	0	0	0	0	0
309 - Middle Sambo Reef	1	0.017	0.033	1,027 (0.2%)	1,027	
152 - Western Sambo ER**	0	0	0	0	0	0
151 - Western Sambo ER**	0	0	0	0	0	0
136 - East of Eastern Dry Rocks SPA	62	1.033	0.725	7,469 (1.2%)	121	206
154 - Eastern Dry Rocks SPA**	0	0	0	0	0	0
153 - Eastern Dry Rocks SPA**	0	0	0	0	0	0
156 - Rock Key SPA**	0	0	0	0	0	0
155 - Rock Key SPA**	0	0	0	0	0	0
325 - Sand Key SPA**	0	0	0	0	0	0
157 - Sand Key SPA**	0	0	0	0	0	0
Lower Florida Keys Total (23)	90	0.065	0.047	21,039 (0.2%)	703	336
High-relief Spur & Groove Total (51)	90	0.029	0.021	21,039 (0.1%)	703	336
<i>Low-relief hard-bottom (6-15 m)</i>						
Upper Florida Keys NMS						
53 - Carysfort Reef SPA**	0	0	0	0	0	0
240 - Carysfort Reef SPA**	0	0	0	0	0	0
57 - Inshore of Watson's Reef	0	0	0	0	0	0

Site number/site location	Colony density			Colony size		
	Colonies	No./m ²	SE	Total area (cm ²) (%)	Area (cm ²) per colony	SE
45 - Offshore of Dry Rocks SPA	0	0	0	0	0	0
22 - SW of French Reef SPA	0	0	0	0	0	0
21 - SW of French Reef SPA	0	0	0	0	0	0
Upper Florida Keys Total (6)	0	0	0	0	0	0
Middle Florida Keys NMS						
353 - Conch Reef SPA**	0	0	0	0	0	0
105 - Conch Reef SPA**	0	0	0	0	0	0
104 - NE of Alligator Light	0	0	0	0	0	0
351 - South of Indian Key	0	0	0	0	0	0
101 - South of Lower Matecumbe	0	0	0	0	0	0
111 - West of Sombrero Key	0	0	0	0	0	0
Middle Florida Keys Total (6)	0	0	0	0	0	0
Lower Florida Keys NMS						
180 - South of Bahia Honda Key	1	0.017	0.033	53 (< 0.1%)	53	
173 - Maryland Shoal	0	0	0	0	0	0
177 - NE of Satan Shoal	0	0	0	0	0	0
Lower Florida Keys Total (3)	1	0.006	0.006	53 (< 0.1%)	53	
Hard-bottom (6-15 m) Total (15)	1	0.001	0.001	53 (< 0.1%)	53	
<i>Patchy hard-bottom (6-15 m)</i>						
Upper Florida Keys NMS						
56 - Inshore of Watson's Reef	0	0	0	0	0	0
44 - Dixie Shoal	0	0	0	0	0	0
43 - Dixie Shoal	0	0	0	0	0	0
42 - Dixie Shoal	0	0	0	0	0	0
Upper Florida Keys Total (4)	0	0	0	0	0	0
Middle Florida Keys NMS						
96 - South of Windley Key	0	0	0	0	0	0
114 - South of Lower Matecumbe	0	0	0	0	0	0
94 - South of Duck Key	0	0	0	0	0	0
93 - South of Duck Key	0	0	0	0	0	0
Middle Florida Keys Total (4)	0	0	0	0	0	0
Lower Florida Keys NMS						
338 - South of Bahia Honda Key	0	0	0	0	0	0
179 - West of American Shoal	0	0	0	0	0	0
160 - North of Pelican Shoal	0	0	0	0	0	0
164 - West of Pelican Shoal	0	0	0	0	0	0
178 - West of Pelican Shoal	0	0	0	0	0	0
166 - Eastern Sambo RO**	4	0.067	0.133	1,376 (0.2%)	344	331
332 - Eastern Sambo RO**	0	0	0	0	0	0
334 - Western Sambo ER**	0	0	0	0	0	0
167 - Western Sambo ER**	2	0.033	0.039	1,689 (0.3%)	845	637
163 - West of Western Sambo ER	0	0	0	0	0	0
335 - Sand Key SPA**	0	0	0	0	0	0
169 - Sand Key SPA**	0	0	0	0	0	0
162 - West of Western Dry Rocks	0	0	0	0	0	0
Lower Florida Keys Total (13)	6	0.008	0.006	3,065 (< 0.1%)	594	250
Patchy Hard-bottom Total (21)	6	0.005	0.003	3065 (< 0.1%)	594	250
<i>Low-relief spur & groove (6-15 m)</i>						
Upper Florida Keys NMS						
52 - Carysfort Reef SPA**	0	0	0	0	0	0
241 - Carysfort Reef SPA**	0	0	0	0	0	0
51 - Offshore of Dry Rocks SPA	0	0	0	0	0	0
50 - Offshore of Dry Rocks SPA	0	0	0	0	0	0
49 - Little Pickles Reef	0	0	0	0	0	0
48 - Little Pickles Reef	0	0	0	0	0	0

Site number/site location	Colony density			Colony size		
	Colonies	No./m ²	SE	Total area (cm ²) (%)	Area (cm ²) per colony	SE
Upper Florida Keys Total (6)	0	0	0	0	0	0
Middle Florida Keys NMS						
355 - NE of Conch Reef	0	0	0	0	0	0
282 - Conch Reef SPA**	0	0	0	0	0	0
354 - Conch Reef SPA**	0	0	0	0	0	0
107 - Conch Reef RO**	0	0	0	0	0	0
106 - Conch Reef RO**	0	0	0	0	0	0
276 - Davis Reef SPA**	0	0	0	0	0	0
80 - Davis Reef SPA**	0	0	0	0	0	0
102 - South of Lower Matecumbe	0	0	0	0	0	0
109 - Tennessee Reef RO**	0	0	0	0	0	0
108 - Tennessee Reef RO**	0	0	0	0	0	0
113 - NE of Tennessee Light	0	0	0	0	0	0
349 - South of Conch Key	0	0	0	0	0	0
100 - South of Conch Key	0	0	0	0	0	0
99 - East of Delta Shoal	0	0	0	0	0	0
110 - Sombrero Key SPA**	0	0	0	0	0	0
287 - Sombrero Key SPA**	0	0	0	0	0	0
Middle Florida Keys Total (16)	0	0	0	0	0	0
Lower Florida Keys NMS						
337 - South of Bahia Honda Key	0	0	0	0	0	0
174 - Looe Key SPA**	0	0	0	0	0	0
339 - Looe Key SPA**	0	0	0	0	0	0
142 - American Shoal	0	0	0	0	0	0
172 - East of Eastern Sambo RO	0	0	0	0	0	0
340 - Eastern Sambo RO**	0	0	0	0	0	0
175 - Eastern Sambo RO**	7	0.117	0.233	643 (0.1%)	92	93
171 - Middle Sambo Reef	1	0.017	0.033	454 (0.1%)	454	
170 - Middle Sambo Reef	0	0	0	0	0	0
341 - Western Sambo ER**	0	0	0	0	0	0
176 - Western Sambo ER**	0	0	0	0	0	0
Lower Florida Keys Total (11)	8	0.012	0.011	1,097 (< 0.1%)	273	181
Low-relief Spur & Groove Total (33)	8	0.004	0.004	1,097 (< 0.1%)	273	181

Table 8. Numbers and relative frequencies (%) of staghorn coral (*Acropora cervicornis*) colonies exhibiting disease-like conditions and predation in the Florida Keys National Marine Sanctuary and Biscayne National Park, as quantified from four 15-m x 1-m transects per site at 235 locations during June-August 2007. Sites are arranged by habitat from northeast to southwest and asterisked locations (**) are Sanctuary Preservation Areas (SPA), Ecological Reserves (ER), or Research Only Areas (RO).

Site number/site location	White band	White pox	Tissue necrosis	Snail predation	Damselfish bites	Total colonies
<i>Mid-channel patch reefs</i>						
Biscayne National Park						
445 - Northern Legare Anchorage	0	0	0	0	0	0
441 - Bache Shoal	0	0	0	0	0	0
440 - South of Bache Shoal	0	0	0	0	0	0
438 - South of Bache Shoal	0	0	0	0	0	0
437 - South of Legare Anchorage	0	0	0	0	0	0
427 - Margot Fish Shoal	0	0	0	0	0	0
421 - Margot Fish Shoal	0	0	0	0	0	0
419 - Inshore of Ajax Reef	0	0	0	0	0	0
413 - Inshore of Pacific Reef	0	0	0	0	0	0
410 - Inshore of Pacific Reef	0	0	0	0	0	4
408 - Offshore of Broad Creek	0	0	0	0	0	0
406 - Offshore of Broad Creek	0	0	0	0	6 (12.8)	47
Biscayne National Park Total (12)	0	0	0	0	6 (11.8)	51
Upper Florida Keys NMS						
4 - Basin Hill Shoals	0	0	0	0	0	10
2 - Near Cannon Patch Reef	0	0	0	0	0	0
3 - Near Cannon Patch Reef	0	0	0	0	0	0
1 - Inshore of Molasses Reef	0	0	0	0	0	0
Upper Florida Keys Total (4)	0	0	0	0	0	10
Middle Florida Keys NMS						
69 - Tavernier Rocks	0	0	0	0	0	0
71 - Hen and Chickens SPA**	0	0	0	0	0	0
70 - Hen and Chickens SPA**	0	0	0	0	0	0
68 - East of Cheeca Rocks SPA	0	0	0	0	0	0
72 - Cheeca Rocks SPA**	0	0	0	0	0	0
73 - Cheeca Rocks SPA**	0	0	0	0	0	0
66 - East Turtle Shoal	0	0	0	0	0	0
254 - East Turtle Shoal	0	0	0	0	0	0
Middle Florida Keys Total (8)	0	0	0	0	0	0
Lower Florida Keys NMS						
122 - North of Big Pine Shoal	0	0	0	0	0	0
121 - North of Maryland Shoal	0	0	0	0	0	8
120 - North of Maryland Shoal	0	0	0	0	0	9
119 - North of Pelican Shoal	0	0	0	0	0	1
118 - East of Western Sambo ER	0	0	0	0	0	0
126 - Western Sambo ER**	0	0	0	0	0	0
125 - Western Sambo ER**	0	0	0	0	0	2
124 - Western Sambo ER**	0	0	0	0	0	11
123 - Western Sambo ER**	0	0	0	0	0	17
117 - NW of Sand Key SPA	0	0	0	0	0	0
116 - North of Satan Shoal	0	0	0	0	0	3
115 - North of Satan Shoal	0	0	0	0	0	1
Lower Florida Keys Total (12)	0	0	0	0	0	52
Mid-channel Patch Reef Total (36)	0	0	0	0	6 (5.3)	113
<i>Offshore patch reefs</i>						
Biscayne National Park						
471 - Northwest of Triumph Reef	0	0	0	0	0	43
461 - NW of Long Reef	0	0	0	0	0	0

Site number/site location	White band	White pox	Tissue necrosis	Snail predation	Damselfish bites	Total colonies
460 - NW of Long Reef	0	0	0	0	0	0
459 - NW of Pacific Reef	0	0	0	0	1	8
458 - Inshore of Pacific Reef	0	0	0	0	0	0
456 - Inshore of Pacific Reef	0	0	0	0	1	4
454 - Northwest of Whistle Buoy	0	0	0	0	0	7
Biscayne National Park Total (7)	0	0	0	0	2	62
Upper Florida Keys NMS						
16 - North of Carysfort Reef SPA	0	0	0	0	0	0
15 - North of Carysfort Reef SPA	0	0	0	0	0	0
14 - North of Carysfort Reef SPA	0	0	0	0	0	0
47 - Carysfort Reef SPA**	0	0	0	0	0	0
345 - Carysfort Reef SPA**	0	0	0	0	0	0
46 - Carysfort Reef SPA**	0	0	0	0	0	0
39 - Carysfort Reef SPA**	0	0	0	0	0	3
37 - West of Carysfort Reef SPA	0	0	0	0	0	0
13 - Inshore of Watson's Reef	0	0	0	0	0	0
55 - Inshore of Watson's Reef	0	0	0	0	0	0
358 - Inshore of Watson's Reef	0	0	0	0	0	0
54 - Inshore of Watson's Reef	0	0	0	0	0	0
347 - Inshore of Watson's Reef	0	0	0	0	0	0
12 - Inshore of Watson's Reef	0	0	0	0	0	0
9 - White Banks	0	0	0	0	0	19
8 - Inshore of French Reef	0	0	0	0	0	0
7 - Inshore of Molasses Reef	0	0	0	0	0	0
6 - Inshore of Molasses Reef	0	0	0	0	0	13
5 - Inshore of Pickles Reef	0	0	0	0	0	0
Upper Florida Keys Total (19)	0	0	0	0	0	35
Middle Florida Keys NMS						
77 - Inshore of Conch Reef SPA	0	0	0	0	0	11
76 - Inshore of Conch Reef SPA	0	0	0	0	0	16
75 - Inshore of Conch Reef SPA	0	0	0	0	0	0
74 - Inshore of Conch Reef SPA	0	0	0	0	0	13
98 - Coffins Patch SPA**	0	0	0	0	0	0
277 - Coffins Patch SPA**	0	0	0	0	0	4
Middle Florida Keys Total (6)	0	0	0	0	0	44
Lower Florida Keys NMS						
133 - Looe Key Research Only**	0	0	0	0	0	0
132 - Looe Key Research Only**	0	0	0	0	0	10
131 - North of Looe Key SPA**	0	0	0	0	1 (1.7)	60
130 - Maryland Shoal	0	0	0	0	0	15
129 - North of Maryland Shoal	0	0	0	0	0	5
165 - North of Maryland Shoal	0	0	0	0	0	5
128 - NE of Eastern Sambo RO	0	0	0	0	0	0
135 - Western Sambo ER**	0	0	0	0	0	0
168 - Western Sambo ER**	0	0	0	0	0	0
127 - West of Sand Key SPA	0	0	0	0	0	0
Lower Florida Keys Total (10)	0	0	0	0	1 (1.1)	95
Offshore Patch Reef Total (42)	0	0	0	0	3 (1.3)	236
<i>Hard-bottom/rubble/sand matrix</i>						
Upper Florida Keys NMS						
40 - Carysfort Reef SPA**	0	0	0	0	0	0
38 - West of Carysfort Reef SPA	0	0	0	0	0	0
36 - West of Carysfort Reef SPA	0	0	0	0	0	0
11 - NW of Dry Rocks SPA	0	0	0	0	0	0
Upper Florida Keys Total (4)	0	0	0	0	0	0
Hard-bottom Matrix Total (4)	0	0	0	0	0	0

Site number/site location	White band	White pox	Tissue necrosis	Snail predation	Damselfish bites	Total colonies
<i>Low-relief hard-bottom (< 6 m)</i>						
Biscayne National Park						
475 - Fowey Rocks	0	0	0	0	0	7
469 - South of Ajax Reef	0	0	0	0	0	0
Biscayne National Park Total (2)	0	0	0	0	0	7
Upper Florida Keys NMS						
346 - Carysfort Reef SPA**	0	0	0	0	0	0
35 - West of Carysfort Reef SPA	0	0	0	0	0	1
34 - West of Carysfort Reef SPA	0	0	0	0	0	0
33 - Inshore of Watson's Reef	0	0	0	0	0	0
17 - Little Pickles Reef	0	0	0	0	0	0
Upper Florida Keys Total (5)	0	0	0	0	0	1
Middle Florida Keys NMS						
269 - Conch Reef SPA**	0	0	0	0	0	0
89 - Conch Reef SPA**	0	0	0	0	0	0
88 - Little Conch Reef	0	0	0	0	0	0
352 - Little Conch Reef	0	0	0	0	0	0
97 - Davis Reef SPA**	0	0	0	0	0	0
90 - Davis Reef SPA**	0	0	0	0	0	0
86 - South of Windley Key	0	0	0	0	0	3
103 - NE of Alligator Light	0	0	0	0	0	0
82 - Alligator Reef SPA**	0	0	0	0	0	0
81 - Alligator Reef SPA**	0	0	0	0	0	0
350 - Tennessee Light	0	0	0	0	0	0
85 - East of Coffins Patch SPA	0	0	0	0	0	0
92 - Coffins Patch SPA**	0	0	0	0	0	0
91 - Coffins Patch SPA**	0	0	0	0	0	0
Middle Florida Keys Total (14)	0	0	0	0	0	3
Lower Florida Keys NMS						
161 - West of American Shoal	0	0	0	0	0	0
140 - Maryland Shoal	0	0	0	0	0	0
159 - North of Pelican Shoal	0	0	0	0	0	1
158 - East of No Name Reef	0	0	0	0	0	3
Lower Florida Keys Total (4)	0	0	0	0	0	4
Hard-bottom (< 6 m) Total (25)	0	0	0	0	0	15
<i>Inner line reef tract spur & groove</i>						
Upper Florida Keys NMS						
61 - Turtle Reef	0	0	0	0	0	19
60 - Inshore of Elbow Reef SPA	0	0	0	0	0	3
59 - Inshore of Elbow Reef SPA	0	0	0	0	0	7
58 - Horseshoe Reef	0	0	0	0	0	1
62 - Dry Rocks SPA**	0	0	0	0	0	0
63 - Dry Rocks SPA**	0	0	0	0	0	0
65 - Grecian Rocks SPA**	0	0	0	0	0	0
64 - Grecian Rocks SPA**	0	0	0	0	0	0
Upper Florida Keys Total (8)	0	0	0	0	0	30
Inner Line Spur & Groove Total (8)	0	0	0	0	0	30
<i>High-relief spur & groove</i>						
Biscayne National Park						
474 - Brewster Reef	0	0	0	0	0	0
472 - Star Reef	0	0	0	0	0	0
470 - Triumph Reef	0	0	0	0	0	0
467 - Long Reef	0	0	0	0	0	0
466 - Ajax Reef	0	0	0	0	0	0
465 - Ajax Reef	0	0	0	0	0	0
464 - Pacific Reef	0	0	0	0	0	0
Biscayne National Park Total (7)	0	0	0	0	0	0

Site number/site location	White band	White pox	Tissue necrosis	Snail predation	Damselfish bites	Total colonies
Upper Florida Keys NMS						
26 - Carysfort Reef SPA**	0	0	0	0	0	0
25 - Carysfort Reef SPA**	0	0	0	0	0	0
218 - South Carysfort Reef SPA**	0	0	0	0	0	0
217 - South Carysfort Reef SPA**	0	0	0	0	0	0
24 - Maitland Grounding Site	0	0	0	0	0	0
28 - Elbow Reef SPA**	0	0	0	0	0	0
27 - Elbow Reef SPA**	0	0	0	0	0	0
30 - French Reef SPA**	0	0	0	0	0	0
29 - French Reef SPA**	0	0	0	0	0	0
23 - SW of French Reef SPA	0	0	0	0	0	0
357 - Sand Island	0	0	0	0	0	0
356 - Sand Island	0	0	0	0	0	0
32 - Molasses Reef SPA**	0	0	0	0	0	0
31 - Molasses Reef SPA**	0	0	0	0	0	0
19 - Pickles Reef	0	0	0	0	0	0
20 - Pickles Reef	0	0	0	0	0	0
18 - Pickles Reef	0	0	0	0	0	0
Upper Florida Keys Total (17)	0	0	0	0	0	0
Middle Florida Keys NMS						
79 - Delta Shoal	0	0	0	0	0	0
78 - Delta Shoal	0	0	0	0	0	0
84 - Sombrero Key SPA**	0	0	0	0	0	0
83 - Sombrero Key SPA**	0	0	0	0	0	0
Middle Florida Keys Total (4)	0	0	0	0	0	0
Lower Florida Keys NMS						
148 - Looe Key SPA**	0	0	0	0	0	0
147 - Looe Key SPA**	0	0	0	0	0	0
145 - American Shoal	0	0	0	0	0	0
146 - American Shoal	0	0	0	0	0	0
144 - Maryland Shoal	0	0	0	0	0	0
141 - Maryland Shoal	0	0	0	0	0	0
143 - Maryland Shoal	0	0	0	0	0	21
139 - Pelican Shoal	0	0	0	0	0	0
138 - No Name Reef	0	0	0	0	0	0
137 - No Name Reef	0	0	0	0	0	7
150 - Eastern Sambo RO**	0	0	0	0	0	0
149 - Eastern Sambo RO**	0	0	0	0	0	0
348 - Middle Sambo Reef	0	0	0	0	0	0
309 - Middle Sambo Reef	0	0	0	0	0	1
152 - Western Sambo ER**	0	0	0	0	0	0
151 - Western Sambo ER**	0	0	0	0	0	0
136 - East of Eastern Dry Rocks SPA	0	0	0	0	0	43
154 - Eastern Dry Rocks SPA**	0	0	0	0	0	0
153 - Eastern Dry Rocks SPA**	0	0	0	0	0	0
156 - Rock Key SPA**	0	0	0	0	0	0
155 - Rock Key SPA**	0	0	0	0	0	0
325 - Sand Key SPA**	0	0	0	0	0	0
157 - Sand Key SPA**	0	0	0	0	0	0
Lower Florida Keys Total (23)	0	0	0	0	0	72
High-relief Spur & Groove Total (51)	0	0	0	0	0	72
<i>Low-relief hard-bottom (6-15 m)</i>						
Upper Florida Keys NMS						
53 - Carysfort Reef SPA**	0	0	0	0	0	0
240 - Carysfort Reef SPA**	0	0	0	0	0	0
57 - Inshore of Watson's Reef	0	0	0	0	0	0
45 - Offshore of Dry Rocks SPA	0	0	0	0	0	0
22 - SW of French Reef SPA	0	0	0	0	0	0

Site number/site location	White band	White pox	Tissue necrosis	Snail predation	Damselfish bites	Total colonies
21 - SW of French Reef SPA	0	0	0	0	0	0
Upper Florida Keys Total (6)	0	0	0	0	0	0
Middle Florida Keys NMS						
353 - Conch Reef SPA**	0	0	0	0	0	0
105 - Conch Reef SPA**	0	0	0	0	0	0
104 - NE of Alligator Light	0	0	0	0	0	0
351 - South of Indian Key	0	0	0	0	0	0
101 - South of Lower Matecumbe	0	0	0	0	0	0
111 - West of Sombrero Key	0	0	0	0	0	0
Middle Florida Keys Total (6)	0	0	0	0	0	0
Lower Florida Keys NMS						
180 - South of Bahia Honda Key	0	0	0	0	0	1
173 - Maryland Shoal	0	0	0	0	0	0
177 - NE of Satan Shoal	0	0	0	0	0	0
Lower Florida Keys Total (3)	0	0	0	0	0	1
Hard-bottom (6-15 m) Total (15)	0	0	0	0	0	1
<i>Patchy hard-bottom (6-15 m)</i>						
Upper Florida Keys NMS						
56 - Inshore of Watson's Reef	0	0	0	0	0	0
44 - Dixie Shoal	0	0	0	0	0	0
43 - Dixie Shoal	0	0	0	0	0	0
42 - Dixie Shoal	0	0	0	0	0	0
Upper Florida Keys Total (4)	0	0	0	0	0	0
Middle Florida Keys NMS						
96 - South of Windley Key	0	0	0	0	0	0
114 - South of Lower Matecumbe	0	0	0	0	0	0
94 - South of Duck Key	0	0	0	0	0	0
93 - South of Duck Key	0	0	0	0	0	0
Middle Florida Keys Total (4)	0	0	0	0	0	0
Lower Florida Keys NMS						
338 - South of Bahia Honda Key	0	0	0	0	0	0
179 - West of American Shoal	0	0	0	0	0	0
160 - North of Pelican Shoal	0	0	0	0	0	0
164 - West of Pelican Shoal	0	0	0	0	0	0
178 - West of Pelican Shoal	0	0	0	0	0	0
166 - Eastern Sambo RO**	0	0	0	0	0	4
332 - Eastern Sambo RO**	0	0	0	0	0	0
334 - Western Sambo ER**	0	0	0	0	0	0
167 - Western Sambo ER**	0	0	0	0	0	2
163 - West of Western Sambo ER	0	0	0	0	0	0
335 - Sand Key SPA**	0	0	0	0	0	0
169 - Sand Key SPA**	0	0	0	0	0	0
162 - West of Western Dry Rocks	0	0	0	0	0	0
Lower Florida Keys Total (13)	0	0	0	0	0	6
Patchy Hard-bottom Total (21)	0	0	0	0	0	6
<i>Low-relief spur & groove (6-15 m)</i>						
Upper Florida Keys NMS						
52 - Carysfort Reef SPA**	0	0	0	0	0	0
241 - Carysfort Reef SPA**	0	0	0	0	0	0
51 - Offshore of Dry Rocks SPA	0	0	0	0	0	0
50 - Offshore of Dry Rocks SPA	0	0	0	0	0	0
49 - Little Pickles Reef	0	0	0	0	0	0
48 - Little Pickles Reef	0	0	0	0	0	0
Upper Florida Keys Total (6)	0	0	0	0	0	0
Middle Florida Keys NMS						
355 - NE of Conch Reef	0	0	0	0	0	0

Site number/site location	White band	White pox	Tissue necrosis	Snail predation	Damselfish bites	Total colonies
282 - Conch Reef SPA**	0	0	0	0	0	0
354 - Conch Reef SPA**	0	0	0	0	0	0
107 - Conch Reef RO**	0	0	0	0	0	0
106 - Conch Reef RO**	0	0	0	0	0	0
276 - Davis Reef SPA**	0	0	0	0	0	0
80 - Davis Reef SPA**	0	0	0	0	0	0
102 - South of Lower Matecumbe	0	0	0	0	0	0
109 - Tennessee Reef RO**	0	0	0	0	0	0
108 - Tennessee Reef RO**	0	0	0	0	0	0
113 - NE of Tennessee Light	0	0	0	0	0	0
349 - South of Conch Key	0	0	0	0	0	0
100 - South of Conch Key	0	0	0	0	0	0
99 - East of Delta Shoal	0	0	0	0	0	0
110 - Sombrero Key SPA**	0	0	0	0	0	0
287 - Sombrero Key SPA**	0	0	0	0	0	0
Middle Florida Keys T total (16)	0	0	0	0	0	0
Lower Florida Keys NMS						
337 - South of Bahia Honda Key	0	0	0	0	0	0
174 - Looe Key SPA**	0	0	0	0	0	0
339 - Looe Key SPA**	0	0	0	0	0	0
142 - American Shoal	0	0	0	0	0	0
172 - East of Eastern Sambo RO	0	0	0	0	0	0
340 - Eastern Sambo RO**	0	0	0	0	0	0
175 - Eastern Sambo RO**	0	0	0	0	0	7
171 - Middle Sambo Reef	0	0	0	0	0	1
170 - Middle Sambo Reef	0	0	0	0	0	0
341 - Western Sambo ER**	0	0	0	0	0	0
176 - Western Sambo ER**	0	0	0	0	0	0
Lower Florida Keys Total (11)	0	0	0	0	0	8
Low-relief Spur & Groove Total (33)	0	0	0	0	0	8
All sites/habitats combined	0 (0%)	0 (0%)	0 (0%)	0 (0%)	9 (2.2%)	481

Table 9. Mean density (no. colonies/m²), tissue surface area (cm² and % cover), and colony size of staghorn coral (*Acropora palmata*) in the Florida Keys National Marine Sanctuary and Biscayne National Park, as determined from four 15-m x 1-m belt transects per site at 235 sites during June-August 2007. Sites are arranged by habitat from NE to SW and asterisked locations (**) are Sanctuary Preservation Areas (SPA), Ecological Reserves (ER), or Research Only Areas (RO). SE = standard error.

Site number/site location	Colony density			Colony size		
	Colonies	No./m ²	SE	Total area (cm ²) (%)	Area (cm ²) per colony	SE
<i>Mid-channel patch reefs</i>						
Biscayne National Park						
445 - Northern Legare Anchorage	0	0	0	0	0	0
441 - Bache Shoal	0	0	0	0	0	0
440 - South of Bache Shoal	0	0	0	0	0	0
438 - South of Bache Shoal	0	0	0	0	0	0
437 - South of Legare Anchorage	0	0	0	0	0	0
427 - Margot Fish Shoal	0	0	0	0	0	0
421 - Margot Fish Shoal	0	0	0	0	0	0
419 - Inshore of Ajax Reef	0	0	0	0	0	0
413 - Inshore of Pacific Reef	0	0	0	0	0	0
410 - Inshore of Pacific Reef	0	0	0	0	0	0
408 - Offshore of Broad Creek	0	0	0	0	0	0
406 - Offshore of Broad Creek	0	0	0	0	0	0
Biscayne National Park Total (12)	0	0	0	0	0	0
Upper Florida Keys NMS						
4 - Basin Hill Shoals	0	0	0	0	0	0
2 - Near Cannon Patch Reef	0	0	0	0	0	0
3 - Near Cannon Patch Reef	0	0	0	0	0	0
1 - Inshore of Molasses Reef	0	0	0	0	0	0
Upper Florida Keys Total (4)	0	0	0	0	0	0
Middle Florida Keys NMS						
69 - Tavernier Rocks	0	0	0	0	0	0
71 - Hen and Chickens SPA**	0	0	0	0	0	0
70 - Hen and Chickens SPA**	0	0	0	0	0	0
68 - East of Cheeca Rocks SPA	0	0	0	0	0	0
72 - Cheeca Rocks SPA**	0	0	0	0	0	0
73 - Cheeca Rocks SPA**	0	0	0	0	0	0
66 - East Turtle Shoal	0	0	0	0	0	0
254 - East Turtle Shoal	0	0	0	0	0	0
Middle Florida Keys Total (8)	0	0	0	0	0	0
Lower Florida Keys NMS						
122 - North of Big Pine Shoal	0	0	0	0	0	0
121 - North of Maryland Shoal	0	0	0	0	0	0
120 - North of Maryland Shoal	0	0	0	0	0	0
119 - North of Pelican Shoal	0	0	0	0	0	0
118 - East of Western Sambo ER	0	0	0	0	0	0
126 - Western Sambo ER**	0	0	0	0	0	0
125 - Western Sambo ER**	0	0	0	0	0	0
124 - Western Sambo ER**	0	0	0	0	0	0
123 - Western Sambo ER**	0	0	0	0	0	0
117 - NW of Sand Key SPA	0	0	0	0	0	0
116 - North of Satan Shoal	0	0	0	0	0	0
115 - North of Satan Shoal	0	0	0	0	0	0
Lower Florida Keys Total (12)	0	0	0	0	0	0
Mid-channel Patch Reef Total (36)	0	0	0	0	0	0
<i>Offshore patch reefs</i>						
Biscayne National Park						
471 - Northwest of Triumph Reef	1	0.017	0.033	326 (0.1%)	326	

Site number/site location	Colony density			Colony size		
	Colonies	No./m ²	SE	Total area (cm ²) (%)	Area (cm ²) per colony	SE
461 - NW of Long Reef	0	0	0	0	0	0
460 - NW of Long Reef	0	0	0	0	0	0
459 - NW of Pacific Reef	0	0	0	0	0	0
458 - Inshore of Pacific Reef	0	0	0	0	0	0
456 - Inshore of Pacific Reef	0	0	0	0	0	0
454 - Northwest of Whistle Buoy	0	0	0	0	0	0
Biscayne National Park Total (7)	1	0.002	0.002	326 (< 0.1%)	326	
Upper Florida Keys NMS						
16 - North of Carysfort Reef SPA	0	0	0	0	0	0
15 - North of Carysfort Reef SPA	14	0.233	0.467	6,953 (1.2%)	497	592
14 - North of Carysfort Reef SPA	0	0	0	0	0	0
47 - Carysfort Reef SPA**	0	0	0	0	0	0
345 - Carysfort Reef SPA**	0	0	0	0	0	0
46 - Carysfort Reef SPA**	0	0	0	0	0	0
39 - Carysfort Reef SPA**	0	0	0	0	0	0
37 - West of Carysfort Reef SPA	0	0	0	0	0	0
13 - Inshore of Watson's Reef	0	0	0	0	0	0
55 - Inshore of Watson's Reef	0	0	0	0	0	0
358 - Inshore of Watson's Reef	0	0	0	0	0	0
54 - Inshore of Watson's Reef	0	0	0	0	0	0
347 - Inshore of Watson's Reef	0	0	0	0	0	0
12 - Inshore of Watson's Reef	0	0	0	0	0	0
9 - White Banks	0	0	0	0	0	0
8 - Inshore of French Reef	0	0	0	0	0	0
7 - Inshore of Molasses Reef	0	0	0	0	0	0
6 - Inshore of Molasses Reef	0	0	0	0	0	0
5 - Inshore of Pickles Reef	0	0	0	0	0	0
Upper Florida Keys Total (19)	14	0.012	0.012	6,953 (0.1%)	497	
Middle Florida Keys NMS						
77 - Inshore of Conch Reef SPA	0	0	0	0	0	0
76 - Inshore of Conch Reef SPA	0	0	0	0	0	0
75 - Inshore of Conch Reef SPA	0	0	0	0	0	0
74 - Inshore of Conch Reef SPA	0	0	0	0	0	0
98 - Coffins Patch SPA**	0	0	0	0	0	0
277 - Coffins Patch SPA**	0	0	0	0	0	0
Middle Florida Keys Total (6)	0	0	0	0	0	0
Lower Florida Keys NMS						
133 - Looe Key Research Only**	0	0	0	0	0	0
132 - Looe Key Research Only**	0	0	0	0	0	0
131 - North of Looe Key SPA**	0	0	0	0	0	0
130 - Maryland Shoal	0	0	0	0	0	0
129 - North of Maryland Shoal	0	0	0	0	0	0
165 - North of Maryland Shoal	0	0	0	0	0	0
128 - NE of Eastern Sambo RO	0	0	0	0	0	0
135 - Western Sambo ER**	0	0	0	0	0	0
168 - Western Sambo ER**	0	0	0	0	0	0
127 - West of Sand Key SPA	0	0	0	0	0	0
Lower Florida Keys Total (10)	0	0	0	0	0	0
Offshore Patch Reef Total (42)	15	0.006	0.006	7,279 (< 0.1%)	411	85
<i>Hard-bottom/rubble/sand matrix</i>						
Upper Florida Keys NMS						
40 - Carysfort Reef SPA**	0	0	0	0	0	0
38 - West of Carysfort Reef SPA	0	0	0	0	0	0
36 - West of Carysfort Reef SPA	0	0	0	0	0	0
11 - NW of Dry Rocks SPA	0	0	0	0	0	0
Upper Florida Keys Total (4)	0	0	0	0	0	0
Hard-bottom Matrix Total (4)	0	0	0	0	0	0

Site number/site location	Colony density			Colony size		
	Colonies	No./m ²	SE	Total area (cm ²) (%)	Area (cm ²) per colony	SE
<i>Low-relief hard-bottom (< 6 m)</i>						
Biscayne National Park						
475 - Fowey Rocks	0	0	0	0	0	0
469 - South of Ajax Reef	0	0	0	0	0	0
Biscayne National Park Total (2)	0	0	0	0	0	0
Upper Florida Keys NMS						
346 - Carysfort Reef SPA**	0	0	0	0	0	0
35 - West of Carysfort Reef SPA	0	0	0	0	0	0
34 - West of Carysfort Reef SPA	0	0	0	0	0	0
33 - Inshore of Watson's Reef	0	0	0	0	0	0
17 - Little Pickles Reef	0	0	0	0	0	0
Upper Florida Keys Total (5)	0	0	0	0	0	0
Middle Florida Keys NMS						
269 - Conch Reef SPA**	0	0	0	0	0	0
89 - Conch Reef SPA**	0	0	0	0	0	0
88 - Little Conch Reef	0	0	0	0	0	0
352 - Little Conch Reef	0	0	0	0	0	0
97 - Davis Reef SPA**	0	0	0	0	0	0
90 - Davis Reef SPA**	0	0	0	0	0	0
86 - South of Windley Key	0	0	0	0	0	0
103 - NE of Alligator Light	0	0	0	0	0	0
82 - Alligator Reef SPA**	0	0	0	0	0	0
81 - Alligator Reef SPA**	0	0	0	0	0	0
350 - Tennessee Light	0	0	0	0	0	0
85 - East of Coffins Patch SPA	0	0	0	0	0	0
92 - Coffins Patch SPA**	0	0	0	0	0	0
91 - Coffins Patch SPA**	0	0	0	0	0	0
Middle Florida Keys Total (14)	0	0	0	0	0	0
Lower Florida Keys NMS						
161 - West of American Shoal	0	0	0	0	0	0
140 - Maryland Shoal	0	0	0	0	0	0
159 - North of Pelican Shoal	0	0	0	0	0	0
158 - East of No Name Reef	0	0	0	0	0	0
Lower Florida Keys Total (4)	0	0	0	0	0	0
Hard-bottom (< 6 m) Total (25)	0	0	0	0	0	0
<i>Inner line reef tract spur & groove</i>						
Upper Florida Keys NMS						
61 - Turtle Reef	0	0	0	0	0	0
60 - Inshore of Elbow Reef SPA	0	0	0	0	0	0
59 - Inshore of Elbow Reef SPA	3	0.050	0.100	583 (0.1%)	194	154
58 - Horseshoe Reef	5	0.083	0.167	2,520 (0.4%)	504	671
62 - Dry Rocks SPA**	2	0.033	0.066	1,075 (0.2%)	537	538
63 - Dry Rocks SPA**	0	0	0	0	0	0
65 - Grecian Rocks SPA**	0	0	0	0	0	0
64 - Grecian Rocks SPA**	0	0	0	0	0	0
Upper Florida Keys Total (8)	10	0.021	0.011	4,178 (0.1%)	412	109
Inner Line Spur & Groove Total (8)	10	0.021	0.011	4,178 (0.1%)	412	109
<i>High-relief spur & groove</i>						
Biscayne National Park						
474 - Brewster Reef	0	0	0	0	0	0
472 - Star Reef	0	0	0	0	0	0
470 - Triumph Reef	0	0	0	0	0	0
467 - Long Reef	5	0.083	0.126	922 (0.2%)	184	346
466 - Ajax Reef	0	0	0	0	0	0
465 - Ajax Reef	0	0	0	0	0	0
464 - Pacific Reef	0	0	0	0	0	0

Site number/site location	Colony density			Colony size		
	Colonies	No./m ²	SE	Total area (cm ²) (%)	Area (cm ²) per colony	SE
Biscayne National Park Total (7)	5	0.012	0.012	922 (< 0.1%)	184	
Upper Florida Keys NMS						
26 - Carysfort Reef SPA**	0	0	0	0	0	0
25 - Carysfort Reef SPA**	0	0	0	0	0	0
218 - South Carysfort Reef SPA**	0	0	0	0	0	0
217 - South Carysfort Reef SPA**	50	0.833	0.168	147,614 (24.6%)	2,952	4,900
24 - Maitland Grounding Site	0	0	0	0	0	0
28 - Elbow Reef SPA**	75	1.250	0.959	71,508 (11.9%)	966	2,272
27 - Elbow Reef SPA**	20	0.333	0.381	20,375 (3.4%)	1,072	2,668
30 - French Reef SPA**	12	0.200	0.357	4,365 (0.7%)	364	630
29 - French Reef SPA**	54	0.900	1.045	29,957 (5.0%)	555	803
23 - SW of French Reef SPA	0	0	0	0	0	0
357 - Sand Island	0	0	0	0	0	0
356 - Sand Island	28	0.467	0.283	53,138 (8.9%)	1,898	4,402
32 - Molasses Reef SPA**	18	0.300	0.515	14,926 (2.5%)	878	2,423
31 - Molasses Reef SPA**	13	0.217	0.433	11,952 (2.0%)	919	1,508
19 - Pickles Reef	0	0	0	0	0	0
20 - Pickles Reef	0	0	0	0	0	0
18 - Pickles Reef	0	0	0	0	0	0
Upper Florida Keys Total (17)	270	0.265	0.094	353,835 (3.5%)	1201	297
Middle Florida Keys NMS						
79 - Delta Shoal	0	0	0	0	0	0
78 - Delta Shoal	0	0	0	0	0	0
84 - Sombrero Key SPA**	68	1.133	2.048	68,525 (11.4%)	1,008	4,013
83 - Sombrero Key SPA**	0	0	0	0	0	0
Middle Florida Keys Total (4)	68	0.283	0.283	68,525 (2.9%)	1008	
Lower Florida Keys NMS						
148 - Looe Key SPA**	32	0.533	0.422	28,645 (4.8%)	895	2,150
147 - Looe Key SPA**	1	0.017	0.033	8,533 (1.4%)	8,533	
145 - American Shoal	0	0	0	0	0	0
146 - American Shoal	0	0	0	0	0	0
144 - Maryland Shoal	0	0	0	0	0	0
141 - Maryland Shoal	0	0	0	0	0	0
143 - Maryland Shoal	0	0	0	0	0	0
139 - Pelican Shoal	0	0	0	0	0	0
138 - No Name Reef	0	0	0	0	0	0
137 - No Name Reef	1	0.017	0.033	4,662 (0.8%)	4,662	
150 - Eastern Sambo RO**	0	0	0	0	0	0
149 - Eastern Sambo RO**	0	0	0	0	0	0
348 - Middle Sambo Reef	0	0	0	0	0	0
309 - Middle Sambo Reef	0	0	0	0	0	0
152 - Western Sambo ER**	0	0	0	0	0	0
151 - Western Sambo ER**	0	0	0	0	0	0
136 - East of Eastern Dry Rocks SPA	0	0	0	0	0	0
154 - Eastern Dry Rocks SPA**	1	0.017	0.033	9,959 (1.7%)	9,959	
153 - Eastern Dry Rocks SPA**	0	0	0	0	0	0
156 - Rock Key SPA**	0	0	0	0	0	0
155 - Rock Key SPA**	0	0	0	0	0	0
325 - Sand Key SPA**	0	0	0	0	0	0
157 - Sand Key SPA**	0	0	0	0	0	0
Lower Florida Keys Total (23)	35	0.025	0.023	51,799 (0.4%)	6012	2040
High-relief Spur & Groove Total (51)	378	0.124	0.041	475,080 (1.6%)	2489	830
<i>Low-relief hard-bottom (6-15 m)</i>						
Upper Florida Keys NMS						
53 - Carysfort Reef SPA**	0	0	0	0	0	0
240 - Carysfort Reef SPA**	0	0	0	0	0	0
57 - Inshore of Watson's Reef	0	0	0	0	0	0

Site number/site location	Colony density			Colony size		
	Colonies	No./m ²	SE	Total area (cm ²) (%)	Area (cm ²) per colony	SE
45 - Offshore of Dry Rocks SPA	0	0	0	0	0	0
22 - SW of French Reef SPA	0	0	0	0	0	0
21 - SW of French Reef SPA	0	0	0	0	0	0
Upper Florida Keys Total (6)	0	0	0	0	0	0
Middle Florida Keys NMS						
353 - Conch Reef SPA**	0	0	0	0	0	0
105 - Conch Reef SPA**	0	0	0	0	0	0
104 - NE of Alligator Light	0	0	0	0	0	0
351 - South of Indian Key	0	0	0	0	0	0
101 - South of Lower Matecumbe	0	0	0	0	0	0
111 - West of Sombra Key	0	0	0	0	0	0
Middle Florida Keys Total (6)	0	0	0	0	0	0
Lower Florida Keys NMS						
180 - South of Bahia Honda Key	0	0	0	0	0	0
173 - Maryland Shoal	0	0	0	0	0	0
177 - NE of Satan Shoal	0	0	0	0	0	0
Lower Florida Keys Total (3)	0	0	0	0	0	0
Hard-bottom (6-15 m) Total (15)	0	0	0	0	0	0
<i>Patchy hard-bottom (6-15 m)</i>						
Upper Florida Keys NMS						
56 - Inshore of Watson's Reef	0	0	0	0	0	0
44 - Dixie Shoal	0	0	0	0	0	0
43 - Dixie Shoal	0	0	0	0	0	0
42 - Dixie Shoal	0	0	0	0	0	0
Upper Florida Keys Total (4)	0	0	0	0	0	0
Middle Florida Keys NMS						
96 - South of Windley Key	0	0	0	0	0	0
114 - South of Lower Matecumbe	0	0	0	0	0	0
94 - South of Duck Key	0	0	0	0	0	0
93 - South of Duck Key	0	0	0	0	0	0
Middle Florida Keys Total (4)	0	0	0	0	0	0
Lower Florida Keys NMS						
338 - South of Bahia Honda Key	0	0	0	0	0	0
179 - West of American Shoal	0	0	0	0	0	0
160 - North of Pelican Shoal	0	0	0	0	0	0
164 - West of Pelican Shoal	0	0	0	0	0	0
178 - West of Pelican Shoal	0	0	0	0	0	0
166 - Eastern Sambo RO**	0	0	0	0	0	0
332 - Eastern Sambo RO**	0	0	0	0	0	0
334 - Western Sambo ER**	0	0	0	0	0	0
167 - Western Sambo ER**	0	0	0	0	0	0
163 - West of Western Sambo ER	0	0	0	0	0	0
335 - Sand Key SPA**	0	0	0	0	0	0
169 - Sand Key SPA**	0	0	0	0	0	0
162 - West of Western Dry Rocks	0	0	0	0	0	0
Lower Florida Keys Total (13)	0	0	0	0	0	0
Patchy Hard-bottom Total (21)	0	0	0	0	0	0
<i>Low-relief spur & groove (6-15 m)</i>						
Upper Florida Keys NMS						
52 - Carysfort Reef SPA**	0	0	0	0	0	0
241 - Carysfort Reef SPA**	0	0	0	0	0	0
51 - Offshore of Dry Rocks SPA	0	0	0	0	0	0
50 - Offshore of Dry Rocks SPA	0	0	0	0	0	0
49 - Little Pickles Reef	0	0	0	0	0	0
48 - Little Pickles Reef	0	0	0	0	0	0

Site number/site location	Colony density			Colony size		
	Colonies	No./m ²	SE	Total area (cm ²) (%)	Area (cm ²) per colony	SE
Upper Florida Keys Total (6)	0	0	0	0	0	0
Middle Florida Keys NMS						
355 - NE of Conch Reef	0	0	0	0	0	0
282 - Conch Reef SPA**	0	0	0	0	0	0
354 - Conch Reef SPA**	0	0	0	0	0	0
107 - Conch Reef RO**	0	0	0	0	0	0
106 - Conch Reef RO**	0	0	0	0	0	0
276 - Davis Reef SPA**	0	0	0	0	0	0
80 - Davis Reef SPA**	0	0	0	0	0	0
102 - South of Lower Matecumbe	0	0	0	0	0	0
109 - Tennessee Reef RO**	0	0	0	0	0	0
108 - Tennessee Reef RO**	0	0	0	0	0	0
113 - NE of Tennessee Light	0	0	0	0	0	0
349 - South of Conch Key	0	0	0	0	0	0
100 - South of Conch Key	0	0	0	0	0	0
99 - East of Delta Shoal	0	0	0	0	0	0
110 - Sombrero Key SPA**	0	0	0	0	0	0
287 - Sombrero Key SPA**	0	0	0	0	0	0
Middle Florida Keys Total (16)	0	0	0	0	0	0
Lower Florida Keys NMS						
337 - South of Bahia Honda Key	0	0	0	0	0	0
174 - Looe Key SPA**	0	0	0	0	0	0
339 - Looe Key SPA**	0	0	0	0	0	0
142 - American Shoal	0	0	0	0	0	0
172 - East of Eastern Sambo RO	0	0	0	0	0	0
340 - Eastern Sambo RO**	0	0	0	0	0	0
175 - Eastern Sambo RO**	0	0	0	0	0	0
171 - Middle Sambo Reef	0	0	0	0	0	0
170 - Middle Sambo Reef	0	0	0	0	0	0
341 - Western Sambo ER**	0	0	0	0	0	0
176 - Western Sambo ER**	0	0	0	0	0	0
Lower Florida Keys Total (11)	0	0	0	0	0	0
Low-relief Spur & Groove Total (33)	0	0	0	0	0	0

Table 10. Numbers and relative frequencies (%) of elkhorn coral (*Acropora palmata*) colonies exhibiting disease-like conditions and predation in the Florida Keys National Marine Sanctuary and Biscayne National Park, as quantified from four 15-m x 1-m transects per site at 235 locations during June-August 2007. Sites are arranged by habitat from northeast to southwest and asterisked locations (**) are Sanctuary Preservation Areas (SPA), Ecological Reserves (ER), or Research Only Areas (RO).

Site number/site location	White band	White pox	Tissue necrosis	Snail predation	Damselfish bites	Total colonies
<i>Mid-channel patch reefs</i>						
Biscayne National Park						
445 - Northern Legare Anchorage	0	0	0	0	0	0
441 - Bache Shoal	0	0	0	0	0	0
440 - South of Bache Shoal	0	0	0	0	0	0
438 - South of Bache Shoal	0	0	0	0	0	0
437 - South of Legare Anchorage	0	0	0	0	0	0
427 - Margot Fish Shoal	0	0	0	0	0	0
421 - Margot Fish Shoal	0	0	0	0	0	0
419 - Inshore of Ajax Reef	0	0	0	0	0	0
413 - Inshore of Pacific Reef	0	0	0	0	0	0
410 - Inshore of Pacific Reef	0	0	0	0	0	0
408 - Offshore of Broad Creek	0	0	0	0	0	0
406 - Offshore of Broad Creek	0	0	0	0	0	0
Biscayne National Park Total (12)	0	0	0	0	0	0
Upper Florida Keys NMS						
4 - Basin Hill Shoals	0	0	0	0	0	0
2 - Near Cannon Patch Reef	0	0	0	0	0	0
3 - Near Cannon Patch Reef	0	0	0	0	0	0
1 - Inshore of Molasses Reef	0	0	0	0	0	0
Upper Florida Keys Total (4)	0	0	0	0	0	0
Middle Florida Keys NMS						
69 - Tavernier Rocks	0	0	0	0	0	0
71 - Hen and Chickens SPA**	0	0	0	0	0	0
70 - Hen and Chickens SPA**	0	0	0	0	0	0
68 - East of Cheeca Rocks SPA	0	0	0	0	0	0
72 - Cheeca Rocks SPA**	0	0	0	0	0	0
73 - Cheeca Rocks SPA**	0	0	0	0	0	0
66 - East Turtle Shoal	0	0	0	0	0	0
254 - East Turtle Shoal	0	0	0	0	0	0
Middle Florida Keys Total (8)	0	0	0	0	0	0
Lower Florida Keys NMS						
122 - North of Big Pine Shoal	0	0	0	0	0	0
121 - North of Maryland Shoal	0	0	0	0	0	0
120 - North of Maryland Shoal	0	0	0	0	0	0
119 - North of Pelican Shoal	0	0	0	0	0	0
118 - East of Western Sambo ER	0	0	0	0	0	0
126 - Western Sambo ER**	0	0	0	0	0	0
125 - Western Sambo ER**	0	0	0	0	0	0
124 - Western Sambo ER**	0	0	0	0	0	0
123 - Western Sambo ER**	0	0	0	0	0	0
117 - NW of Sand Key SPA	0	0	0	0	0	0
116 - North of Satan Shoal	0	0	0	0	0	0
115 - North of Satan Shoal	0	0	0	0	0	0
Lower Florida Keys Total (12)	0	0	0	0	0	0
Mid-channel Patch Reef Total (36)	0	0	0	0	0	0
<i>Offshore patch reefs</i>						
Biscayne National Park						
471 - Northwest of Triumph Reef	0	0	0	0	0	1
461 - NW of Long Reef	0	0	0	0	0	0

Site number/site location	White band	White pox	Tissue necrosis	Snail predation	Damselfish bites	Total colonies
460 - NW of Long Reef	0	0	0	0	0	0
459 - NW of Pacific Reef	0	0	0	0	0	0
458 - Inshore of Pacific Reef	0	0	0	0	0	0
456 - Inshore of Pacific Reef	0	0	0	0	0	0
454 - Northwest of Whistle Buoy	0	0	0	0	0	0
Biscayne National Park Total (7)	0	0	0	0	0	0
Upper Florida Keys NMS	0	0	0	0	0	0
16 - North of Carysfort Reef SPA	0	0	0	0	0	0
15 - North of Carysfort Reef SPA	0	0	0	1 (7.1)	0	14
14 - North of Carysfort Reef SPA	0	0	0	0	0	0
47 - Carysfort Reef SPA**	0	0	0	0	0	0
345 - Carysfort Reef SPA**	0	0	0	0	0	0
46 - Carysfort Reef SPA**	0	0	0	0	0	0
39 - Carysfort Reef SPA**	0	0	0	0	0	0
37 - West of Carysfort Reef SPA	0	0	0	0	0	0
13 - Inshore of Watson's Reef	0	0	0	0	0	0
55 - Inshore of Watson's Reef	0	0	0	0	0	0
358 - Inshore of Watson's Reef	0	0	0	0	0	0
54 - Inshore of Watson's Reef	0	0	0	0	0	0
347 - Inshore of Watson's Reef	0	0	0	0	0	0
12 - Inshore of Watson's Reef	0	0	0	0	0	0
9 - White Banks	0	0	0	0	0	0
8 - Inshore of French Reef	0	0	0	0	0	0
7 - Inshore of Molasses Reef	0	0	0	0	0	0
6 - Inshore of Molasses Reef	0	0	0	0	0	0
5 - Inshore of Pickles Reef	0	0	0	0	0	0
Upper Florida Keys Total (19)	0	0	0	1 (7.1)	0	14
Middle Florida Keys NMS						
77 - Inshore of Conch Reef SPA	0	0	0	0	0	0
76 - Inshore of Conch Reef SPA	0	0	0	0	0	0
75 - Inshore of Conch Reef SPA	0	0	0	0	0	0
74 - Inshore of Conch Reef SPA	0	0	0	0	0	0
98 - Coffins Patch SPA**	0	0	0	0	0	0
277 - Coffins Patch SPA**	0	0	0	0	0	0
Middle Florida Keys Total (6)	0	0	0	0	0	0
Lower Florida Keys NMS						
133 - Looe Key Research Only**	0	0	0	0	0	0
132 - Looe Key Research Only**	0	0	0	0	0	0
131 - North of Looe Key SPA**	0	0	0	0	0	0
130 - Maryland Shoal	0	0	0	0	0	0
129 - North of Maryland Shoal	0	0	0	0	0	0
165 - North of Maryland Shoal	0	0	0	0	0	0
128 - NE of Eastern Sambo RO	0	0	0	0	0	0
135 - Western Sambo ER**	0	0	0	0	0	0
168 - Western Sambo ER**	0	0	0	0	0	0
127 - West of Sand Key SPA	0	0	0	0	0	0
Lower Florida Keys Total (10)	0	0	0	0	0	0
Offshore Patch Reef Total (42)	0	0	0	1 (6.7)	0	15
<i>Hard-bottom/rubble/sand matrix</i>						
Upper Florida Keys NMS						
40 - Carysfort Reef SPA**	0	0	0	0	0	0
38 - West of Carysfort Reef SPA	0	0	0	0	0	0
36 - West of Carysfort Reef SPA	0	0	0	0	0	0
11 - NW of Dry Rocks SPA	0	0	0	0	0	0
Upper Florida Keys Total (4)	0	0	0	0	0	0
Hard-bottom Matrix Total (4)	0	0	0	0	0	0

Site number/site location	White band	White pox	Tissue necrosis	Snail predation	Damselfish bites	Total colonies
<i>Low-relief hard-bottom (< 6 m)</i>						
Biscayne National Park						
475 - Fowey Rocks	0	0	0	0	0	0
469 - South of Ajax Reef	0	0	0	0	0	0
Biscayne National Park Total (2)	0	0	0	0	0	0
Upper Florida Keys NMS						
346 - Carysfort Reef SPA**	0	0	0	0	0	0
35 - West of Carysfort Reef SPA	0	0	0	0	0	0
34 - West of Carysfort Reef SPA	0	0	0	0	0	0
33 - Inshore of Watson's Reef	0	0	0	0	0	0
17 - Little Pickles Reef	0	0	0	0	0	0
Upper Florida Keys Total (5)	0	0	0	0	0	0
Middle Florida Keys NMS						
269 - Conch Reef SPA**	0	0	0	0	0	0
89 - Conch Reef SPA**	0	0	0	0	0	0
88 - Little Conch Reef	0	0	0	0	0	0
352 - Little Conch Reef	0	0	0	0	0	0
97 - Davis Reef SPA**	0	0	0	0	0	0
90 - Davis Reef SPA**	0	0	0	0	0	0
86 - South of Windley Key	0	0	0	0	0	0
103 - NE of Alligator Light	0	0	0	0	0	0
82 - Alligator Reef SPA**	0	0	0	0	0	0
81 - Alligator Reef SPA**	0	0	0	0	0	0
350 - Tennessee Light	0	0	0	0	0	0
85 - East of Coffins Patch SPA	0	0	0	0	0	0
92 - Coffins Patch SPA**	0	0	0	0	0	0
91 - Coffins Patch SPA**	0	0	0	0	0	0
Middle Florida Keys Total (14)	0	0	0	0	0	0
Lower Florida Keys NMS						
161 - West of American Shoal	0	0	0	0	0	0
140 - Maryland Shoal	0	0	0	0	0	0
159 - North of Pelican Shoal	0	0	0	0	0	0
158 - East of No Name Reef	0	0	0	0	0	0
Lower Florida Keys Total (4)	0	0	0	0	0	0
Hard-bottom (< 6 m) Total (25)	0	0	0	0	0	0
<i>Inner line reef tract spur & groove</i>						
Upper Florida Keys NMS						
61 - Turtle Reef	0	0	0	0	0	0
60 - Inshore of Elbow Reef SPA	0	0	0	0	0	0
59 - Inshore of Elbow Reef SPA	0	0	0	0	0	3
58 - Horseshoe Reef	0	0	0	0	0	5
62 - Dry Rocks SPA**	0	0	0	0	0	2
63 - Dry Rocks SPA**	0	0	0	0	0	0
65 - Grecian Rocks SPA**	0	0	0	0	0	0
64 - Grecian Rocks SPA**	0	0	0	0	0	0
Upper Florida Keys Total (8)	0	0	0	0	0	10
Inner Line Spur & Groove Total (8)	0	0	0	0	0	10
<i>High-relief spur & groove</i>						
Biscayne National Park						
474 - Brewster Reef	0	0	0	0	0	0
472 - Star Reef	0	0	0	0	0	0
470 - Triumph Reef	0	0	0	0	0	0
467 - Long Reef	0	0	0	0	0	5
466 - Ajax Reef	0	0	0	0	0	0
465 - Ajax Reef	0	0	0	0	0	0
464 - Pacific Reef	0	0	0	0	0	0
Biscayne National Park Total (7)	0	0	0	0	0	5

Site number/site location	White band	White pox	Tissue necrosis	Snail predation	Damselfish bites	Total colonies
Upper Florida Keys NMS						
26 - Carysfort Reef SPA**	0	0	0	0	0	0
25 - Carysfort Reef SPA**	0	0	0	0	0	0
218 - South Carysfort Reef SPA**	0	0	0	0	0	0
217 - South Carysfort Reef SPA**	0	0	0	1 (2.0)	3 (5.9)	51
24 - Maitland Grounding Site	0	0	0	0	0	0
28 - Elbow Reef SPA**	0	0	0	0	2 (26)	76
27 - Elbow Reef SPA**	0	0	0	0	0	21
30 - French Reef SPA**	0	0	0	0	1 (8.3)	12
29 - French Reef SPA**	0	0	0	1 (1.9)	5 (9.3)	54
23 - SW of French Reef SPA	0	0	0	0	0	0
357 - Sand Island	0	0	0	0	0	0
356 - Sand Island	0	0	0	1 (2.9)	2 (5.7)	35
32 - Molasses Reef SPA**	0	0	0	0	3 (17.7)	17
31 - Molasses Reef SPA**	0	0	0	1 (7.7)	0	13
19 - Pickles Reef	0	0	0	0	0	0
20 - Pickles Reef	0	0	0	0	0	0
18 - Pickles Reef	0	0	0	0	0	0
Upper Florida Keys Total (17)	0	0	0	4 (1.4)	16 (5.7)	279
Middle Florida Keys NMS						
79 - Delta Shoal	0	0	0	0	0	0
78 - Delta Shoal	0	0	0	0	0	0
84 - Sombrero Key SPA**	0	0	0	2 (2.9)	3 (4.4)	68
83 - Sombrero Key SPA**	0	0	0	0	0	0
Middle Florida Keys Total (4)	0	0	0	2 (2.9)	3 (4.4)	68
Lower Florida Keys NMS						
148 - Looe Key SPA**	0	0	0	1 (3.0)	0	33
147 - Looe Key SPA**	0	0	0	0	1 (100)	1
145 - American Shoal	0	0	0	0	0	0
146 - American Shoal	0	0	0	0	0	0
144 - Maryland Shoal	0	0	0	0	0	0
141 - Maryland Shoal	0	0	0	0	0	0
143 - Maryland Shoal	0	0	0	0	0	0
139 - Pelican Shoal	0	0	0	0	0	0
138 - No Name Reef	0	0	0	0	0	0
137 - No Name Reef	0	0	0	0	0	1
150 - Eastern Sambo RO**	0	0	0	0	0	0
149 - Eastern Sambo RO**	0	0	0	0	0	0
348 - Middle Sambo Reef	0	0	0	0	0	0
309 - Middle Sambo Reef	0	0	0	0	0	0
152 - Western Sambo ER**	0	0	0	0	0	0
151 - Western Sambo ER**	0	0	0	0	0	0
136 - East of Eastern Dry Rocks SPA	0	0	0	0	0	20
154 - Eastern Dry Rocks SPA**	0	0	0	0	1 (100)	1
153 - Eastern Dry Rocks SPA**	0	0	0	0	0	0
156 - Rock Key SPA**	0	0	0	0	0	0
155 - Rock Key SPA**	0	0	0	0	0	0
325 - Sand Key SPA**	0	0	0	0	0	0
157 - Sand Key SPA**	0	0	0	0	0	0
Lower Florida Keys Total (23)	0	0	0	1 (1.8)	2 (3.6)	56
High-relief Spur & Groove Total (51)	0	0	0	7 (1.7)	21 (5.2)	408
<i>Low-relief hard-bottom (6-15 m)</i>						
Upper Florida Keys NMS						
53 - Carysfort Reef SPA**	0	0	0	0	0	0
240 - Carysfort Reef SPA**	0	0	0	0	0	0
57 - Inshore of Watson's Reef	0	0	0	0	0	0
45 - Offshore of Dry Rocks SPA	0	0	0	0	0	0
22 - SW of French Reef SPA	0	0	0	0	0	0

Site number/site location	White band	White pox	Tissue necrosis	Snail predation	Damselfish bites	Total colonies
21 - SW of French Reef SPA	0	0	0	0	0	0
Upper Florida Keys Total (6)	0	0	0	0	0	0
Middle Florida Keys NMS						
353 - Conch Reef SPA**	0	0	0	0	0	0
105 - Conch Reef SPA**	0	0	0	0	0	0
104 - NE of Alligator Light	0	0	0	0	0	0
351 - South of Indian Key	0	0	0	0	0	0
101 - South of Lower Matecumbe	0	0	0	0	0	0
111 - West of Sombrero Key	0	0	0	0	0	0
Middle Florida Keys Total (6)	0	0	0	0	0	0
Lower Florida Keys NMS						
180 - South of Bahia Honda Key	0	0	0	0	0	0
173 - Maryland Shoal	0	0	0	0	0	0
177 - NE of Satan Shoal	0	0	0	0	0	0
Lower Florida Keys Total (3)	0	0	0	0	0	0
Hard-bottom (6-15 m) Total (15)	0	0	0	0	0	0
<i>Patchy hard-bottom (6-15 m)</i>						
Upper Florida Keys NMS						
56 - Inshore of Watson's Reef	0	0	0	0	0	0
44 - Dixie Shoal	0	0	0	0	0	0
43 - Dixie Shoal	0	0	0	0	0	0
42 - Dixie Shoal	0	0	0	0	0	0
Upper Florida Keys Total (4)	0	0	0	0	0	0
Middle Florida Keys NMS						
96 - South of Windley Key	0	0	0	0	0	0
114 - South of Lower Matecumbe	0	0	0	0	0	0
94 - South of Duck Key	0	0	0	0	0	0
93 - South of Duck Key	0	0	0	0	0	0
Middle Florida Keys Total (4)	0	0	0	0	0	0
Lower Florida Keys NMS						
338 - South of Bahia Honda Key	0	0	0	0	0	0
179 - West of American Shoal	0	0	0	0	0	0
160 - North of Pelican Shoal	0	0	0	0	0	0
164 - West of Pelican Shoal	0	0	0	0	0	0
178 - West of Pelican Shoal	0	0	0	0	0	0
166 - Eastern Sambo RO**	0	0	0	0	0	0
332 - Eastern Sambo RO**	0	0	0	0	0	0
334 - Western Sambo ER**	0	0	0	0	0	0
167 - Western Sambo ER**	0	0	0	0	0	0
163 - West of Western Sambo ER	0	0	0	0	0	0
335 - Sand Key SPA**	0	0	0	0	0	0
169 - Sand Key SPA**	0	0	0	0	0	0
162 - West of Western Dry Rocks	0	0	0	0	0	0
Lower Florida Keys Total (13)	0	0	0	0	0	0
Patchy Hard-bottom Total (21)	0	0	0	0	0	0
<i>Low-relief spur & groove (6-15 m)</i>						
Upper Florida Keys NMS						
52 - Carysfort Reef SPA**	0	0	0	0	0	0
241 - Carysfort Reef SPA**	0	0	0	0	0	0
51 - Offshore of Dry Rocks SPA	0	0	0	0	0	0
50 - Offshore of Dry Rocks SPA	0	0	0	0	0	0
49 - Little Pickles Reef	0	0	0	0	0	0
48 - Little Pickles Reef	0	0	0	0	0	0
Upper Florida Keys Total (6)	0	0	0	0	0	0
Middle Florida Keys NMS						
355 - NE of Conch Reef	0	0	0	0	0	0

Site number/site location	White band	White pox	Tissue necrosis	Snail predation	Damselfish bites	Total colonies
282 - Conch Reef SPA**	0	0	0	0	0	0
354 - Conch Reef SPA**	0	0	0	0	0	0
107 - Conch Reef RO**	0	0	0	0	0	0
106 - Conch Reef RO**	0	0	0	0	0	0
276 - Davis Reef SPA**	0	0	0	0	0	0
80 - Davis Reef SPA**	0	0	0	0	0	0
102 - South of Lower Matecumbe	0	0	0	0	0	0
109 - Tennessee Reef RO**	0	0	0	0	0	0
108 - Tennessee Reef RO**	0	0	0	0	0	0
113 - NE of Tennessee Light	0	0	0	0	0	0
349 - South of Conch Key	0	0	0	0	0	0
100 - South of Conch Key	0	0	0	0	0	0
99 - East of Delta Shoal	0	0	0	0	0	0
110 - Sombrero Key SPA**	0	0	0	0	0	0
287 - Sombrero Key SPA**	0	0	0	0	0	0
Middle Florida Keys Total (16)	0	0	0	0	0	0
Lower Florida Keys NMS						
337 - South of Bahia Honda Key	0	0	0	0	0	0
174 - Looe Key SPA**	0	0	0	0	0	0
339 - Looe Key SPA**	0	0	0	0	0	0
142 - American Shoal	0	0	0	0	0	0
172 - East of Eastern Sambo RO	0	0	0	0	0	0
340 - Eastern Sambo RO**	0	0	0	0	0	0
175 - Eastern Sambo RO**	0	0	0	0	0	0
171 - Middle Sambo Reef	0	0	0	0	0	0
170 - Middle Sambo Reef	0	0	0	0	0	0
341 - Western Sambo ER**	0	0	0	0	0	0
176 - Western Sambo ER**	0	0	0	0	0	0
Lower Florida Keys Total (11)	0	0	0	0	0	0
Low-relief Spur & Groove Total (33)	0	0	0	0	0	0
All sites/habitats combined	0 (0%)	0 (0%)	0 (0%)	8 (1.9%)	21 (4.9%)	433

Table 11. Mean $\pm$ 1 SE densities (no. individuals per m²) and total shell lengths (SL, cm) of *Coralliophila* snails and other gastropod mollusks in the Florida Keys National Marine Sanctuary and Biscayne National Park, as determined from four 15-m x 1-m belt transects per site at 235 sites during June-August 2007. Sites are arranged by habitat from northeast to southwest and asterisked locations (**) are Sanctuary Preservation Areas (SPA), Ecological Reserves (ER), or Research Only Areas (RO).

Site number/site location	<i>Coralliophila</i> sp.		<i>Thais deltoidea</i>		<i>Leucozonia nassa</i>	
	No./m ²	SL (cm)	No./m ²	SL (cm)	No./m ²	SL (cm)
<i>Mid-channel patch reefs</i>						
Biscayne National Park						
445 - Northern Legare Anchorage	0 $\pm$ 0	0 $\pm$ 0	0 $\pm$ 0	0 $\pm$ 0	0 $\pm$ 0	0 $\pm$ 0
441 - Bache Shoal	0 $\pm$ 0	0 $\pm$ 0	0 $\pm$ 0	0 $\pm$ 0	0.017 $\pm$ 0.017	2.3
440 - South of Bache Shoal	0 $\pm$ 0	0 $\pm$ 0	0.017 $\pm$ 0.017	3.3	0 $\pm$ 0	0 $\pm$ 0
438 - South of Bache Shoal	0 $\pm$ 0	0 $\pm$ 0	0.017 $\pm$ 0.017	4.4	0 $\pm$ 0	0 $\pm$ 0
437 - South of Legare Anchorage	0 $\pm$ 0	0 $\pm$ 0	0 $\pm$ 0	0 $\pm$ 0	0 $\pm$ 0	0 $\pm$ 0
427 - Margot Fish Shoal	0 $\pm$ 0	0 $\pm$ 0	0 $\pm$ 0	0 $\pm$ 0	0 $\pm$ 0	0 $\pm$ 0
421 - Margot Fish Shoal	0 $\pm$ 0	0 $\pm$ 0	0 $\pm$ 0	0 $\pm$ 0	0 $\pm$ 0	0 $\pm$ 0
419 - Inshore of Ajax Reef	0 $\pm$ 0	0 $\pm$ 0	0 $\pm$ 0	0 $\pm$ 0	0 $\pm$ 0	0 $\pm$ 0
413 - Inshore of Pacific Reef	0 $\pm$ 0	0 $\pm$ 0	0 $\pm$ 0	0 $\pm$ 0	0 $\pm$ 0	0 $\pm$ 0
410 - Inshore of Pacific Reef	0 $\pm$ 0	0 $\pm$ 0	0 $\pm$ 0	0 $\pm$ 0	0 $\pm$ 0	0 $\pm$ 0
408 - Offshore of Broad Creek	0 $\pm$ 0	0 $\pm$ 0	0 $\pm$ 0	0 $\pm$ 0	0 $\pm$ 0	0 $\pm$ 0
406 - Offshore of Broad Creek	0 $\pm$ 0	0 $\pm$ 0	0 $\pm$ 0	0 $\pm$ 0	0 $\pm$ 0	0 $\pm$ 0
Biscayne National Park Total (12)	0 $\pm$ 0	0 $\pm$ 0	0.003 $\pm$ 0.002	3.9 $\pm$ 0.5	0.001 $\pm$ 0.001	2.3
Upper Florida Keys NMS						
4 - Basin Hill Shoals	0 $\pm$ 0	0 $\pm$ 0	0 $\pm$ 0	0 $\pm$ 0	0.017 $\pm$ 0.017	3.4
2 - Near Cannon Patch Reef	0 $\pm$ 0	0 $\pm$ 0	0 $\pm$ 0	0 $\pm$ 0	0 $\pm$ 0	0 $\pm$ 0
3 - Near Cannon Patch Reef	0 $\pm$ 0	0 $\pm$ 0	0 $\pm$ 0	0 $\pm$ 0	0 $\pm$ 0	0 $\pm$ 0
1 - Inshore of Molasses Reef	0 $\pm$ 0	0 $\pm$ 0	0 $\pm$ 0	0 $\pm$ 0	0 $\pm$ 0	0 $\pm$ 0
Upper Florida Keys Total (4)	0 $\pm$ 0	0 $\pm$ 0	0 $\pm$ 0	0 $\pm$ 0	0.004 $\pm$ 0.004	3.4
Middle Florida Keys NMS						
69 - Tavernier Rocks	0 $\pm$ 0	0 $\pm$ 0	0.017 $\pm$ 0.017	4.8	0.017 $\pm$ 0.017	2.7
71 - Hen and Chickens SPA**	0 $\pm$ 0	0 $\pm$ 0	0 $\pm$ 0	0 $\pm$ 0	0 $\pm$ 0	0 $\pm$ 0
70 - Hen and Chickens SPA**	0 $\pm$ 0	0 $\pm$ 0	0 $\pm$ 0	0 $\pm$ 0	0 $\pm$ 0	0 $\pm$ 0
68 - East of Cheeca Rocks SPA	0 $\pm$ 0	0 $\pm$ 0	0 $\pm$ 0	0 $\pm$ 0	0 $\pm$ 0	0 $\pm$ 0
72 - Cheeca Rocks SPA**	0 $\pm$ 0	0 $\pm$ 0	0 $\pm$ 0	0 $\pm$ 0	0 $\pm$ 0	0 $\pm$ 0
73 - Cheeca Rocks SPA**	0 $\pm$ 0	0 $\pm$ 0	0 $\pm$ 0	0 $\pm$ 0	0 $\pm$ 0	0 $\pm$ 0
66 - East Turtle Shoal	0 $\pm$ 0	0 $\pm$ 0	0 $\pm$ 0	0 $\pm$ 0	0 $\pm$ 0	0 $\pm$ 0
254 - East Turtle Shoal	0 $\pm$ 0	0 $\pm$ 0	0 $\pm$ 0	0 $\pm$ 0	0.017 $\pm$ 0.017	2.7
Middle Florida Keys Total (8)	0 $\pm$ 0	0 $\pm$ 0	0.002 $\pm$ 0.002	4.8	0.004 $\pm$ 0.003	2.7 $\pm$ 0
Lower Florida Keys NMS						
122 - North of Big Pine Shoal	0 $\pm$ 0	0 $\pm$ 0	0 $\pm$ 0	0 $\pm$ 0	0 $\pm$ 0	0 $\pm$ 0
121 - North of Maryland Shoal	0 $\pm$ 0	0 $\pm$ 0	0 $\pm$ 0	0 $\pm$ 0	0 $\pm$ 0	0 $\pm$ 0
120 - North of Maryland Shoal	0 $\pm$ 0	0 $\pm$ 0	0 $\pm$ 0	0 $\pm$ 0	0 $\pm$ 0	0 $\pm$ 0
119 - North of Pelican Shoal	0 $\pm$ 0	0 $\pm$ 0	0 $\pm$ 0	0 $\pm$ 0	0 $\pm$ 0	0 $\pm$ 0
118 - East of Western Sambo ER	0 $\pm$ 0	0 $\pm$ 0	0 $\pm$ 0	0 $\pm$ 0	0 $\pm$ 0	0 $\pm$ 0
126 - Western Sambo ER**	0 $\pm$ 0	0 $\pm$ 0	0 $\pm$ 0	0 $\pm$ 0	0 $\pm$ 0	0 $\pm$ 0
125 - Western Sambo ER**	0 $\pm$ 0	0 $\pm$ 0	0 $\pm$ 0	0 $\pm$ 0	0 $\pm$ 0	0 $\pm$ 0
124 - Western Sambo ER**	0 $\pm$ 0	0 $\pm$ 0	0 $\pm$ 0	0 $\pm$ 0	0 $\pm$ 0	0 $\pm$ 0
123 - Western Sambo ER**	0 $\pm$ 0	0 $\pm$ 0	0 $\pm$ 0	0 $\pm$ 0	0 $\pm$ 0	0 $\pm$ 0
117 - NW of Sand Key SPA	0 $\pm$ 0	0 $\pm$ 0	0 $\pm$ 0	0 $\pm$ 0	0 $\pm$ 0	0 $\pm$ 0
116 - North of Satan Shoal	0 $\pm$ 0	0 $\pm$ 0	0 $\pm$ 0	0 $\pm$ 0	0 $\pm$ 0	0 $\pm$ 0
115 - North of Satan Shoal	0 $\pm$ 0	0 $\pm$ 0	0 $\pm$ 0	0 $\pm$ 0	0 $\pm$ 0	0 $\pm$ 0
Lower Florida Keys Total (12)	0 $\pm$ 0	0 $\pm$ 0	0 $\pm$ 0	0 $\pm$ 0	0 $\pm$ 0	0 $\pm$ 0
Mid-channel Patch Reef Total (36)	0 $\pm$ 0	0 $\pm$ 0	0.001 $\pm$ 0.001	4.2 $\pm$ 0.4	0.002 $\pm$ 0.001	2.8 $\pm$ 0.2
<i>Offshore patch reefs</i>						
Biscayne National Park						
471 - Northwest of Triumph Reef	0.017 $\pm$ 0.017	2.0	0 $\pm$ 0	0 $\pm$ 0	0 $\pm$ 0	0 $\pm$ 0
461 - NW of Long Reef	0 $\pm$ 0	0 $\pm$ 0	0 $\pm$ 0	0 $\pm$ 0	0 $\pm$ 0	0 $\pm$ 0

Site number/site location	<i>Coralliophila</i> sp.		<i>Thais deltoidea</i>		<i>Leucozonia nassa</i>	
	No./m ²	SL (cm)	No./m ²	SL (cm)	No./m ²	SL (cm)
460 - NW of Long Reef	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0
459 - NW of Pacific Reef	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0
458 - Inshore of Pacific Reef	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0
456 - Inshore of Pacific Reef	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0
454 - Northwest of Whistle Buoy	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0
Biscayne National Park Total (7)	0.002 ± 0.002	2.0	0 ± 0	0 ± 0	0 ± 0	0 ± 0
Upper Florida Keys NMS						
16 - North of Carysfort Reef SPA	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0
15 - North of Carysfort Reef SPA	0 ± 0	0 ± 0	0.133 ± 0.072	2.1 ± 0.2	0 ± 0	0 ± 0
14 - North of Carysfort Reef SPA	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0
47 - Carysfort Reef SPA**	0 ± 0	0 ± 0	0.017 ± 0.017	1.3	0 ± 0	0 ± 0
345 - Carysfort Reef SPA**	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0
46 - Carysfort Reef SPA**	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0
39 - Carysfort Reef SPA**	0 ± 0	0 ± 0	0.017 ± 0.017	1.9	0 ± 0	0 ± 0
37 - West of Carysfort Reef SPA	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0
13 - Inshore of Watson's Reef	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0
55 - Inshore of Watson's Reef	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0
358 - Inshore of Watson's Reef	0.017 ± 0.017	1.8	0 ± 0	0 ± 0	0 ± 0	0 ± 0
54 - Inshore of Watson's Reef	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0
347 - Inshore of Watson's Reef	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0
12 - Inshore of Watson's Reef	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0
9 - White Banks	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0
8 - Inshore of French Reef	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0
7 - Inshore of Molasses Reef	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0
6 - Inshore of Molasses Reef	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0
5 - Inshore of Pickles Reef	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0
Upper Florida Keys Total (19)	0.001 ± 0.001	1.8	0.009 ± 0.007	2.0 ± 0.2	0 ± 0	0 ± 0
Middle Florida Keys NMS						
77 - Inshore of Conch Reef SPA	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0
76 - Inshore of Conch Reef SPA	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0
75 - Inshore of Conch Reef SPA	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0
74 - Inshore of Conch Reef SPA	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0
98 - Coffins Patch SPA**	0 ± 0	0 ± 0	0.033 ± 0.019	2.6 ± 0.4	0 ± 0	0 ± 0
277 - Coffins Patch SPA**	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0
Middle Florida Keys Total (6)	0 ± 0	0 ± 0	0.006 ± 0.006	2.6 ± 0.4	0 ± 0	0 ± 0
Lower Florida Keys NMS						
133 - Looe Key Research Only**	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0
132 - Looe Key Research Only**	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0
131 - North of Looe Key SPA**	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0
130 - Maryland Shoal	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0
129 - North of Maryland Shoal	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0
165 - North of Maryland Shoal	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0
128 - NE of Eastern Sambo RO	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0
135 - Western Sambo ER**	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0
168 - Western Sambo ER**	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0.017 ± 0.017	3.6
127 - West of Sand Key SPA	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0
Lower Florida Keys Total (10)	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0.002 ± 0.002	3.6
Offshore Patch Reef Total (42)	0.001 ± 0.001	1.9 ± 0.1	0.005 ± 0.003	2.1 ± 0.1	0.001 ± 0.001	3.6
<i>Hard-bottom/rubble/sand matrix</i>						
Upper Florida Keys NMS						
40 - Carysfort Reef SPA**	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0
38 - West of Carysfort Reef SPA	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0
36 - West of Carysfort Reef SPA	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0
11 - NW of Dry Rocks SPA	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0
Upper Florida Keys Total (4)	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0
Hard-bottom Matrix Total (4)	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0

Site number/site location	<i>Coralliophila</i> sp.		<i>Thais deltoidea</i>		<i>Leucozonia nassa</i>	
	No./m ²	SL (cm)	No./m ²	SL (cm)	No./m ²	SL (cm)
<i>Low-relief hard-bottom (< 6 m)</i>						
Biscayne National Park						
475 - Fowey Rocks	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0
469 - South of Ajax Reef	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0.017 ± 0.017	3.1
Biscayne National Park Total (2)	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0.008 ± 0.008	3.1
Upper Florida Keys NMS						
346 - Carysfort Reef SPA**	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0
35 - West of Carysfort Reef SPA	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0
34 - West of Carysfort Reef SPA	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0
33 - Inshore of Watson's Reef	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0.017 ± 0.017	4.5
17 - Little Pickles Reef	0 ± 0	0 ± 0	0.133 ± 0.072	3.5 ± 0.1	0.017 ± 0.017	6.0
Upper Florida Keys Total (5)	0 ± 0	0 ± 0	0.027 ± 0.027	3.5 ± 0.1	0.007 ± 0.004	5.3 ± 0.8
Middle Florida Keys NMS						
269 - Conch Reef SPA**	0 ± 0	0 ± 0	0.200 ± 0.072	2.7 ± 0.1	0 ± 0	0 ± 0
89 - Conch Reef SPA**	0 ± 0	0 ± 0	0.333 ± 0.105	2.8 ± 0.1	0.017 ± 0.017	2.7
88 - Little Conch Reef	0 ± 0	0 ± 0	0.033 ± 0.033	3.0 ± 0.0	0 ± 0	0 ± 0
352 - Little Conch Reef	0 ± 0	0 ± 0	0.167 ± 0.088	3.2 ± 0.2	0 ± 0	0 ± 0
97 - Davis Reef SPA**	0 ± 0	0 ± 0	0.183 ± 0.057	2.9 ± 0.1	0 ± 0	0 ± 0
90 - Davis Reef SPA**	0 ± 0	0 ± 0	0.050 ± 0.032	3.3 ± 0.4	0 ± 0	0 ± 0
86 - South of Windley Key	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0
103 - NE of Alligator Light	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0
82 - Alligator Reef SPA**	0 ± 0	0 ± 0	0.133 ± 0.027	3.3 ± 0.3	0.017 ± 0.017	4.5
81 - Alligator Reef SPA**	0 ± 0	0 ± 0	0.133 ± 0.061	3.4 ± 0.2	0 ± 0	0 ± 0
350 - Tennessee Light	0 ± 0	0 ± 0	0.017 ± 0.017	3.1	0 ± 0	0 ± 0
85 - East of Coffins Patch SPA	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0
92 - Coffins Patch SPA**	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0
91 - Coffins Patch SPA**	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0
Middle Florida Keys Total (14)	0 ± 0	0 ± 0	0.089 ± 0.028	3.0 ± 0.1	0.002 ± 0.002	3.6 ± 0.9
Lower Florida Keys NMS						
161 - West of American Shoal	0 ± 0	0 ± 0	0.017 ± 0.017	3.0	0 ± 0	0 ± 0
140 - Maryland Shoal	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0
159 - North of Pelican Shoal	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0
158 - East of No Name Reef	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0
Lower Florida Keys Total (4)	0 ± 0	0 ± 0	0.004 ± 0.004	3.0	0 ± 0	0 ± 0
Hard-bottom (< 6 m) Total (25)	0 ± 0	0 ± 0	0.056 ± 0.018	3.0 ± 0.1	0.003 ± 0.001	4.2 ± 0.6
<i>Inner line reef tract spur & groove</i>						
Upper Florida Keys NMS						
61 - Turtle Reef	0 ± 0	0 ± 0	0.033 ± 0.033	1.8 ± 0.5	0 ± 0	0 ± 0
60 - Inshore of Elbow Reef SPA	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0
59 - Inshore of Elbow Reef SPA	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0
58 - Horseshoe Reef	0 ± 0	0 ± 0	0.267 ± 0.125	2.8 ± 0.2	0.017 ± 0.017	3.3
62 - Dry Rocks SPA**	0 ± 0	0 ± 0	0.300 ± 0.117	2.6 ± 0.1	0 ± 0	0 ± 0
63 - Dry Rocks SPA**	0 ± 0	0 ± 0	0.367 ± 0.104	2.8 ± 0.1	0.033 ± 0.033	3.4 ± 0.3
65 - Grecian Rocks SPA**	0 ± 0	0 ± 0	0.267 ± 0.122	2.7 ± 0.1	0.100 ± 0.043	3.2 ± 0.1
64 - Grecian Rocks SPA**	0 ± 0	0 ± 0	0.050 ± 0.032	2.3 ± 0.3	0.067 ± 0.038	2.6 ± 0.3
Upper Florida Keys Total (8)	0 ± 0	0 ± 0	0.160 ± 0.054	2.7 ± 0.1	0.027 ± 0.013	3.0 ± 0.1
Inner Line Reef Tract Total (8)	0 ± 0	0 ± 0	0.160 ± 0.054	2.7 ± 0.1	0.027 ± 0.013	3.0 ± 0.1
<i>High-relief spur & groove</i>						
Biscayne National Park						
474 - Brewster Reef	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0
472 - Star Reef	0 ± 0	0 ± 0	0.017 ± 0.017	3.1	0 ± 0	0 ± 0
470 - Triumph Reef	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0.067 ± 0.047	2.1 ± 0.2
467 - Long Reef	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0
466 - Ajax Reef	0 ± 0	0 ± 0	0.083 ± 0.050	3.2 ± 0.1	0 ± 0	0 ± 0
465 - Ajax Reef	0 ± 0	0 ± 0	0.017 ± 0.017	1.8	0.050 ± 0.050	1.6 ± 0.2

Site number/site location	<i>Coralliophila</i> sp.		<i>Thais deltoidea</i>		<i>Leucozonia nassa</i>	
	No./m ²	SL (cm)	No./m ²	SL (cm)	No./m ²	SL (cm)
464 - Pacific Reef	0 ± 0	0 ± 0	0.133 ± 0.027	2.7 ± 0.3	0.033 ± 0.033	2.3 ± 0.4
Biscayne National Park Total (7)	0 ± 0	0 ± 0	0.036 ± 0.020	2.8 ± 0.2	0.021 ± 0.011	2.0 ± 0.2
Upper Florida Keys NMS						
26 - Carysfort Reef SPA**	0 ± 0	0 ± 0	0.067 ± 0.038	3.0 ± 0.1	0 ± 0	0 ± 0
25 - Carysfort Reef SPA**	0 ± 0	0 ± 0	0.050 ± 0.032	2.2 ± 0.5	0 ± 0	0 ± 0
218 - South Carysfort Reef SPA**	0 ± 0	0 ± 0	0.017 ± 0.017	3.4	0.033 ± 0.033	4.1 ± 0.1
217 - South Carysfort Reef SPA**	0 ± 0	0 ± 0	0.333 ± 0.061	3.2 ± 0.1	0.067 ± 0.038	3.2 ± 0.3
24 - Maitland Grounding Site	0 ± 0	0 ± 0	0.083 ± 0.032	2.8 ± 0.1	0 ± 0	0 ± 0
28 - Elbow Reef SPA**	0 ± 0	0 ± 0	0.617 ± 0.250	2.7 ± 0.1	0.117 ± 0.079	3.2 ± 0.4
27 - Elbow Reef SPA**	0 ± 0	0 ± 0	0.217 ± 0.032	2.7 ± 0.2	0.033 ± 0.019	4.0 ± 0.3
30 - French Reef SPA**	0 ± 0	0 ± 0	0.117 ± 0.032	2.6 ± 0.2	0.017 ± 0.017	4.5
29 - French Reef SPA**	0.017 ± 0.017	4.1	0.067 ± 0.027	2.9 ± 0.1	0 ± 0	0 ± 0
23 - SW of French Reef SPA	0 ± 0	0 ± 0	0.017 ± 0.017	4.0	0 ± 0	0 ± 0
357 - Sand Island	0 ± 0	0 ± 0	0.500 ± 0.137	2.4 ± 0.1	0.050 ± 0.017	2.9 ± 0.1
356 - Sand Island	0.117 ± 0.057	2.2 ± 0.2	0.400 ± 0.133	2.4 ± 0.1	0.183 ± 0.032	2.8 ± 0.2
32 - Molasses Reef SPA**	0.017 ± 0.017	2.1	0.417 ± 0.100	2.7 ± 0.1	0.033 ± 0.019	3.8 ± 1.0
31 - Molasses Reef SPA**	0.250 ± 0.145	1.6 ± 0.1	0.100 ± 0.079	2.6 ± 0.3	0.033 ± 0.019	2.7 ± 0.1
19 - Pickles Reef	0 ± 0	0 ± 0	0.200 ± 0.082	3.1 ± 0.1	0 ± 0	0 ± 0
20 - Pickles Reef	0 ± 0	0 ± 0	0.250 ± 0.092	2.8 ± 0.1	0.033 ± 0.019	3.2 ± 0.2
18 - Pickles Reef	0.017 ± 0.017	3.4	0.267 ± 0.047	2.8 ± 0.1	0.150 ± 0.042	3.0 ± 0.2
Upper Florida Keys Total (17)	0.025 ± 0.016	2.0 ± 0.2	0.219 ± 0.044	2.7 ± 0.0	0.044 ± 0.013	3.1 ± 0.1
Middle Florida Keys NMS						
79 - Delta Shoal	0 ± 0	0 ± 0	0.150 ± 0.017	2.8 ± 0.3	0.033 ± 0.019	3.8 ± 0.7
78 - Delta Shoal	0 ± 0	0 ± 0	0.200 ± 0.027	2.9 ± 0.2	0.083 ± 0.063	1.6 ± 0.5
84 - Sombrero Key SPA**	0.017 ± 0.017	4.8	0.317 ± 0.050	2.9 ± 0.1	0.117 ± 0.074	3.3 ± 0.3
83 - Sombrero Key SPA**	0 ± 0	0 ± 0	0.433 ± 0.262	2.8 ± 0.1	0.017 ± 0.017	5.3
Middle Florida Keys Total (4)	0.004 ± 0.004	4.8	0.275 ± 0.063	2.9 ± 0.1	0.063 ± 0.023	2.9 ± 0.4
Lower Florida Keys NMS						
148 - Looe Key SPA**	0.217 ± 0.217	2.4 ± 0.2	0.933 ± 0.246	2.6 ± 0.1	0.233 ± 0.117	3.4 ± 0.2
147 - Looe Key SPA**	0 ± 0	0 ± 0	0.367 ± 0.111	2.8 ± 0.1	0 ± 0	0 ± 0
145 - American Shoal	0 ± 0	0 ± 0	0.017 ± 0.017	3.2	0 ± 0	0 ± 0
146 - American Shoal	0 ± 0	0 ± 0	0.150 ± 0.032	3.3 ± 0.2	0.033 ± 0.019	2.1 ± 0.4
144 - Maryland Shoal	0 ± 0	0 ± 0	0.283 ± 0.050	2.6 ± 0.2	0 ± 0	0 ± 0
141 - Maryland Shoal	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0
143 - Maryland Shoal	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0.017 ± 0.017	2.8
139 - Pelican Shoal	0 ± 0	0 ± 0	0.450 ± 0.21	2.7 ± 0.1	0.050 ± 0.050	1.6 ± 0.6
138 - No Name Reef	0 ± 0	0 ± 0	0.850 ± 0.254	2.7 ± 0.1	0.067 ± 0.038	1.8 ± 0.4
137 - No Name Reef	0 ± 0	0 ± 0	0.350 ± 0.113	2.6 ± 0.1	0.017 ± 0.017	2.7
150 - Eastern Sambo RO**	0 ± 0	0 ± 0	1.383 ± 0.208	2.5 ± 0.1	0.200 ± 0.082	2.8 ± 0.3
149 - Eastern Sambo RO**	0 ± 0	0 ± 0	1.717 ± 0.107	2.5 ± 0.0	0.117 ± 0.074	3.2 ± 0.3
348 - Middle Sambo Reef	0 ± 0	0 ± 0	1.300 ± 0.222	2.7 ± 0.1	0.100 ± 0.058	2.8 ± 0.1
309 - Middle Sambo Reef	0 ± 0	0 ± 0	1.267 ± 0.328	2.5 ± 0.1	0.167 ± 0.058	3.3 ± 0.1
152 - Western Sambo ER**	0 ± 0	0 ± 0	0.917 ± 0.247	2.7 ± 0.1	0.250 ± 0.032	2.9 ± 0.3
151 - Western Sambo ER**	0 ± 0	0 ± 0	2.483 ± 0.321	2.7 ± 0.0	0.133 ± 0.027	2.8 ± 0.4
136 - East of E. Dry Rocks SPA	0 ± 0	0 ± 0	0.267 ± 0.189	2.6 ± 0.1	0.050 ± 0.032	2.9 ± 0.5
154 - Eastern Dry Rocks SPA**	0 ± 0	0 ± 0	0.717 ± 0.069	2.8 ± 0.1	0.100 ± 0.043	4.0 ± 0.3
153 - Eastern Dry Rocks SPA**	0 ± 0	0 ± 0	1.850 ± 0.385	2.7 ± 0.0	0.167 ± 0.19	3.2 ± 0.2
156 - Rock Key SPA**	0 ± 0	0 ± 0	0.450 ± 0.145	2.9 ± 0.1	0.250 ± 0.129	2.8 ± 0.2
155 - Rock Key SPA**	0 ± 0	0 ± 0	1.267 ± 0.321	2.5 ± 0.1	0.033 ± 0.033	3.5 ± 0.5
325 - Sand Key SPA**	0 ± 0	0 ± 0	1.067 ± 0.268	2.8 ± 0.1	0.333 ± 0.112	2.8 ± 0.1
157 - Sand Key SPA**	0 ± 0	0 ± 0	1.767 ± 0.441	2.5 ± 0.0	0.233 ± 0.064	2.9 ± 0.2
Lower Florida Keys Total (23)	0.009 ± 0.009	2.4 ± 0.2	0.863 ± 0.142	3.6 ± 0.6	0.111 ± 0.021	3.3 ± 0.5
High-relief Spur & Groove (51)	0.013 ± 0.007	2.2 ± 0.1	0.489 ± 0.081	2.7 ± 0.0	0.073 ± 0.012	2.9 ± 0.1
Low-relief hard-bottom (6-15 m)						
Upper Florida Keys NMS						
53 - Carysfort Reef SPA**	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0
240 - Carysfort Reef SPA**	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0

Site number/site location	<i>Coralliophila</i> sp.		<i>Thais deltoidea</i>		<i>Leucozonia nassa</i>	
	No./m ²	SL (cm)	No./m ²	SL (cm)	No./m ²	SL (cm)
57 - Inshore of Watson's Reef	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0
45 - Offshore of Dry Rocks SPA	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0
22 - SW of French Reef SPA	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0.017 ± 0.017	2.3
21 - SW of French Reef SPA	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0
Upper Florida Keys Total (6)	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0.003 ± 0.003	2.3
Middle Florida Keys NMS						
353 - Conch Reef SPA**	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0
105 - Conch Reef SPA**	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0
104 - NE of Alligator Light	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0
351 - South of Indian Key	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0
101 - South of Lower Matecumbe	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0.017 ± 0.017	4.6
111 - West of Sombra Key	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0
Middle Florida Keys Total (6)	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0.003 ± 0.003	4.6
Lower Florida Keys NMS						
180 - South of Bahia Honda Key	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0
173 - Maryland Shoal	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0
177 - NE of Satan Shoal	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0
Lower Florida Keys Total (3)	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0
Hard-bottom (6-15 m) Total (15)	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0.002 ± 0.002	3.5 ± 1.2
<i>Patchy hard-bottom (6-15 m)</i>						
Upper Florida Keys NMS						
56 - Inshore of Watson's Reef	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0
44 - Dixie Shoal	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0
43 - Dixie Shoal	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0
42 - Dixie Shoal	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0
Upper Florida Keys Total (4)	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0
Middle Florida Keys NMS						
96 - South of Windley Key	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0
114 - South of Lower Matecumbe	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0
94 - South of Duck Key	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0
93 - South of Duck Key	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0
Middle Florida Keys Total (4)	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0
Lower Florida Keys NMS						
338 - South of Bahia Honda Key	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0
179 - West of American Shoal	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0
160 - North of Pelican Shoal	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0
164 - West of Pelican Shoal	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0
178 - West of Pelican Shoal	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0
166 - Eastern Sambo RO**	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0
332 - Eastern Sambo RO**	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0
334 - Western Sambo ER**	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0
167 - Western Sambo ER**	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0.017 ± 0.017	2.9
163 - West of Western Sambo ER	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0
335 - Sand Key SPA**	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0
169 - Sand Key SPA**	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0
162 - West of Western Dry Rocks	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0
Lower Florida Keys Total (13)	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0
Patchy Hard-bottom Total (21)	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0.001 ± 0.001	2.9
<i>Low-relief spur & groove (6-15 m)</i>						
Upper Florida Keys NMS						
52 - Carysfort Reef SPA**	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0
241 - Carysfort Reef SPA**	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0
51 - Offshore of Dry Rocks SPA	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0
50 - Offshore of Dry Rocks SPA	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0
49 - Little Pickles Reef	0.033 ± 0.033	1.8 ± 0.3	0 ± 0	0 ± 0	0 ± 0	0 ± 0
48 - Little Pickles Reef	0.083 ± 0.083	2.0 ± 0.2	0 ± 0	0 ± 0	0 ± 0	0 ± 0

Site number/site location	<i>Coralliophila</i> sp.		<i>Thais deltoidea</i>		<i>Leucozonia nassa</i>	
	No./m ²	SL (cm)	No./m ²	SL (cm)	No./m ²	SL (cm)
Upper Florida Keys Total (6)	0.019 ± 0.014	2.0 ± 0.2	0 ± 0	0 ± 0	0 ± 0	0 ± 0
Middle Florida Keys NMS						
355 - NE of Conch Reef	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0
282 - Conch Reef SPA**	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0
354 - Conch Reef SPA**	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0
107 - Conch Reef RO**	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0
106 - Conch Reef RO**	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0
276 - Davis Reef SPA**	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0
80 - Davis Reef SPA**	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0
102 - South of Lower Matecumbe	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0
109 - Tennessee Reef RO**	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0
108 - Tennessee Reef RO**	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0
113 - NE of Tennessee Light	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0
349 - South of Conch Key	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0
100 - South of Conch Key	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0
99 - East of Delta Shoal	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0
110 - Sombrero Key SPA**	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0
287 - Sombrero Key SPA**	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0
Middle Florida Keys Total (16)	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0
Lower Florida Keys NMS						
337 - South of Bahia Honda Key	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0
174 - Looe Key SPA**	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0
339 - Looe Key SPA**	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0
142 - American Shoal	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0
172 - East of Eastern Sambo RO	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0
340 - Eastern Sambo RO**	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0
175 - Eastern Sambo RO**	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0
171 - Middle Sambo Reef	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0
170 - Middle Sambo Reef	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0
341 - Western Sambo ER**	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0
176 - Western Sambo ER**	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0
Lower Florida Keys Total (11)	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0
Low-relief Spur & Groove (33)	0.004 ± 0.003	2.0 ± 0.2	0 ± 0	0 ± 0	0 ± 0	0 ± 0

Table 12. Size frequency distributions (top) and substratum occupancy patterns (bottom) of *Coralliophila* and other gastropod mollusks in the Florida Keys National Marine Sanctuary and Biscayne National Park, as determined from four 15-m x 1-m belt transects per site at 235 sites during June-August 2007.

Gastropod Shell Length Frequency

Total Shell Length (cm)	<i>Coralliophila</i> sp.		<i>Thais deltoidea</i>		<i>Leucozonia nassa</i>	
	Frequency	% Total	Frequency	% Total	Frequency	% Total
< 1.0	2	4.2	0	0.0	2	0.8
1-1.9	18	37.5	182	10.9	28	11.3
2-2.9	19	39.6	992	59.4	86	34.7
3-3.9	7	14.6	475	28.4	106	42.7
4-4.9	2	4.2	22	1.3	23	9.3
5-5.9	0	0.0	0	0.0	2	0.8
6-6.9	0	0.0	0	0.0	1	0.4
Total	48	100.0	1,671	100.0	248	100.0

Gastropod Substratum Occupancy

Substratum Type	<i>Coralliophila</i> sp.		<i>Thais deltoidea</i>		<i>Leucozonia nassa</i>	
	Frequency	% Total	Frequency	% Total	Frequency	% Total
Algal turf	4	8.3	1,129	67.6	141	56.9
Coralline algae	2	4.2	428	25.6	91	36.7
<i>Dictyota</i> algae	0	0.0	8	0.5	1	0.4
<i>Halimeda</i> algae	0	0.0	4	0.2	2	0.8
Sponge	0	0.0	0	0.0	1	0.4
<i>Millepora</i>	0	0.0	1	0.1	0	0.0
Scleractinian coral	41	85.4	14	0.8	1	0.4
<i>Palythoa</i>	0	0.0	1	0.1	0	0.0
<i>Coralliophila</i> sp.	1	2.1	0	0.0	0	0.0
<i>Thais deltoidea</i>	0	0.0	59	3.5	1	0.4
<i>Leucozonia nassa</i>	0	0.0	2	0.1	3	1.2
Sand	0	0.0	25	1.5	7	2.8
Total	48	100.0	1,671	100.0	248	100.0

Table 13. Mean $\pm$ 1 SE densities (no. individuals per m²), test diameter (TD, cm), and numbers of individuals (N) of the urchins *Diadema antillarum* and *Echinometra lucunter* in the Florida Keys National Marine Sanctuary and Biscayne National Park, as determined from four 15-m x 1-m belt transects per site at 235 sites during June-August 2007. Sites are arranged by habitat from northeast to southwest and asterisked locations (**) are no-take marine reserves.

Site number/site location	<i>Diadema antillarum</i>			<i>Echinometra lucunter</i>		
	No./m ²	TD (cm)	N	No./m ²	TD (cm)	N
<i>Mid-channel patch reefs</i>						
Biscayne National Park						
445 - Northern Legare Anchorage	0 $\pm$ 0	0 $\pm$ 0		0 $\pm$ 0	0 $\pm$ 0	
441 - Bache Shoal	0 $\pm$ 0	0 $\pm$ 0		0 $\pm$ 0	0 $\pm$ 0	
440 - South of Bache Shoal	0 $\pm$ 0	0 $\pm$ 0		0 $\pm$ 0	0 $\pm$ 0	
438 - South of Bache Shoal	0.017 $\pm$ 0.017	6.8	1	0 $\pm$ 0	0 $\pm$ 0	
437 - South of Legare Anchorage	0 $\pm$ 0	0 $\pm$ 0		0 $\pm$ 0	0 $\pm$ 0	
427 - Margot Fish Shoal	0 $\pm$ 0	0 $\pm$ 0		0 $\pm$ 0	0 $\pm$ 0	
421 - Margot Fish Shoal	0.050 $\pm$ 0.050	0.7 $\pm$ 0.0	3	0.017 $\pm$ 0.017	2.2	1
419 - Inshore of Ajax Reef	0 $\pm$ 0	0 $\pm$ 0		0 $\pm$ 0	0 $\pm$ 0	
413 - Inshore of Pacific Reef	0 $\pm$ 0	0 $\pm$ 0		0 $\pm$ 0	0 $\pm$ 0	
410 - Inshore of Pacific Reef	0.050 $\pm$ 0.032	2.0 $\pm$ 1.2	3	0.033 $\pm$ 0.033	1.9 $\pm$ 0.3	2
408 - Offshore of Broad Creek	0 $\pm$ 0	0 $\pm$ 0		0.133 $\pm$ 0.072	2.1 $\pm$ 0.1	8
406 - Offshore of Broad Creek	0 $\pm$ 0	0 $\pm$ 0		0 $\pm$ 0	0 $\pm$ 0	
Biscayne National Park Total (12)	0.010 $\pm$ 0.006	2.2 $\pm$ 0.9	7	0.015 $\pm$ 0.011	2.0 $\pm$ 0.1	11
Upper Florida Keys NMS						
4 - Basin Hill Shoals	0 $\pm$ 0	0 $\pm$ 0		0 $\pm$ 0	0 $\pm$ 0	
2 - Near Cannon Patch Reef	0 $\pm$ 0	0 $\pm$ 0		0 $\pm$ 0	0 $\pm$ 0	
3 - Near Cannon Patch Reef	0 $\pm$ 0	0 $\pm$ 0		0 $\pm$ 0	0 $\pm$ 0	
1 - Inshore of Molasses Reef	0 $\pm$ 0	0 $\pm$ 0		0 $\pm$ 0	0 $\pm$ 0	
Upper Florida Keys Total (4)	0 $\pm$ 0	0 $\pm$ 0		0 $\pm$ 0	0 $\pm$ 0	
Middle Florida Keys NMS						
69 - Tavernier Rocks	0 $\pm$ 0	0 $\pm$ 0		0 $\pm$ 0	0 $\pm$ 0	
71 - Hen and Chickens SPA**	0 $\pm$ 0	0 $\pm$ 0		0 $\pm$ 0	0 $\pm$ 0	
70 - Hen and Chickens SPA**	0 $\pm$ 0	0 $\pm$ 0		0 $\pm$ 0	0 $\pm$ 0	
68 - East of Cheeca Rocks SPA	0 $\pm$ 0	0 $\pm$ 0		0 $\pm$ 0	0 $\pm$ 0	
72 - Cheeca Rocks SPA**	0 $\pm$ 0	0 $\pm$ 0		0 $\pm$ 0	0 $\pm$ 0	
73 - Cheeca Rocks SPA**	0 $\pm$ 0	0 $\pm$ 0		0 $\pm$ 0	0 $\pm$ 0	
66 - East Turtle Shoal	0.050 $\pm$ 0.050	4.2 $\pm$ 0.5	3	0 $\pm$ 0	0 $\pm$ 0	
254 - East Turtle Shoal	0 $\pm$ 0	0 $\pm$ 0		0 $\pm$ 0	0 $\pm$ 0	
Middle Florida Keys Total (8)	0.006 $\pm$ 0.006	4.2 $\pm$ 0.5	3	0 $\pm$ 0	0 $\pm$ 0	
Lower Florida Keys NMS						
122 - North of Big Pine Shoal	0.050 $\pm$ 0.032	5.2 $\pm$ 2.3	3	0.017 $\pm$ 0.017	1.0	1
121 - North of Maryland Shoal	0.017 $\pm$ 0.017	5.6	1	0 $\pm$ 0	0 $\pm$ 0	
120 - North of Maryland Shoal	0.017 $\pm$ 0.017	1.4	1	0 $\pm$ 0	0 $\pm$ 0	
119 - North of Pelican Shoal	0 $\pm$ 0	0 $\pm$ 0		0 $\pm$ 0	0 $\pm$ 0	
118 - East of Western Sambo ER	0.050 $\pm$ 0.132	3.7 $\pm$ 1.5	3	0 $\pm$ 0	0 $\pm$ 0	
126 - Western Sambo ER**	0.017 $\pm$ 0.017	6.0	1	0 $\pm$ 0	0 $\pm$ 0	
125 - Western Sambo ER**	0.050 $\pm$ 0.032	2.5 $\pm$ 1.5	3	0 $\pm$ 0	0 $\pm$ 0	
124 - Western Sambo ER**	0.017 $\pm$ 0.017	4.2	1	0 $\pm$ 0	0 $\pm$ 0	
123 - Western Sambo ER**	0 $\pm$ 0	0 $\pm$ 0		0 $\pm$ 0	0 $\pm$ 0	
117 - NW of Sand Key SPA	0.033 $\pm$ 0.019	4.6 $\pm$ 0.6	2	0 $\pm$ 0	0 $\pm$ 0	
116 - North of Satan Shoal	0.033 $\pm$ 0.019	1.8 $\pm$ 0.2	2	0 $\pm$ 0	0 $\pm$ 0	
115 - North of Satan Shoal	0.033 $\pm$ 0.019	1.4 $\pm$ 0.2	2	0 $\pm$ 0	0 $\pm$ 0	
Lower Florida Keys Total (12)	0.026 $\pm$ 0.005	3.5 $\pm$ 0.6	19	0.001 $\pm$ 0.001	1.0	1
Mid-channel Patch Reef Total (36)	0.013 $\pm$ 0.003	3.3 $\pm$ 0.4	29	0.006 $\pm$ 0.004	1.9 $\pm$ 0.1	12

Site number/site location	<i>Diadema antillarum</i>			<i>Echinometra lucunter</i>		
	No./m ²	TD (cm)	N	No./m ²	TD (cm)	N
<i>Offshore patch reefs</i>						
Biscayne National Park						
471 - Northwest of Triumph Reef	0.067 ± 0.047	6.5 ± 0.5	4	0 ± 0	0 ± 0	
461 - NW of Long Reef	0.067 ± 0.027	4.4 ± 1.0	4	0 ± 0	0 ± 0	
460 - NW of Long Reef	0.033 ± 0.019	5.3 ± 0.8	2	0 ± 0	0 ± 0	
459 - NW of Pacific Reef	0.150 ± 0.050	5.4 ± 0.6	9	0 ± 0	0 ± 0	
458 - Inshore of Pacific Reef	0.200 ± 0.119	4.9 ± 0.4	12	0 ± 0	0 ± 0	
456 - Inshore of Pacific Reef	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
454 - Northwest of Whistle Buoy	0.083 ± 0.032	1.9 ± 1.0	5	0 ± 0	0 ± 0	
Biscayne National Park Total (7)	0.086 ± 0.026	4.8 ± 0.3	36	0 ± 0	0 ± 0	
Upper Florida Keys NMS						
16 - North of Carysfort Reef SPA	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
15 - North of Carysfort Reef SPA	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
14 - North of Carysfort Reef SPA	0.083 ± 0.032	7.1 ± 0.9	5	0.017 ± 0.017	2.0	1
47 - Carysfort Reef SPA**	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
345 - Carysfort Reef SPA**	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
46 - Carysfort Reef SPA**	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
39 - Carysfort Reef SPA**	0.017 ± 0.017	6.6	1	0 ± 0	0 ± 0	
37 - West of Carysfort Reef SPA	0.133 ± 0.077	5.2 ± 0.3	8	0 ± 0	0 ± 0	
13 - Inshore of Watson's Reef	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
55 - Inshore of Watson's Reef	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
358 - Inshore of Watson's Reef	0.017 ± 0.017	1.0	1	0 ± 0	0 ± 0	
54 - Inshore of Watson's Reef	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
347 - Inshore of Watson's Reef	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
12 - Inshore of Watson's Reef	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
9 - White Banks	0.017 ± 0.017	0.7	1	0 ± 0	0 ± 0	
8 - Inshore of French Reef	0.033 ± 0.019	4.2 ± 0.2	2	0.117 ± 0.042	1.6 ± 0.2	7
7 - Inshore of Molasses Reef	0.267 ± 0.061	3.9 ± 0.6	16	0 ± 0	0 ± 0	
6 - Inshore of Molasses Reef	0.033 ± 0.033	9.5 ± 0.5	2	0 ± 0	0 ± 0	
5 - Inshore of Pickles Reef	0.100 ± 0.033	5.1 ± 0.6	6	0 ± 0	0 ± 0	
Upper Florida Keys Total (19)	0.037 ± 0.016	4.9 ± 0.4	42	0.007 ± 0.006	1.7 ± 0.2	8
Middle Florida Keys NMS						
77 - Inshore of Conch Reef SPA	0.033 ± 0.033	5.8 ± 0.3	2	0 ± 0	0 ± 0	
76 - Inshore of Conch Reef SPA	0.033 ± 0.019	3.7 ± 3.1	2	0 ± 0	0 ± 0	
75 - Inshore of Conch Reef SPA	0.017 ± 0.017	7.0	1	0.033 ± 0.033	1.2 ± 0.4	2
74 - Inshore of Conch Reef SPA	0.017 ± 0.017	5.5	1	0 ± 0	0 ± 0	
98 - Coffins Patch SPA**	0.033 ± 0.019	5.3 ± 1.8	2	0 ± 0	0 ± 0	
277 - Coffins Patch SPA**	0.050 ± 0.032	0.7 ± 0.1	3	0 ± 0	0 ± 0	
Middle Florida Keys Total (6)	0.031 ± 0.005	4.0 ± 0.8	11	0.006 ± 0.006	1.2 ± 0.4	2
Lower Florida Keys NMS						
133 - Looe Key Research Only**	0.050 ± 0.032	5.4 ± 1.4	3	0 ± 0	0 ± 0	
132 - Looe Key Research Only**	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
131 - North of Looe Key SPA**	0.133 ± 0.027	4.5 ± 0.6	8	0 ± 0	0 ± 0	
130 - Maryland Shoal	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
129 - North of Maryland Shoal	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
165 - North of Maryland Shoal	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
128 - NE of Eastern Sambo RO	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
135 - Western Sambo ER**	0.033 ± 0.019	1.1 ± 0.3	2	0 ± 0	0 ± 0	
168 - Western Sambo ER**	0.067 ± 0.000	3.0 ± 1.5	4	0 ± 0	0 ± 0	
127 - West of Sand Key SPA	0.017 ± 0.017	1.0	1	0 ± 0	0 ± 0	
Lower Florida Keys Total (10)	0.030 ± 0.014	3.7 ± 0.6	18	0 ± 0	0 ± 0	
Offshore Patch Reef Total (42)	0.042 ± 0.009	4.6 ± 2.3	107	0.004 ± 0.003	1.6 ± 0.2	10
<i>Hard-bottom/rubble/sand matrix</i>						
Upper Florida Keys NMS						

Site number/site location	<i>Diadema antillarum</i>			<i>Echinometra lucunter</i>		
	No./m ²	TD (cm)	N	No./m ²	TD (cm)	N
40 - Carysfort Reef SPA**	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
38 - West of Carysfort Reef SPA	0 ± 0	0 ± 0		0.050 ± 0.032	2.6 ± 0.8	3
36 - West of Carysfort Reef SPA	0.017 ± 0.017	2.3	1	0 ± 0	0 ± 0	
11 - NW of Dry Rocks SPA	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
Upper Florida Keys Total (4)	0.004 ± 0.004	2.3	1	0.013 ± 0.013	2.6 ± 0.8	3
Hard-bottom Matrix Total (4)	0.004 ± 0.004	2.3	1	0.013 ± 0.013	2.6 ± 0.8	3
<i>Low-relief hard-bottom (< 6 m)</i>						
Biscayne National Park						
475 - Fowey Rocks	0.017 ± 0.017	4.5	1	0 ± 0	0 ± 0	
469 - South of Ajax Reef	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
Biscayne National Park Total (2)	0.008 ± 0.008	4.5	1	0 ± 0	0 ± 0	
Upper Florida Keys NMS						
346 - Carysfort Reef SPA**	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
35 - West of Carysfort Reef SPA	0.017 ± 0.017	5.2	1	0 ± 0	0 ± 0	
34 - West of Carysfort Reef SPA	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
33 - Inshore of Watson's Reef	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
17 - Little Pickles Reef	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
Upper Florida Keys Total (5)	0.003 ± 0.003	5.2	1	0 ± 0	0 ± 0	
Middle Florida Keys NMS						
269 - Conch Reef SPA**	0.017 ± 0.017	4.1	1	0 ± 0	0 ± 0	
89 - Conch Reef SPA**	0.083 ± 0.050	1.5 ± 0.8	5	0 ± 0	0 ± 0	
88 - Little Conch Reef	0 ± 0	0 ± 0		0.017 ± 0.017	0.5	1
352 - Little Conch Reef	0.017 ± 0.017	0.8	1	0 ± 0	0 ± 0	
97 - Davis Reef SPA**	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
90 - Davis Reef SPA**	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
86 - South of Windley Key	0.133 ± 0.047	3.8 ± 0.7	8	0 ± 0	0 ± 0	
103 - NE of Alligator Light	0.050 ± 0.032	0.7 ± 0.1	3	0 ± 0	0 ± 0	
82 - Alligator Reef SPA**	0.017 ± 0.017	0.5	1	0 ± 0	0 ± 0	
81 - Alligator Reef SPA**	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
350 - Tennessee Light	0.033 ± 0.033	3.2 ± 1.1	2	0 ± 0	0 ± 0	
85 - East of Coffins Patch SPA	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
92 - Coffins Patch SPA**	0.033 ± 0.033	3.5 ± 1.3	2	0 ± 0	0 ± 0	
91 - Coffins Patch SPA**	0.033 ± 0.033	0.8 ± 0.1	2	0 ± 0	0 ± 0	
Middle Florida Keys Total (14)	0.030 ± 0.010	2.4 ± 0.4	25	0.001 ± 0.001	0.5	1
Lower Florida Keys NMS						
161 - West of American Shoal	0.017 ± 0.017	0.6	1	0 ± 0	0 ± 0	
140 - Maryland Shoal	0.017 ± 0.017	3.0	1	0 ± 0	0 ± 0	
159 - North of Pelican Shoal	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
158 - East of No Name Reef	0.017 ± 0.017	0.7	1	0 ± 0	0 ± 0	
Lower Florida Keys Total (4)	0.013 ± 0.004	1.4 ± 0.8	3	0 ± 0	0 ± 0	
Hard-bottom (< 6 m) Total (25)	0.020 ± 0.006	2.5 ± 0.4	30	0.001 ± 0.001	0.5	1
<i>Inner line reef tract spur & groove</i>						
Upper Florida Keys NMS						
61 - Turtle Reef	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
60 - Inshore of Elbow Reef SPA	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
59 - Inshore of Elbow Reef SPA	0.033 ± 0.019	6.7 ± 0.6	2	0 ± 0	0 ± 0	
58 - Horseshoe Reef	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
62 - Dry Rocks SPA**	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
63 - Dry Rocks SPA**	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
65 - Grecian Rocks SPA**	0.050 ± 0.050	4.8 ± 1.7	3	0 ± 0	0 ± 0	
64 - Grecian Rocks SPA**	0.017 ± 0.017	3.7	1	0.017 ± 0.017	1.2	1
Upper Florida Keys Total (8)	0.013 ± 0.007	5.3 ± 0.9	6	0.002 ± 0.002	1.2	1
Inner Line Spur & Groove Total (8)	0.013 ± 0.007	5.3 ± 0.9	6	0.002 ± 0.002	1.2	1
<i>High-relief spur & groove</i>						
Biscayne National Park						

Site number/site location	<i>Diadema antillarum</i>			<i>Echinometra lucunter</i>		
	No./m ²	TD (cm)	N	No./m ²	TD (cm)	N
474 - Brewster Reef	0.017 ± 0.017	4.0	1	0 ± 0	0 ± 0	
472 - Star Reef	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
470 - Triumph Reef	0.017 ± 0.017	0.7	1	0 ± 0	0 ± 0	
467 - Long Reef	0.017 ± 0.017	0.7	1	0 ± 0	0 ± 0	
466 - Ajax Reef	0.050 ± 0.032	2.4 ± 1.2	3	0 ± 0	0 ± 0	
465 - Ajax Reef	0.050 ± 0.032	0.9 ± 0.1	3	0.017 ± 0.017	1.9	1
464 - Pacific Reef	0.033 ± 0.019	1.0 ± 0.1	2	0 ± 0	0 ± 0	
Biscayne National Park Total (7)	0.026 ± 0.077	1.6 ± 0.4	11	0.002 ± 0.002	1.9	1
Upper Florida Keys NMS						
26 - Carysfort Reef SPA**	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
25 - Carysfort Reef SPA**	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
218 - South Carysfort Reef SPA**	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
217 - South Carysfort Reef SPA**	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
24 - Maitland Grounding Site	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
28 - Elbow Reef SPA**	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
27 - Elbow Reef SPA**	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
30 - French Reef SPA**	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
29 - French Reef SPA**	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
23 - SW of French Reef SPA	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
357 - Sand Island	0.033 ± 0.019	0.6 ± 0.0	2	0 ± 0	0 ± 0	
356 - Sand Island	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
32 - Molasses Reef SPA**	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
31 - Molasses Reef SPA**	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
19 - Pickles Reef	0.050 ± 0.017	2.4 ± 1.3	3	0 ± 0	0 ± 0	
20 - Pickles Reef	0.217 ± 0.083	2.3 ± 0.5	13	0 ± 0	0 ± 0	
18 - Pickles Reef	0.083 ± 0.042	1.7 ± 0.5	5	0.017 ± 0.017	0.5	1
Upper Florida Keys Total (17)	0.023 ± 0.013	2.1 ± 0.4	23	0 ± 0	0 ± 0	
Middle Florida Keys NMS						
79 - Delta Shoal	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
78 - Delta Shoal	0.033 ± 0.019	1.9 ± 1.0	2	0 ± 0	0 ± 0	
84 - Sombrero Key SPA**	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
83 - Sombrero Key SPA**	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
Middle Florida Keys Total (4)	0.008 ± 0.008	1.9 ± 1.0	2	0 ± 0	0 ± 0	
Lower Florida Keys NMS						
148 - Looe Key SPA**	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
147 - Looe Key SPA**	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
145 - American Shoal	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
146 - American Shoal	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
144 - Maryland Shoal	0.183 ± 0.074	5.2 ± 1.3	11	1.100 ± 0.376	1.8 ± 0.1	66
141 - Maryland Shoal	0.100 ± 0.043	5.7 ± 0.5	6	0 ± 0	0 ± 0	
143 - Maryland Shoal	0.017 ± 0.017	5.8	1	0 ± 0	0 ± 0	
139 - Pelican Shoal	0.017 ± 0.017	0.4	1	0 ± 0	0 ± 0	
138 - No Name Reef	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
137 - No Name Reef	0.017 ± 0.017	1.1	1	0 ± 0	0 ± 0	
150 - Eastern Sambo RO**	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
149 - Eastern Sambo RO**	0.033 ± 0.033	2.0 ± 1.0	2	0 ± 0	0 ± 0	
348 - Middle Sambo Reef	0.050 ± 0.032	2.2 ± 1.4	3	0.017 ± 0.017	1.2	1
309 - Middle Sambo Reef	0.017 ± 0.017	1.2	1	0.017 ± 0.017	2.1	1
152 - Western Sambo ER**	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
151 - Western Sambo ER**	0.033 ± 0.033	1.6 ± 1.0	2	0.017 ± 0.017	1.2	1
136 - East of Eastern Dry Rocks SPA	0.033 ± 0.019	1.7 ± 1.3	2	0 ± 0	0 ± 0	
154 - Eastern Dry Rocks SPA**	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
153 - Eastern Dry Rocks SPA**	0.050 ± 0.032	3.1 ± 2.5	3	0 ± 0	0 ± 0	
156 - Rock Key SPA**	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
155 - Rock Key SPA**	0 ± 0	0 ± 0		0.083 ± 0.063	2.8 ± 0.3	5
325 - Sand Key SPA**	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
157 - Sand Key SPA**	0.067 ± 0.067	3.3 ± 1.1	4	0 ± 0	0 ± 0	
Lower Florida Keys Total (23)	0.027 ± 0.009	3.8 ± 0.4	37	0.054 ± 0.048	1.8 ± 0.1	74
High-relief Spur & Groove Total (51)	0.024 ± 0.006	2.8 ± 0.3	73	0.025 ± 0.022	1.8 ± 0.1	76

Site number/site location	<i>Diadema antillarum</i>			<i>Echinometra lucunter</i>		
	No./m ²	TD (cm)	N	No./m ²	TD (cm)	N
<i>Low-relief hard-bottom (6-15 m)</i>						
Upper Florida Keys NMS						
53 - Carysfort Reef SPA**	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
240 - Carysfort Reef SPA**	0.017 ± 0.017	0.9	1	0 ± 0	0 ± 0	
57 - Inshore of Watson's Reef	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
45 - Offshore of Dry Rocks SPA	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
22 - SW of French Reef SPA	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
21 - SW of French Reef SPA	0.017 ± 0.017	5.0	1	0 ± 0	0 ± 0	
Upper Florida Keys Total (6)	0.006 ± 0.004	3.0 ± 2.1	2	0 ± 0	0 ± 0	
Middle Florida Keys NMS						
353 - Conch Reef SPA**	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
105 - Conch Reef SPA**	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
104 - NE of Alligator Light	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
351 - South of Indian Key	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
101 - South of Lower Matecumbe	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
111 - West of Sombrero Key	0.017 ± 0.017	0.7	1	0 ± 0	0 ± 0	
Middle Florida Keys Total (6)	0.003 ± 0.003	0.7	1	0 ± 0	0 ± 0	
Lower Florida Keys NMS						
180 - South of Bahia Honda Key	0.017 ± 0.017	0.8	1	0 ± 0	0 ± 0	
173 - Maryland Shoal	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
177 - NE of Satan Shoal	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
Lower Florida Keys Total (3)	0.006 ± 0.006	0.8	1	0 ± 0	0 ± 0	
Hard-bottom (6-15 m) Total (15)	0.004 ± 0.002	1.9 ± 1.1	4	0 ± 0	0 ± 0	
<i>Patchy hard-bottom (6-15 m)</i>						
Upper Florida Keys NMS						
56 - Inshore of Watson's Reef	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
44 - Dixie Shoal	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
43 - Dixie Shoal	0.017 ± 0.017	1.4	1	0 ± 0	0 ± 0	
42 - Dixie Shoal	0.017 ± 0.017	1.3	1	0 ± 0	0 ± 0	
Upper Florida Keys Total (4)	0.008 ± 0.005	1.4 ± 0.0	2	0 ± 0	0 ± 0	
Middle Florida Keys NMS						
96 - South of Windley Key	0.033 ± 0.033	2.5 ± 1.8	2	0 ± 0	0 ± 0	
114 - South of Lower Matecumbe	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
94 - South of Duck Key	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
93 - South of Duck Key	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
Middle Florida Keys Total (4)	0.008 ± 0.008	2.5 ± 1.8	2	0 ± 0	0 ± 0	
Lower Florida Keys NMS						
338 - South of Bahia Honda Key	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
179 - West of American Shoal	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
160 - North of Pelican Shoal	0.133 ± 0.047	4.1 ± 0.5	8	0 ± 0	0 ± 0	
164 - West of Pelican Shoal	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
178 - West of Pelican Shoal	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
166 - Eastern Sambo RO**	0.017 ± 0.017	1.1	1	0 ± 0	0 ± 0	
332 - Eastern Sambo RO**	0.033 ± 0.019	3.6 ± 0.4	2	0 ± 0	0 ± 0	
334 - Western Sambo ER**	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
167 - Western Sambo ER**	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
163 - West of Western Sambo ER	0.067 ± 0.000	4.7 ± 0.6	4	0 ± 0	0 ± 0	
335 - Sand Key SPA**	0.017 ± 0.017	0.5	1	0 ± 0	0 ± 0	
169 - Sand Key SPA**	0.033 ± 0.019	4.6 ± 0.6	2	0 ± 0	0 ± 0	
162 - West of Western Dry Rocks	0.100 ± 0.079	5.1 ± 0.5	6	0 ± 0	0 ± 0	
Lower Florida Keys Total (13)	0.031 ± 0.012	4.2 ± 0.3	24	0 ± 0	0 ± 0	
Patchy Hard-bottom Total (21)	0.022 ± 0.008	3.9 ± 0.3	28	0 ± 0	0 ± 0	
<i>Low-relief spur & groove (6-15 m)</i>						
Upper Florida Keys NMS						
52 - Carysfort Reef SPA**	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
241 - Carysfort Reef SPA**	0 ± 0	0 ± 0		0 ± 0	0 ± 0	

Site number/site location	<i>Diadema antillarum</i>			<i>Echinometra lucunter</i>		
	No./m ²	TD (cm)	N	No./m ²	TD (cm)	N
51 - Offshore of Dry Rocks SPA	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
50 - Offshore of Dry Rocks SPA	0.017 ± 0.017	3.7	1	0 ± 0	0 ± 0	
49 - Little Pickles Reef	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
48 - Little Pickles Reef	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
Upper Florida Keys Total (6)	0.003 ± 0.003	3.7	1	0 ± 0	0 ± 0	
Middle Florida Keys NMS						
355 - NE of Conch Reef	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
282 - Conch Reef SPA**	0.083 ± 0.042	3.3 ± 1.3	5	0 ± 0	0 ± 0	
354 - Conch Reef SPA**	0.033 ± 0.019	0.6 ± 0.1	2	0 ± 0	0 ± 0	
107 - Conch Reef RO**	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
106 - Conch Reef RO**	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
276 - Davis Reef SPA**	0.017 ± 0.017	1.6	1	0 ± 0	0 ± 0	
80 - Davis Reef SPA**	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
102 - South of Lower Matecumbe	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
109 - Tennessee Reef RO**	0.067 ± 0.047	4.9 ± 0.4	4	0 ± 0	0 ± 0	
108 - Tennessee Reef RO**	0.033 ± 0.033	1.8 ± 0.3	2	0 ± 0	0 ± 0	
113 - NE of Tennessee Light	0.050 ± 0.017	2.3 ± 1.4	3	0 ± 0	0 ± 0	
349 - South of Conch Key	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
100 - South of Conch Key	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
99 - East of Delta Shoal	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
110 - Sombrero Key SPA**	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
287 - Sombrero Key SPA**	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
Middle Florida Keys Total (16)	0.018 ± 0.007	2.9 ± 0.6	17	0 ± 0	0 ± 0	
Lower Florida Keys NMS						
337 - South of Bahia Honda Key	0.017 ± 0.017	0.8	1	0 ± 0	0 ± 0	
174 - Looe Key SPA**	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
339 - Looe Key SPA**	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
142 - American Shoal	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
172 - East of Eastern Sambo RO	0.017 ± 0.017	2.7	1	0 ± 0	0 ± 0	
340 - Eastern Sambo RO**	0.017 ± 0.017	0.4	1	0 ± 0	0 ± 0	
175 - Eastern Sambo RO**	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
171 - Middle Sambo Reef	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
170 - Middle Sambo Reef	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
341 - Western Sambo ER**	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
176 - Western Sambo ER**	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
Lower Florida Keys Total (11)	0.005 ± 0.002	1.3 ± 0.7	3	0 ± 0	0 ± 0	
Low-relief Spur & Groove Total (33)	0.011 ± 0.004	2.7 ± 0.5	21	0 ± 0	0 ± 0	

Table 14. Mean $\pm$ 1 SE densities (no. individuals per m²), test diameter (TD, cm), and numbers of individuals (N) of the urchins *Echinometra viridis* and *Eucidaris tribuloides* in the Florida Keys National Marine Sanctuary and Biscayne National Park, as determined from four 15-m x 1-m belt transects per site at 235 sites during June-August 2007. Sites are arranged by habitat from northeast to southwest and asterisked locations (**) are no-take marine reserves.

Site number/site location	<i>Echinometra viridis</i>			<i>Eucidaris tribuloides</i>		
	No./m ²	TD (cm)	N	No./m ²	TD (cm)	N
<i>Mid-channel patch reefs</i>						
Biscayne National Park						
445 - Northern Legare Anchorage	0.033 $\pm$ 0.019	2.2 $\pm$ 0.2	2	0 $\pm$ 0	0 $\pm$ 0	
441 - Bache Shoal	0.050 $\pm$ 0.017	1.8 $\pm$ 0.1	3	0 $\pm$ 0	0 $\pm$ 0	
440 - South of Bache Shoal	0.033 $\pm$ 0.019	2.4 $\pm$ 0.1	2	0 $\pm$ 0	0 $\pm$ 0	
438 - South of Bache Shoal	0.117 $\pm$ 0.079	2.9 $\pm$ 0.1	7	0.017 $\pm$ 0.017	2.0	1
437 - South of Legare Anchorage	0.267 $\pm$ 0.027	2.1 $\pm$ 0.1	16	0 $\pm$ 0	0 $\pm$ 0	
427 - Margot Fish Shoal	0.417 $\pm$ 0.308	2.7 $\pm$ 0.1	25	0.033 $\pm$ 0.019	2.9 $\pm$ 0.1	2
421 - Margot Fish Shoal	9.317 $\pm$ 1.211	2.1 $\pm$ 0.0	559	0.067 $\pm$ 0.047	2.4 $\pm$ 0.3	4
419 - Inshore of Ajax Reef	0.833 $\pm$ 0.177	2.1 $\pm$ 0.1	50	0 $\pm$ 0	0 $\pm$ 0	
413 - Inshore of Pacific Reef	1.417 $\pm$ 0.341	2.4 $\pm$ 0.1	85	0.050 $\pm$ 0.017	2.6 $\pm$ 0.5	3
410 - Inshore of Pacific Reef	1.600 $\pm$ 0.314	1.8 $\pm$ 0.1	96	0.083 $\pm$ 0.017	2.0 $\pm$ 0.1	5
408 - Offshore of Broad Creek	1.117 $\pm$ 0.244	2.0 $\pm$ 0.1	67	0.033 $\pm$ 0.019	2.5 $\pm$ 0.0	2
406 - Offshore of Broad Creek	0.233 $\pm$ 0.079	1.9 $\pm$ 0.1	14	0.033 $\pm$ 0.033	1.8 $\pm$ 0.0	2
Biscayne National Park Total (12)	1.286 $\pm$ 0.748	2.1 $\pm$ 0.0	926	0.026 $\pm$ 0.008	2.3 $\pm$ 0.1	19
Upper Florida Keys NMS						
4 - Basin Hill Shoals	5.183 $\pm$ 1.693	4.0 $\pm$ 0.0	311	0 $\pm$ 0	0 $\pm$ 0	
2 - Near Cannon Patch Reef	0.217 $\pm$ 0.032	2.3 $\pm$ 0.3	13	0.017 $\pm$ 0.017	2.5	1
3 - Near Cannon Patch Reef	0.417 $\pm$ 0.162	3.2 $\pm$ 0.1	25	0.050 $\pm$ 0.017	2.1 $\pm$ 0.5	3
1 - Inshore of Molasses Reef	1.550 $\pm$ 0.443	2.4 $\pm$ 0.1	93	0.017 $\pm$ 0.017	2.8	1
Upper Florida Keys Total (4)	1.842 $\pm$ 1.152	2.8 $\pm$ 0.0	442	0.021 $\pm$ 0.010	2.3 $\pm$ 0.3	5
Middle Florida Keys NMS						
69 - Tavernier Rocks	0 $\pm$ 0	0 $\pm$ 0		0 $\pm$ 0	0 $\pm$ 0	
71 - Hen and Chickens SPA**	0.017 $\pm$ 0.017	2.7	1	0 $\pm$ 0	0 $\pm$ 0	
70 - Hen and Chickens SPA**	0 $\pm$ 0	0 $\pm$ 0		0 $\pm$ 0	0 $\pm$ 0	
68 - East of Cheeca Rocks SPA	0 $\pm$ 0	0 $\pm$ 0		0 $\pm$ 0	0 $\pm$ 0	
72 - Cheeca Rocks SPA**	0.017 $\pm$ 0.017	1.6	1	0 $\pm$ 0	0 $\pm$ 0	
73 - Cheeca Rocks SPA**	0 $\pm$ 0	0 $\pm$ 0		0 $\pm$ 0	0 $\pm$ 0	
66 - East Turtle Shoal	0.133 $\pm$ 0.047	2.3 $\pm$ 0.3	8	0.050 $\pm$ 0.017	2.3 $\pm$ 0.5	3
254 - East Turtle Shoal	0.083 $\pm$ 0.063	2.3 $\pm$ 0.3		0.067 $\pm$ 0.027	1.8 $\pm$ 0.3	4
Middle Florida Keys Total (8)	0.031 $\pm$ 0.018	2.3 $\pm$ 0.2		0.015 $\pm$ 0.010	2.0 $\pm$ 0.3	7
Lower Florida Keys NMS						
122 - North of Big Pine Shoal	0 $\pm$ 0	0 $\pm$ 0		0.183 $\pm$ 0.092	3.2 $\pm$ 0.3	11
121 - North of Maryland Shoal	1.100 $\pm$ 0.197	2.9 $\pm$ 0.1	66	0.033 $\pm$ 0.033	1.1 $\pm$ 0.0	2
120 - North of Maryland Shoal	0.467 $\pm$ 0.166	2.5 $\pm$ 0.1	28	0.017 $\pm$ 0.017	2.0	1
119 - North of Pelican Shoal	4.133 $\pm$ 1.017	3.2 $\pm$ 0.1	248	0.033 $\pm$ 0.019	1.1 $\pm$ 0.3	2
118 - East of Western Sambo ER	0.367 $\pm$ 0.114	2.8 $\pm$ 0.1	22	0 $\pm$ 0	0 $\pm$ 0	
126 - Western Sambo ER**	0.033 $\pm$ 0.033	2.1 $\pm$ 0.4	2	0.050 $\pm$ 0.032	1.5 $\pm$ 0.3	3
125 - Western Sambo ER**	0.150 $\pm$ 0.057	2.6 $\pm$ 0.2	9	0.033 $\pm$ 0.019	1.8 $\pm$ 0.6	2
124 - Western Sambo ER**	0.200 $\pm$ 0.061	2.5 $\pm$ 0.2	12	0.017 $\pm$ 0.017	0.8	1
123 - Western Sambo ER**	0.417 $\pm$ 0.096	2.6 $\pm$ 0.2	25	0.150 $\pm$ 0.609	2.4 $\pm$ 0.2	9
117 - NW of Sand Key SPA	0.200 $\pm$ 0.072	2.9 $\pm$ 0.2	12	0.083 $\pm$ 0.017	3.0 $\pm$ 0.3	5
116 - North of Satan Shoal	0.033 $\pm$ 0.033	1.6 $\pm$ 0.4	2	0.200 $\pm$ 0.072	2.3 $\pm$ 0.2	12
115 - North of Satan Shoal	0.017 $\pm$ 0.017	1.7	1	0.150 $\pm$ 0.088	2.5 $\pm$ 0.2	9
Lower Florida Keys Total (12)	0.593 $\pm$ 0.334	3.0 $\pm$ 0.0	427	0.079 $\pm$ 0.021	2.4 $\pm$ 0.1	57
Mid-channel Patch Reef Total (36)	0.838 $\pm$ 0.304	2.5 $\pm$ 0.0	1810	0.041 $\pm$ 0.009	2.3 $\pm$ 0.1	88

Site number/site location	<i>Echinometra viridis</i>			<i>Eucidaris tribuloides</i>		
	No./m ²	TD (cm)	N	No./m ²	TD (cm)	N
<i>Offshore patch reefs</i>						
Biscayne National Park						
471 - Northwest of Triumph Reef	0 ± 0	0 ± 0		0.033 ± 0.033	2.3 ± 0.1	2
461 - NW of Long Reef	0.017 ± 0.017	0.9	1	0.067 ± 0.038	2.0 ± 0.0	4
460 - NW of Long Reef	0 ± 0	0 ± 0		0.083 ± 0.042	1.9 ± 0.3	5
459 - NW of Pacific Reef	0.017 ± 0.017	1.6	1	0.100 ± 0.019	1.8 ± 0.1	6
458 - Inshore of Pacific Reef	0.017 ± 0.017	0.7	1	0.467 ± 0.105	1.9 ± 0.1	28
456 - Inshore of Pacific Reef	0.017 ± 0.017	1.0	1	0 ± 0	0 ± 0	
454 - Northwest of Whistle Buoy	0 ± 0	0 ± 0		0.033 ± 0.033	1.5 ± 0.7	2
Biscayne National Park Total (7)	0.010 ± 0.003	1.1 ± 0.2	4	0.112 ± 0.060	1.9 ± 0.1	47
Upper Florida Keys NMS						
16 - North of Carysfort Reef SPA	0 ± 0	0 ± 0		0.017 ± 0.017	2.1	1
15 - North of Carysfort Reef SPA	0 ± 0	0 ± 0		0.033 ± 0.033	2.0 ± 0.2	2
14 - North of Carysfort Reef SPA	0.017 ± 0.017	1.5	1	0.100 ± 0.033	1.8 ± 0.2	6
47 - Carysfort Reef SPA**	0.017 ± 0.017	1.2	1	0.033 ± 0.019	2.5 ± 1.6	2
345 - Carysfort Reef SPA**	0 ± 0	0 ± 0		0.533 ± 0.370	1.5 ± 0.1	32
46 - Carysfort Reef SPA**	0 ± 0	0 ± 0		0.017 ± 0.017	1.2	1
39 - Carysfort Reef SPA**	0 ± 0	0 ± 0		0.083 ± 0.042	1.8 ± 0.1	5
37 - West of Carysfort Reef SPA	0 ± 0	0 ± 0		0.117 ± 0.069	2.0 ± 0.1	7
13 - Inshore of Watson's Reef	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
55 - Inshore of Watson's Reef	0 ± 0	0 ± 0		0.017 ± 0.017	2.1	1
358 - Inshore of Watson's Reef	0 ± 0	0 ± 0		0.017 ± 0.017	1.9	1
54 - Inshore of Watson's Reef	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
347 - Inshore of Watson's Reef	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
12 - Inshore of Watson's Reef	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
9 - White Banks	0.100 ± 0.064	1.5 ± 0.3	6	0.133 ± 0.072	2.0 ± 0.3	8
8 - Inshore of French Reef	0.133 ± 0.061	2.3 ± 0.3	8	0.200 ± 0.047	2.5 ± 0.3	12
7 - Inshore of Molasses Reef	0.283 ± 0.074	1.3 ± 0.2	17	0.317 ± 0.074	2.0 ± 0.1	19
6 - Inshore of Molasses Reef	0 ± 0	0 ± 0		0.133 ± 0.027	1.7 ± 0.1	8
5 - Inshore of Pickles Reef	0.017 ± 0.017	3.0	1	0.050 ± 0.032	2.1 ± 0.6	3
Upper Florida Keys Total (19)	0.030 ± 0.016	1.6 ± 0.1	34	0.095 ± 0.031	1.9 ± 0.1	108
Middle Florida Keys NMS						
77 - Inshore of Conch Reef SPA	0.033 ± 0.019	2.7 ± 0.2	2	0.067 ± 0.067	2.5 ± 0.2	4
76 - Inshore of Conch Reef SPA	0.033 ± 0.019	2.0 ± 0.5	2	0.033 ± 0.019	2.3 ± 0.2	2
75 - Inshore of Conch Reef SPA	0.017 ± 0.017	2.0	1	0.050 ± 0.032	3.1 ± 0.5	3
74 - Inshore of Conch Reef SPA	0.050 ± 0.017	2.5 ± 0.6	3	0.267 ± 0.122	2.8 ± 0.1	16
98 - Coffins Patch SPA**	0 ± 0	0 ± 0		0.067 ± 0.027	1.7 ± 0.4	4
277 - Coffins Patch SPA**	0.017 ± 0.017	2.0	1	0.050 ± 0.032	2.2 ± 0.3	3
Middle Florida Keys Total (6)	0.025 ± 0.007	2.2 ± 0.3	9	0.089 ± 0.036	2.6 ± 0.1	32
Lower Florida Keys NMS						
133 - Looe Key Research Only**	0 ± 0	0 ± 0		0.033 ± 0.019	1.9 ± 0.0	2
132 - Looe Key Research Only**	0 ± 0	0 ± 0		0.083 ± 0.032	2.3 ± 0.4	5
131 - North of Looe Key SPA**	0 ± 0	0 ± 0		0.033 ± 0.019	1.7 ± 0.3	2
130 - Maryland Shoal	0 ± 0	0 ± 0		0.133 ± 0.047	2.7 ± 0.3	8
129 - North of Maryland Shoal	0 ± 0	0 ± 0		0.067 ± 0.027	1.7 ± 0.1	4
165 - North of Maryland Shoal	0 ± 0	0 ± 0		0.067 ± 0.027	1.8 ± 0.2	4
128 - NE of Eastern Sambo RO	0 ± 0	0 ± 0		0.167 ± 0.033	2.3 ± 0.3	10
135 - Western Sambo ER**	0 ± 0	0 ± 0		0.050 ± 0.032	2.8 ± 0.3	3
168 - Western Sambo ER**	0 ± 0	0 ± 0		0.117 ± 0.079	2.2 ± 0.2	7
127 - West of Sand Key SPA	0 ± 0	0 ± 0		0.083 ± 0.032	2.5 ± 0.3	5
Lower Florida Keys Total (10)	0 ± 0	0 ± 0		0.083 ± 0.014	2.3 ± 0.1	50
Offshore Patch Reef Total (42)	0.019 ± 0.008	1.7 ± 0.1	47	0.094 ± 0.018	2.1 ± 0.0	237

Hard-bottom/rubble/sand matrix

Upper Florida Keys NMS

Site number/site location	<i>Echinometra viridis</i>			<i>Eucidaris tribuloides</i>		
	No./m ²	TD (cm)	N	No./m ²	TD (cm)	N
40 - Carysfort Reef SPA**	0 ± 0	0 ± 0		0.033 ± 0.019	1.9 ± 0.7	2
38 - West of Carysfort Reef SPA	0.050 ± 0.017	1.7 ± 0.2	3	0 ± 0	0 ± 0	
36 - West of Carysfort Reef SPA	0.083 ± 0.032	2.0 ± 0.3	5	0.033 ± 0.019	2.7 ± 0.3	2
11 - NW of Dry Rocks SPA	0 ± 0	0 ± 0		0.183 ± 0.017	2.6 ± 0.2	11
Upper Florida Keys Total (4)	0.033 ± 0.020	1.9 ± 0.2	8	0.063 ± 0.041	2.5 ± 0.1	15
Hard-bottom Matrix Total (4)	0.033 ± 0.020	1.9 ± 0.2	8	0.063 ± 0.041	2.5 ± 0.1	15
<i>Low-relief hard-bottom (< 6 m)</i>						
Biscayne National Park						
475 - Fowey Rocks	0 ± 0	0 ± 0		0.067 ± 0.047	1.4 ± 0.3	4
469 - South of Ajax Reef	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
Biscayne National Park Total (2)	0 ± 0	0 ± 0		0.033 ± 0.033	1.4 ± 0.3	4
Upper Florida Keys NMS						
346 - Carysfort Reef SPA**	0 ± 0	0 ± 0		0.017 ± 0.017	1.9	1
35 - West of Carysfort Reef SPA	0.050 ± 0.017	2.1 ± 0.8	3	0.067 ± 0.038	2.4 ± 0.3	4
34 - West of Carysfort Reef SPA	0.017 ± 0.017	2.0	1	0.083 ± 0.050	2.5 ± 0.2	5
33 - Inshore of Watson's Reef	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
17 - Little Pickles Reef	0 ± 0	0 ± 0		0.017 ± 0.017	1.5	1
Upper Florida Keys Total (5)	0.013 ± 0.010	2.1 ± 0.6		0.037 ± 0.016	2.3 ± 0.2	11
Middle Florida Keys NMS						
269 - Conch Reef SPA**	0.017 ± 0.017	1.4	1	0.017 ± 0.017	0.9	1
89 - Conch Reef SPA**	0 ± 0	0 ± 0		0.133 ± 0.072	1.5 ± 0.3	8
88 - Little Conch Reef	0 ± 0	0 ± 0		0.067 ± 0.047	1.9 ± 0.1	4
352 - Little Conch Reef	0 ± 0	0 ± 0		0.083 ± 0.042	1.8 ± 0.2	5
97 - Davis Reef SPA**	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
90 - Davis Reef SPA**	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
86 - South of Windley Key	0 ± 0	0 ± 0		0.333 ± 0.152	2.8 ± 0.1	20
103 - NE of Alligator Light	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
82 - Alligator Reef SPA**	0 ± 0	0 ± 0		0.033 ± 0.033	1.2 ± 0.4	2
81 - Alligator Reef SPA**	0 ± 0	0 ± 0		0.017 ± 0.017	2.3	1
350 - Tennessee Light	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
85 - East of Coffins Patch SPA	0 ± 0	0 ± 0		0.217 ± 0.017	2.2 ± 0.2	13
92 - Coffins Patch SPA**	0 ± 0	0 ± 0		0.167 ± 0.043	2.6 ± 0.2	10
91 - Coffins Patch SPA**	0 ± 0	0 ± 0		0.167 ± 0.079	2.3 ± 0.2	10
Middle Florida Keys Total (14)	0.001 ± 0.001	1.4	1	0.088 ± 0.027	2.3 ± 0.1	74
Lower Florida Keys NMS						
161 - West of American Shoal	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
140 - Maryland Shoal	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
159 - North of Pelican Shoal	0 ± 0	0 ± 0		0.017 ± 0.017	3.0	1
158 - East of No Name Reef	0 ± 0	0 ± 0		0.050 ± 0.017	2.2 ± 0.5	3
Lower Florida Keys Total (4)	0 ± 0	0 ± 0		0.017 ± 0.012	2.4 ± 0.4	4
Hard-bottom (< 6 m) Total (25)	0.003 ± 0.002	1.9 ± 0.5	5	0.062 ± 0.017	2.2 ± 0.1	93
<i>Inner line reef tract spur & groove</i>						
Upper Florida Keys NMS						
61 - Turtle Reef	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
60 - Inshore of Elbow Reef SPA	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
59 - Inshore of Elbow Reef SPA	0 ± 0	0 ± 0		0.083 ± 0.017	2.8 ± 0.5	5
58 - Horseshoe Reef	0 ± 0	0 ± 0		0.117 ± 0.050	2.2 ± 0.2	7
62 - Dry Rocks SPA**	0 ± 0	0 ± 0		0.067 ± 0.047	2.4 ± 0.2	4
63 - Dry Rocks SPA**	0 ± 0	0 ± 0		0.233 ± 0.096	2.0 ± 0.1	14
65 - Grecian Rocks SPA**	0 ± 0	0 ± 0		0.183 ± 0.032	2.2 ± 0.1	11
64 - Grecian Rocks SPA**	0 ± 0	0 ± 0		0.167 ± 0.043	2.1 ± 0.2	10
Upper Florida Keys Total (8)	0 ± 0	0 ± 0		0.106 ± 0.030	2.2 ± 0.1	51
Inner Line Spur & Groove Total (8)	0 ± 0	0 ± 0		0.106 ± 0.030	2.2 ± 0.1	51
<i>High-relief spur & groove</i>						
Biscayne National Park						

Site number/site location	<i>Echinometra viridis</i>			<i>Eucidaris tribuloides</i>		
	No./m ²	TD (cm)	N	No./m ²	TD (cm)	N
474 - Brewster Reef	0 ± 0	0 ± 0		0.017 ± 0.017	2.2	1
472 - Star Reef	0 ± 0	0 ± 0		0.050 ± 0.050	1.9 ± 0.2	3
470 - Triumph Reef	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
467 - Long Reef	0 ± 0	0 ± 0		0.033 ± 0.019	1.9 ± 0.4	2
466 - Ajax Reef	0 ± 0	0 ± 0		0.117 ± 0.050	1.7 ± 0.1	7
465 - Ajax Reef	0 ± 0	0 ± 0		0.017 ± 0.017	2.0	1
464 - Pacific Reef	0 ± 0	0 ± 0		0.100 ± 0.058	1.6 ± 0.1	6
Biscayne National Park Total (7)	0 ± 0	0 ± 0		0.048 ± 0.017	1.8 ± 0.1	20
Upper Florida Keys NMS						
26 - Carysfort Reef SPA**	0 ± 0	0 ± 0		0.033 ± 0.033	1.9 ± 0.4	2
25 - Carysfort Reef SPA**	0 ± 0	0 ± 0		0.067 ± 0.027	1.7 ± 0.6	4
218 - South Carysfort Reef SPA**	0 ± 0	0 ± 0		0.017 ± 0.017	1.8	1
217 - South Carysfort Reef SPA**	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
24 - Maitland Grounding Site	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
28 - Elbow Reef SPA**	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
27 - Elbow Reef SPA**	0.017 ± 0.017	1.4	1	0.033 ± 0.019	1.6 ± 0.2	2
30 - French Reef SPA**	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
29 - French Reef SPA**	0 ± 0	0 ± 0		0.033 ± 0.033	1.4 ± 0.3	2
23 - SW of French Reef SPA	0 ± 0	0 ± 0		0.033 ± 0.033	2.2 ± 0.3	2
357 - Sand Island	0 ± 0	0 ± 0		0.167 ± 0.064	1.7 ± 0.1	10
356 - Sand Island	0.033 ± 0.033	1.4 ± 0.7	2	0.033 ± 0.019	1.8 ± 0.3	2
32 - Molasses Reef SPA**	0.017 ± 0.017	1.1	1	0.083 ± 0.083	2.3 ± 0.2	5
31 - Molasses Reef SPA**	0 ± 0	0 ± 0		0.050 ± 0.017	1.7 ± 0.3	3
19 - Pickles Reef	0 ± 0	0 ± 0		0.133 ± 0.112	2.3 ± 0.1	8
20 - Pickles Reef	0.033 ± 0.033	1.2 ± 0.1	2	0.250 ± 0.050	1.8 ± 0.1	15
18 - Pickles Reef	0 ± 0	0 ± 0		0.133 ± 0.077	1.5 ± 0.1	8
Upper Florida Keys Total (17)	0.006 ± 0.003	1.3 ± 0.2	6	0.063 ± 0.017	1.8 ± 0.1	63
Middle Florida Keys NMS						
79 - Delta Shoal	0.033 ± 0.033	1.3 ± 0.0	2	0.050 ± 0.017	1.6 ± 0.2	3
78 - Delta Shoal	0 ± 0	0 ± 0		0.067 ± 0.027	1.6 ± 0.1	4
84 - Sombrero Key SPA**	0 ± 0	0 ± 0		0.050 ± 0.017	1.7 ± 0.4	3
83 - Sombrero Key SPA**	0 ± 0	0 ± 0		0.083 ± 0.042	1.8 ± 0.2	5
Middle Florida Keys Total (4)	0.008 ± 0.008	1.3 ± 0.0	2	0.063 ± 0.008	1.7 ± 0.1	15
Lower Florida Keys NMS						
148 - Looe Key SPA**	0.017 ± 0.017	2.8	1	0.100 ± 0.064	1.9 ± 0.3	6
147 - Looe Key SPA**	0 ± 0	0 ± 0		0.033 ± 0.019	1.8 ± 0.5	2
145 - American Shoal	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
146 - American Shoal	0 ± 0	0 ± 0		0.017 ± 0.017	1.4	1
144 - Maryland Shoal	0.017 ± 0.017	1.5	1	0.467 ± 0.141	2.4 ± 0.1	28
141 - Maryland Shoal	0 ± 0	0 ± 0		0.600 ± 0.187	2.3 ± 0.1	36
143 - Maryland Shoal	0.033 ± 0.019	1.8 ± 0.3	2	0.300 ± 0.019	2.0 ± 0.1	18
139 - Pelican Shoal	0.050 ± 0.017	2.3 ± 0.6	3	0.700 ± 0.079	1.8 ± 0.1	42
138 - No Name Reef	0.033 ± 0.033	1.9 ± 0.4	2	0.033 ± 0.019	1.9 ± 0.0	2
137 - No Name Reef	0.017 ± 0.017	1.1	1	0.083 ± 0.042	1.5 ± 0.1	5
150 - Eastern Sambo RO**	0 ± 0	0 ± 0		0.150 ± 0.042	2.1 ± 0.2	9
149 - Eastern Sambo RO**	0 ± 0	0 ± 0		0.083 ± 0.032	1.4 ± 0.3	5
348 - Middle Sambo Reef	0.033 ± 0.019	2.0 ± 0.6	2	0.083 ± 0.050	1.5 ± 0.1	5
309 - Middle Sambo Reef	0.017 ± 0.017	2.8	1	0.233 ± 0.079	1.8 ± 0.2	14
152 - Western Sambo ER**	0.033 ± 0.019	1.4 ± 0.0	2	0.050 ± 0.032	1.4 ± 0.1	3
151 - Western Sambo ER**	0 ± 0	0 ± 0		0.133 ± 0.054	1.7 ± 0.4	8
136 - East of Eastern Dry Rocks SPA	0 ± 0	0 ± 0		0.033 ± 0.033	1.1 ± 0.1	2
154 - Eastern Dry Rocks SPA**	0 ± 0	0 ± 0		0.083 ± 0.032	1.7 ± 0.1	5
153 - Eastern Dry Rocks SPA**	0 ± 0	0 ± 0		0.067 ± 0.047	1.4 ± 0.3	4
156 - Rock Key SPA**	0 ± 0	0 ± 0		0.067 ± 0.027	1.5 ± 0.2	4
155 - Rock Key SPA**	0.050 ± 0.032	1.4 ± 0.3	3	0.117 ± 0.032	2.1 ± 0.2	7
325 - Sand Key SPA**	0 ± 0	0 ± 0		0.083 ± 0.042	1.9 ± 0.3	5
157 - Sand Key SPA**	0 ± 0	0 ± 0		0.117 ± 0.050	2.2 ± 0.3	7
Lower Florida Keys Total (23)	0.013 ± 0.004	1.8 ± 0.2	18	0.158 ± 0.039	2.0 ± 0.0	218
High-relief Spur & Groove (51)	0.008 ± 0.002	1.7 ± 0.7	26	0.104 ± 0.020	1.9 ± 0.0	317

Site number/site location	<i>Echinometra viridis</i>			<i>Eucidaris tribuloides</i>		
	No./m ²	TD (cm)	N	No./m ²	TD (cm)	N
<i>Low-relief hard-bottom (6-15 m)</i>						
Upper Florida Keys NMS						
53 - Carysfort Reef SPA**	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
240 - Carysfort Reef SPA**	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
57 - Inshore of Watson's Reef	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
45 - Offshore of Dry Rocks SPA	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
22 - SW of French Reef SPA	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
21 - SW of French Reef SPA	0 ± 0	0 ± 0		0.050 ± 0.032	1.7 ± 0.2	3
Upper Florida Keys Total (6)	0 ± 0	0 ± 0		0.008 ± 0.008	1.7 ± 0.2	3
Middle Florida Keys NMS						
353 - Conch Reef SPA**	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
105 - Conch Reef SPA**	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
104 - NE of Alligator Light	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
351 - South of Indian Key	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
101 - South of Lower Matecumbe	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
111 - West of Sombrero Key	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
Middle Florida Keys Total (6)	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
Lower Florida Keys NMS						
180 - South of Bahia Honda Key	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
173 - Maryland Shoal	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
177 - NE of Satan Shoal	0.017 ± 0.017	0.5	1	0.033 ± 0.033	1.5 ± 0.6	2
Lower Florida Keys Total (3)	0.006 ± 0.006	0.5	1	0.011 ± 0.011	1.5 ± 0.6	2
Hard-bottom (6-15 m) Total (15)	0.001 ± 0.001	0.5	1	0.006 ± 0.004	1.6 ± 0.2	5
<i>Patchy hard-bottom (6-15 m)</i>						
Upper Florida Keys NMS						
56 - Inshore of Watson's Reef	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
44 - Dixie Shoal	0 ± 0	0 ± 0		0.067 ± 0.027	1.9 ± 0.3	4
43 - Dixie Shoal	0 ± 0	0 ± 0		0.017 ± 0.017	1.8	1
42 - Dixie Shoal	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
Upper Florida Keys Total (4)	0 ± 0	0 ± 0		0.021 ± 0.016	1.9 ± 0.2	5
Middle Florida Keys NMS						
96 - South of Windley Key	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
114 - South of Lower Matecumbe	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
94 - South of Duck Key	0 ± 0	0 ± 0		0.033 ± 0.019	3.3 ± 0.1	2
93 - South of Duck Key	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
Middle Florida Keys Total (4)	0 ± 0	0 ± 0		0.008 ± 0.088	3.3 ± 0.1	2
Lower Florida Keys NMS						
338 - South of Bahia Honda Key	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
179 - West of American Shoal	0 ± 0	0 ± 0		0.017 ± 0.017	2.4	1
160 - North of Pelican Shoal	0 ± 0	0 ± 0		0.300 ± 0.064	2.8 ± 0.2	18
164 - West of Pelican Shoal	0 ± 0	0 ± 0		0.017 ± 0.017	3.0	1
178 - West of Pelican Shoal	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
166 - Eastern Sambo RO**	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
332 - Eastern Sambo RO**	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
334 - Western Sambo ER**	0 ± 0	0 ± 0		0.017 ± 0.017	0.6	1
167 - Western Sambo ER**	0 ± 0	0 ± 0		0.017 ± 0.017	1.5	1
163 - West of Western Sambo ER	0.033 ± 0.019	1.4 ± 0.1	2	0.100 ± 0.019	2.1 ± 0.1	6
335 - Sand Key SPA**	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
169 - Sand Key SPA**	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
162 - West of Western Dry Rocks	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
Lower Florida Keys Total (13)	0.003 ± 0.003	1.4 ± 0.1	2	0.036 ± 0.023	2.5 ± 0.1	28
Patchy Hard-bottom Total (21)	0.002 ± 0.002	1.4 ± 0.1	2	0.028 ± 0.015	2.5 ± 0.1	35
<i>Low-relief spur & groove (6-15 m)</i>						
Upper Florida Keys NMS						
52 - Carysfort Reef SPA**	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
241 - Carysfort Reef SPA**	0 ± 0	0 ± 0		0.017 ± 0.017	2.0	1

Site number/site location	<i>Echinometra viridis</i>			<i>Eucidaris tribuloides</i>		
	No./m ²	TD (cm)	N	No./m ²	TD (cm)	N
51 - Offshore of Dry Rocks SPA	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
50 - Offshore of Dry Rocks SPA	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
49 - Little Pickles Reef	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
48 - Little Pickles Reef	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
Upper Florida Keys Total (6)	0 ± 0	0 ± 0		0.003 ± 0.003	2.0	1
Middle Florida Keys NMS						
355 - NE of Conch Reef	0.017 ± 0.017	1.7	1	0.050 ± 0.050	1.8 ± 0.1	3
282 - Conch Reef SPA**	0 ± 0	0 ± 0		0.067 ± 0.047	2.4 ± 0.3	4
354 - Conch Reef SPA**	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
107 - Conch Reef RO**	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
106 - Conch Reef RO**	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
276 - Davis Reef SPA**	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
80 - Davis Reef SPA**	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
102 - South of Lower Matecumbe	0 ± 0	0 ± 0		0.067 ± 0.027	2.1 ± 0.1	4
109 - Tennessee Reef RO**	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
108 - Tennessee Reef RO**	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
113 - NE of Tennessee Light	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
349 - South of Conch Key	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
100 - South of Conch Key	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
99 - East of Delta Shoal	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
110 - Sombrero Key SPA**	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
287 - Sombrero Key SPA**	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
Middle Florida Keys Total (16)	0.001 ± 0.001	1.7	1	0.011 ± 0.006	2.1 ± 0.1	11
Lower Florida Keys NMS						
337 - South of Bahia Honda Key	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
174 - Looe Key SPA**	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
339 - Looe Key SPA**	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
142 - American Shoal	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
172 - East of Eastern Sambo RO	0 ± 0	0 ± 0		0.017 ± 0.017	1.4	1
340 - Eastern Sambo RO**	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
175 - Eastern Sambo RO**	0 ± 0	0 ± 0		0.017 ± 0.017	1.6	1
171 - Middle Sambo Reef	0 ± 0	0 ± 0		0.017 ± 0.017	1.3	1
170 - Middle Sambo Reef	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
341 - Western Sambo ER**	0.017 ± 0.017	0.7	1	0 ± 0	0 ± 0	
176 - Western Sambo ER**	0 ± 0	0 ± 0		0.033 ± 0.019	1.9 ± 0.0	2
Lower Florida Keys Total (11)	0.002 ± 0.002	0.7	1	0.008 ± 0.003	1.6 ± 0.1	5
Low-relief Spur & Groove Total (33)	0.001 ± 0.001	1.2 ± 0.7	2	0.009 ± 0.003	2.0 ± 0.1	17

Table 15. Mean $\pm$ 1 SE densities (no. individuals per m²), test diameter (TD, cm), and numbers of individuals (N) of the urchins *Lytechinus variegatus* and *Tripneustes ventricosus* in the Florida Keys National Marine Sanctuary and Biscayne National Park, as determined from four 15-m x 1-m belt transects per site at 235 sites during June-August 2007. Sites are arranged by habitat from northeast to southwest and asterisked locations (**) are no-take marine reserves.

Site number/site location	<i>Lytechinus variegatus</i>			<i>Tripneustes ventricosus</i>		
	No./m ²	TD (cm)	N	No./m ²	TD (cm)	N
<i>Mid-channel patch reefs</i>						
Biscayne National Park						
445 - Northern Legare Anchorage	0 $\pm$ 0	0 $\pm$ 0		0 $\pm$ 0	0 $\pm$ 0	
441 - Bache Shoal	0 $\pm$ 0	0 $\pm$ 0		0 $\pm$ 0	0 $\pm$ 0	
440 - South of Bache Shoal	0 $\pm$ 0	0 $\pm$ 0		0 $\pm$ 0	0 $\pm$ 0	
438 - South of Bache Shoal	0 $\pm$ 0	0 $\pm$ 0		0 $\pm$ 0	0 $\pm$ 0	
437 - South of Legare Anchorage	0 $\pm$ 0	0 $\pm$ 0		0 $\pm$ 0	0 $\pm$ 0	
427 - Margot Fish Shoal	0 $\pm$ 0	0 $\pm$ 0		0.017 $\pm$ 0.017	10.3	1
421 - Margot Fish Shoal	0 $\pm$ 0	0 $\pm$ 0		0 $\pm$ 0	0 $\pm$ 0	
419 - Inshore of Ajax Reef	0 $\pm$ 0	0 $\pm$ 0		0 $\pm$ 0	0 $\pm$ 0	
413 - Inshore of Pacific Reef	0 $\pm$ 0	0 $\pm$ 0		0 $\pm$ 0	0 $\pm$ 0	
410 - Inshore of Pacific Reef	0 $\pm$ 0	0 $\pm$ 0		0 $\pm$ 0	0 $\pm$ 0	
408 - Offshore of Broad Creek	0 $\pm$ 0	0 $\pm$ 0		0.017 $\pm$ 0.017	5.1	1
406 - Offshore of Broad Creek	0 $\pm$ 0	0 $\pm$ 0		0 $\pm$ 0	0 $\pm$ 0	
Biscayne National Park Total (12)	0 $\pm$ 0	0 $\pm$ 0		0.003 $\pm$ 0.002	7.7 $\pm$ 2.6	2
Upper Florida Keys NMS						
4 - Basin Hill Shoals	0 $\pm$ 0	0 $\pm$ 0		0 $\pm$ 0	0 $\pm$ 0	
2 - Near Cannon Patch Reef	0 $\pm$ 0	0 $\pm$ 0		0 $\pm$ 0	0 $\pm$ 0	
3 - Near Cannon Patch Reef	0 $\pm$ 0	0 $\pm$ 0		0 $\pm$ 0	0 $\pm$ 0	
1 - Inshore of Molasses Reef	0 $\pm$ 0	0 $\pm$ 0		0 $\pm$ 0	0 $\pm$ 0	
Upper Florida Keys Total (4)	0 $\pm$ 0	0 $\pm$ 0		0 $\pm$ 0	0 $\pm$ 0	
Middle Florida Keys NMS						
69 - Tavernier Rocks	0 $\pm$ 0	0 $\pm$ 0		0 $\pm$ 0	0 $\pm$ 0	
71 - Hen and Chickens SPA**	0 $\pm$ 0	0 $\pm$ 0		0 $\pm$ 0	0 $\pm$ 0	
70 - Hen and Chickens SPA**	0 $\pm$ 0	0 $\pm$ 0		0 $\pm$ 0	0 $\pm$ 0	
68 - East of Cheeca Rocks SPA	0 $\pm$ 0	0 $\pm$ 0		0 $\pm$ 0	0 $\pm$ 0	
72 - Cheeca Rocks SPA**	0 $\pm$ 0	0 $\pm$ 0		0 $\pm$ 0	0 $\pm$ 0	
73 - Cheeca Rocks SPA**	0 $\pm$ 0	0 $\pm$ 0		0 $\pm$ 0	0 $\pm$ 0	
66 - East Turtle Shoal	0 $\pm$ 0	0 $\pm$ 0		0.017 $\pm$ 0.017	6.4	1
254 - East Turtle Shoal	0 $\pm$ 0	0 $\pm$ 0		0 $\pm$ 0	0 $\pm$ 0	
Middle Florida Keys Total (8)	0 $\pm$ 0	0 $\pm$ 0		0.002 $\pm$ 0.001	6.4	1
Lower Florida Keys NMS						
122 - North of Big Pine Shoal	0 $\pm$ 0	0 $\pm$ 0		0 $\pm$ 0	0 $\pm$ 0	
121 - North of Maryland Shoal	0 $\pm$ 0	0 $\pm$ 0		0 $\pm$ 0	0 $\pm$ 0	
120 - North of Maryland Shoal	0 $\pm$ 0	0 $\pm$ 0		0 $\pm$ 0	0 $\pm$ 0	
119 - North of Pelican Shoal	0 $\pm$ 0	0 $\pm$ 0		0 $\pm$ 0	0 $\pm$ 0	
118 - East of Western Sambo ER	0 $\pm$ 0	0 $\pm$ 0		0 $\pm$ 0	0 $\pm$ 0	
126 - Western Sambo ER**	0 $\pm$ 0	0 $\pm$ 0		0 $\pm$ 0	0 $\pm$ 0	
125 - Western Sambo ER**	0 $\pm$ 0	0 $\pm$ 0		0 $\pm$ 0	0 $\pm$ 0	
124 - Western Sambo ER**	0 $\pm$ 0	0 $\pm$ 0		0 $\pm$ 0	0 $\pm$ 0	
123 - Western Sambo ER**	0 $\pm$ 0	0 $\pm$ 0		0 $\pm$ 0	0 $\pm$ 0	
117 - NW of Sand Key SPA	0 $\pm$ 0	0 $\pm$ 0		0 $\pm$ 0	0 $\pm$ 0	
116 - North of Satan Shoal	0 $\pm$ 0	0 $\pm$ 0		0 $\pm$ 0	0 $\pm$ 0	
115 - North of Satan Shoal	0 $\pm$ 0	0 $\pm$ 0		0 $\pm$ 0	0 $\pm$ 0	
Lower Florida Keys Total (12)	0 $\pm$ 0	0 $\pm$ 0		0 $\pm$ 0	0 $\pm$ 0	
Mid-channel Patch Reef Total (36)	0 $\pm$ 0	0 $\pm$ 0		0.001 $\pm$ 0.001	7.3 $\pm$ 1.6	3

Site number/site location	<i>Lytechinus variegatus</i>			<i>Tripneustes ventricosus</i>		
	No./m ²	TD (cm)	N	No./m ²	TD (cm)	N
<i>Offshore patch reefs</i>						
Biscayne National Park						
471 - Northwest of Triumph Reef	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
461 - NW of Long Reef	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
460 - NW of Long Reef	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
459 - NW of Pacific Reef	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
458 - Inshore of Pacific Reef	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
456 - Inshore of Pacific Reef	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
454 - Northwest of Whistle Buoy	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
Biscayne National Park Total (7)	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
Upper Florida Keys NMS						
16 - North of Carysfort Reef SPA	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
15 - North of Carysfort Reef SPA	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
14 - North of Carysfort Reef SPA	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
47 - Carysfort Reef SPA**	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
345 - Carysfort Reef SPA**	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
46 - Carysfort Reef SPA**	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
39 - Carysfort Reef SPA**	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
37 - West of Carysfort Reef SPA	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
13 - Inshore of Watson's Reef	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
55 - Inshore of Watson's Reef	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
358 - Inshore of Watson's Reef	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
54 - Inshore of Watson's Reef	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
347 - Inshore of Watson's Reef	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
12 - Inshore of Watson's Reef	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
9 - White Banks	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
8 - Inshore of French Reef	0.017 ± 0.017	7.4	1	0.067 ± 0.047	5.7 ± 0.5	4
7 - Inshore of Molasses Reef	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
6 - Inshore of Molasses Reef	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
5 - Inshore of Pickles Reef	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
Upper Florida Keys Total (19)	0.001 ± 0.001	7.4	1	0.004 ± 0.004	5.7 ± 0.5	4
Middle Florida Keys NMS						
77 - Inshore of Conch Reef SPA	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
76 - Inshore of Conch Reef SPA	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
75 - Inshore of Conch Reef SPA	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
74 - Inshore of Conch Reef SPA	0 ± 0	0 ± 0		0.033 ± 0.033	4.9 ± 0.5	2
98 - Coffins Patch SPA**	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
277 - Coffins Patch SPA**	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
Middle Florida Keys Total (6)	0 ± 0	0 ± 0		0.006 ± 0.006	4.9 ± 0.5	2
Lower Florida Keys NMS						
133 - Looe Key Research Only**	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
132 - Looe Key Research Only**	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
131 - North of Looe Key SPA**	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
130 - Maryland Shoal	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
129 - North of Maryland Shoal	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
165 - North of Maryland Shoal	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
128 - NE of Eastern Sambo RO	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
135 - Western Sambo ER**	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
168 - Western Sambo ER**	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
127 - West of Sand Key SPA	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
Lower Florida Keys Total (10)	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
Offshore Patch Reef Total (42)	0.001 ± 0.001	7.4	1	0.002 ± 0.002	5.4 ± 0.4	6
<i>Hard-bottom/rubble/sand matrix</i>						
Upper Florida Keys NMS						

Site number/site location	<i>Lytechinus variegatus</i>			<i>Tripneustes ventricosus</i>		
	No./m ²	TD (cm)	N	No./m ²	TD (cm)	N
40 - Carysfort Reef SPA**	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
38 - West of Carysfort Reef SPA	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
36 - West of Carysfort Reef SPA	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
11 - NW of Dry Rocks SPA	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
Upper Florida Keys Total (4)	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
Hard-bottom Matrix Total (4)	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
<i>Low-relief hard-bottom (< 6 m)</i>						
Biscayne National Park						
475 - Fowey Rocks	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
469 - South of Ajax Reef	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
Biscayne National Park Total (2)	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
Upper Florida Keys NMS						
346 - Carysfort Reef SPA**	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
35 - West of Carysfort Reef SPA	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
34 - West of Carysfort Reef SPA	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
33 - Inshore of Watson's Reef	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
17 - Little Pickles Reef	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
Upper Florida Keys Total (5)	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
Middle Florida Keys NMS						
269 - Conch Reef SPA**	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
89 - Conch Reef SPA**	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
88 - Little Conch Reef	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
352 - Little Conch Reef	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
97 - Davis Reef SPA**	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
90 - Davis Reef SPA**	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
86 - South of Windley Key	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
103 - NE of Alligator Light	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
82 - Alligator Reef SPA**	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
81 - Alligator Reef SPA**	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
350 - Tennessee Light	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
85 - East of Coffins Patch SPA	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
92 - Coffins Patch SPA**	0 ± 0	0 ± 0		0.017 ± 0.017	5.7	1
91 - Coffins Patch SPA**	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
Middle Florida Keys Total (14)	0 ± 0	0 ± 0		0.001 ± 0.001	5.7	1
Lower Florida Keys NMS						
161 - West of American Shoal	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
140 - Maryland Shoal	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
159 - North of Pelican Shoal	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
158 - East of No Name Reef	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
Lower Florida Keys Total (4)	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
Hard-bottom (< 6 m) Total (25)	0 ± 0	0 ± 0		0.001 ± 0.001	5.7	1
<i>Inner line reef tract spur & groove</i>						
Upper Florida Keys NMS						
61 - Turtle Reef	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
60 - Inshore of Elbow Reef SPA	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
59 - Inshore of Elbow Reef SPA	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
58 - Horseshoe Reef	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
62 - Dry Rocks SPA**	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
63 - Dry Rocks SPA**	0 ± 0	0 ± 0		0.067 ± 0.067	9.1 ± 0.4	4
65 - Grecian Rocks SPA**	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
64 - Grecian Rocks SPA**	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
Upper Florida Keys Total (8)	0 ± 0	0 ± 0		0.008 ± 0.008	9.1 ± 0.4	4
Inner Line Spur & Groove Total (8)	0 ± 0	0 ± 0		0.008 ± 0.008	9.1 ± 0.4	4
<i>High-relief spur & groove</i>						
Biscayne National Park						

Site number/site location	<i>Lytechinus variegatus</i>			<i>Triptneustes ventricosus</i>		
	No./m ²	TD (cm)	N	No./m ²	TD (cm)	N
474 - Brewster Reef	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
472 - Star Reef	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
470 - Triumph Reef	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
467 - Long Reef	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
466 - Ajax Reef	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
465 - Ajax Reef	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
464 - Pacific Reef	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
Biscayne National Park Total (7)	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
Upper Florida Keys NMS						
26 - Carysfort Reef SPA**	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
25 - Carysfort Reef SPA**	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
218 - South Carysfort Reef SPA**	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
217 - South Carysfort Reef SPA**	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
24 - Maitland Grounding Site	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
28 - Elbow Reef SPA**	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
27 - Elbow Reef SPA**	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
30 - French Reef SPA**	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
29 - French Reef SPA**	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
23 - SW of French Reef SPA	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
357 - Sand Island	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
356 - Sand Island	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
32 - Molasses Reef SPA**	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
31 - Molasses Reef SPA**	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
19 - Pickles Reef	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
20 - Pickles Reef	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
18 - Pickles Reef	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
Upper Florida Keys Total (17)	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
Middle Florida Keys NMS						
79 - Delta Shoal	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
78 - Delta Shoal	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
84 - Sombrero Key SPA**	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
83 - Sombrero Key SPA**	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
Middle Florida Keys Total (4)	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
Lower Florida Keys NMS						
148 - Looe Key SPA**	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
147 - Looe Key SPA**	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
145 - American Shoal	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
146 - American Shoal	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
144 - Maryland Shoal	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
141 - Maryland Shoal	0 ± 0	0 ± 0		0.017 ± 0.017	8.7	1
143 - Maryland Shoal	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
139 - Pelican Shoal	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
138 - No Name Reef	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
137 - No Name Reef	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
150 - Eastern Sambo RO**	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
149 - Eastern Sambo RO**	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
348 - Middle Sambo Reef	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
309 - Middle Sambo Reef	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
152 - Western Sambo ER**	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
151 - Western Sambo ER**	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
136 - East of Eastern Dry Rocks SPA	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
154 - Eastern Dry Rocks SPA**	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
153 - Eastern Dry Rocks SPA**	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
156 - Rock Key SPA**	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
155 - Rock Key SPA**	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
325 - Sand Key SPA**	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
157 - Sand Key SPA**	0 ± 0	0 ± 0		0 ± 0	0 ± 0	

Site number/site location	<i>Lytechinus variegatus</i>			<i>Triptoeustes ventricosus</i>		
	No./m ²	TD (cm)	N	No./m ²	TD (cm)	N
Lower Florida Keys Total (23)	0 ± 0	0 ± 0		0.001 ± 0.001	8.7	1
High-relief Spur & Groove Total (51)	0 ± 0	0 ± 0		0.001 ± 0.001	8.7	1
<i>Low-relief hard-bottom (6-15 m)</i>						
Upper Florida Keys NMS						
53 - Carysfort Reef SPA**	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
240 - Carysfort Reef SPA**	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
57 - Inshore of Watson's Reef	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
45 - Offshore of Dry Rocks SPA	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
22 - SW of French Reef SPA	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
21 - SW of French Reef SPA	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
Upper Florida Keys Total (6)	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
Middle Florida Keys NMS						
353 - Conch Reef SPA**	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
105 - Conch Reef SPA**	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
104 - NE of Alligator Light	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
351 - South of Indian Key	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
101 - South of Lower Matecumbe	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
111 - West of Sombrero Key	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
Middle Florida Keys Total (6)	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
Lower Florida Keys NMS						
180 - South of Bahia Honda Key	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
173 - Maryland Shoal	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
177 - NE of Satan Shoal	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
Lower Florida Keys Total (3)	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
Hard-bottom (6-15 m) Total (15)	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
<i>Patchy hard-bottom (6-15 m)</i>						
Upper Florida Keys NMS						
56 - Inshore of Watson's Reef	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
44 - Dixie Shoal	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
43 - Dixie Shoal	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
42 - Dixie Shoal	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
Upper Florida Keys Total (4)	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
Middle Florida Keys NMS						
96 - South of Windley Key	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
114 - South of Lower Matecumbe	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
94 - South of Duck Key	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
93 - South of Duck Key	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
Middle Florida Keys Total (4)	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
Lower Florida Keys NMS						
338 - South of Bahia Honda Key	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
179 - West of American Shoal	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
160 - North of Pelican Shoal	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
164 - West of Pelican Shoal	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
178 - West of Pelican Shoal	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
166 - Eastern Sambo RO**	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
332 - Eastern Sambo RO**	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
334 - Western Sambo ER**	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
167 - Western Sambo ER**	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
163 - West of Western Sambo ER	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
335 - Sand Key SPA**	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
169 - Sand Key SPA**	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
162 - West of Western Dry Rocks	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
Lower Florida Keys Total (13)	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
Patchy Hard-bottom Total (21)	0 ± 0	0 ± 0		0 ± 0	0 ± 0	

Site number/site location	<i>Lytechinus variegatus</i>			<i>Tripneustes ventricosus</i>		
	No./m ²	TD (cm)	N	No./m ²	TD (cm)	N
<i>Low-relief spur & groove (6-15 m)</i>						
Upper Florida Keys NMS						
52 - Carysfort Reef SPA**	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
241 - Carysfort Reef SPA**	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
51 - Offshore of Dry Rocks SPA	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
50 - Offshore of Dry Rocks SPA	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
49 - Little Pickles Reef	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
48 - Little Pickles Reef	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
Upper Florida Keys Total (6)	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
Middle Florida Keys NMS						
355 - NE of Conch Reef	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
282 - Conch Reef SPA**	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
354 - Conch Reef SPA**	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
107 - Conch Reef RO**	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
106 - Conch Reef RO**	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
276 - Davis Reef SPA**	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
80 - Davis Reef SPA**	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
102 - South of Lower Matecumbe	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
109 - Tennessee Reef RO**	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
108 - Tennessee Reef RO**	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
113 - NE of Tennessee Light	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
349 - South of Conch Key	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
100 - South of Conch Key	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
99 - East of Delta Shoal	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
110 - Sombrero Key SPA**	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
287 - Sombrero Key SPA**	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
Middle Florida Keys Total (16)	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
Lower Florida Keys NMS						
337 - South of Bahia Honda Key	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
174 - Looe Key SPA**	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
339 - Looe Key SPA**	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
142 - American Shoal	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
172 - East of Eastern Sambo RO	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
340 - Eastern Sambo RO**	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
175 - Eastern Sambo RO**	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
171 - Middle Sambo Reef	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
170 - Middle Sambo Reef	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
341 - Western Sambo ER**	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
176 - Western Sambo ER**	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
Lower Florida Keys Total (11)	0 ± 0	0 ± 0		0 ± 0	0 ± 0	
Low-relief Spur & Groove Total (33)	0 ± 0	0 ± 0		0 ± 0	0 ± 0	

Table 16. Number of individuals (N), mean, standard error (SE), and range in sea urchin test diameter by species and habitat type in the Florida Keys National Marine Sanctuary and Biscayne National Park, as determined from surveys of four 15-m x 1-m belt transects per site at 235 sites during June-August 2007.

Habitat type (no. sites)	Transect depth (m)	N	Mean test size (cm)	SE	Min. test size (cm)	Max. test size (cm)
<i>Diadema antillarum</i>						
Mid-channel patch reef (36)	0.9-9.1 m	29	3.3	0.4	0.6	8.0
Offshore patch reef (42)	2.1-14.6 m	107	4.6	0.2	0.5	10.0
Hard-bottom-sand-rubble matrix (4)	2.7-5.8 m	1	2.3		2.3	2.3
Shallow (< 6 m) hard-bottom (25)	2.7-7.0 m	30	2.5	0.4	0.4	5.7
Inner line reef tract spur & groove (8)	1.5-6.1 m	6	5.3	0.9	1.5	7.3
High-relief spur and groove (51)	0.6-9.4 m	73	2.8	0.3	0.3	8.1
Deeper (> 6 m) hard-bottom (15)	6.7-13.7 m	4	1.9	1.1	0.7	5.0
Patchy hard-bottom, 6-15 m (21)	4.6-11.3 m	28	3.9	0.3	0.5	7.0
Low-relief spur and groove (33)	7.6-16.2 m	21	2.7	0.5	0.4	7.0
All habitats combined (235 sites)	0.9-16.2 m	299	3.6	0.1	0.3	10.0
<i>Echinometra lucunter</i>						
Mid-channel patch reef (36)	0.9-9.1 m	12	1.9	0.1	1.0	2.6
Offshore patch reef (42)	2.1-14.6 m	10	1.6	0.2	0.8	2.5
Hard-bottom-sand-rubble matrix (4)	2.7-5.8 m	3	2.6	0.8	1.2	4.0
Shallow (< 6 m) hard-bottom (25)	2.7-7.0 m	1	0.5		0.5	0.5
Inner line reef tract spur & groove (8)	1.5-6.1 m	1	1.2		1.2	1.2
High-relief spur and groove (51)	0.6-9.4 m	76	1.8	0.1	0.5	3.7
Deeper (> 6 m) hard-bottom (15)	6.7-13.7 m	0				
Patchy hard-bottom, 6-15 m (21)	4.6-11.3 m	0				
Low-relief spur and groove (33)	7.6-16.2 m	0				
All habitats combined (235 sites)	0.9-16.2 m	103	1.8	0.1	0.5	4.0
<i>Echinometra viridis</i>						
Mid-channel patch reef (36)	0.9-9.1 m	1,810	2.5	0.0	0.5	5.0
Offshore patch reef (42)	2.1-14.6 m	47	1.7	0.1	0.5	3.5
Hard-bottom-sand-rubble matrix (4)	2.7-5.8 m	8	1.9	0.2	0.9	3.0
Shallow (< 6 m) hard-bottom (25)	2.7-7.0 m	5	1.9	0.5	1.2	3.7
Inner line reef tract spur & groove (8)	1.5-6.1 m	0				
High-relief spur and groove (51)	0.6-9.4 m	26	1.7	0.1	0.7	3.4
Deeper (> 6 m) hard-bottom (15)	6.7-13.7 m	1	0.5		0.5	0.5
Patchy hard-bottom, 6-15 m (21)	4.6-11.3 m	2	1.4	0.1	1.2	1.5
Low-relief spur and groove (33)	7.6-16.2 m	2	1.2	0.5	0.7	1.7
All habitats combined (235 sites)	0.9-16.2 m	1,901	2.4	0.0	0.5	5.0
<i>Eucidaris tribuloides</i>						
Mid-channel patch reef (36)	0.9-9.1 m	88	2.3	0.1	0.7	4.2
Offshore patch reef (42)	2.1-14.6 m	237	2.1	0.0	0.7	4.6
Hard-bottom-sand-rubble matrix (4)	2.7-5.8 m	15	2.5	0.1	1.2	3.4
Shallow (< 6 m) hard-bottom (25)	2.7-7.0 m	93	2.2	0.1	0.8	3.8
Inner line reef tract spur & groove (8)	1.5-6.1 m	51	2.2	0.1	1.0	3.5
High-relief spur and groove (51)	0.6-9.4 m	317	1.9	0.0	0.5	3.4
Deeper (> 6 m) hard-bottom (15)	6.7-13.7 m	5	1.6	0.2	0.9	2.1
Patchy hard-bottom, 6-15 m (21)	4.6-11.3 m	35	2.5	0.1	0.6	3.5
Low-relief spur and groove (33)	7.6-16.2 m	17	2.0	0.1	1.3	3.0
All habitats combined (235 sites)	0.9-16.2 m	858	2.1	0.0	0.5	4.6
<i>Lytechinus variegatus</i>						
Mid-channel patch reef (36)	0.9-9.1 m	0				
Offshore patch reef (42)	2.1-14.6 m	1	7.4		7.4	7.4
Hard-bottom-sand-rubble matrix (4)	2.7-5.8 m	0				
Shallow (< 6 m) hard-bottom (25)	2.7-7.0 m	0				
Inner line reef tract spur & groove (8)	1.5-6.1 m	0				

Habitat type (no. sites)	Transect depth (m)	N	Mean test size (cm)	SE	Min. test size (cm)	Max. test size (cm)
<i>Lytechinus variegatus</i>						
High-relief spur and groove (51)	0.6-9.4 m	0				
Deeper (> 6 m) hard-bottom (15)	6.7-13.7 m	0				
Patchy hard-bottom, 6-15 m (21)	4.6-11.3 m	0				
Low-relief spur and groove (33)	7.6-16.2 m	0				
All habitats combined (235 sites)	0.9-16.2 m	1	7.4		7.4	7.4
<i>Tripneustes ventricosus</i>						
Mid-channel patch reef (36)	0.9-9.1 m	3	7.3	1.6	5.1	10.3
Offshore patch reef (42)	2.1-14.6 m	6	5.4	0.4	4.4	7.0
Hard-bottom-sand-rubble matrix (4)	2.7-5.8 m	0				
Shallow (< 6 m) hard-bottom (25)	2.7-7.0 m	1	5.7		5.7	5.7
Inner line reef tract spur & groove (8)	1.5-6.1 m	4	9.1	0.4	8.0	9.8
High-relief spur and groove (51)	0.6-9.4 m	1	8.7		8.7	8.7
Deeper (> 6 m) hard-bottom (15)	6.7-13.7 m	0				
Patchy hard-bottom, 6-15 m (21)	4.6-11.3 m	0				
Low-relief spur and groove (33)	7.6-16.2 m	0				
All habitats combined (235 sites)	0.9-16.2 m	15	7.0	0.5	4.4	10.3

Table 17. Alphabetical list of stony coral species (Milleporina and Scleractinia) recorded within belt transect surveys at 235 sites in the Florida Keys National Marine Sanctuary and Biscayne National Park during June-August 2007. Habitats are arranged from inshore to offshore and are designated as: MPR = mid-channel patch reef, OPR = offshore patch reef, HBM = hard-bottom matrix, LHBS = shallow (< 6 m) hard-bottom, IRT = inner line reef tract, HSG = high-relief spur and groove, LHBD = deeper (6-15 m) hard-bottom, PHB = patchy hard-bottom, and LSG = low-relief spur and groove. ? = present, ? = absent

Stony coral species	MPR (36)	OPR (42)	HBM (4)	LHBS (25)	IRT (8)	HSG (51)	LHBD (15)	PHB (21)	LSG (33)
<i>Acropora cervicornis</i>	?	?	?	?	?	?	?	?	?
<i>A. palmata</i>	?	?	?	?	?	?	?	?	?
<i>Agaricia agaricites</i>	?	?	?	?	?	?	?	?	?
<i>A. fragilis</i>	?	?	?	?	?	?	?	?	?
<i>A. humilis</i>	?	?	?	?	?	?	?	?	?
<i>A. lamarcki</i>	?	?	?	?	?	?	?	?	?
<i>Cladocora arbuscula</i>	?	?	?	?	?	?	?	?	?
<i>Colpophyllia natans</i>	?	?	?	?	?	?	?	?	?
<i>Dendrogyra cylindrus</i>	?	?	?	?	?	?	?	?	?
<i>Dichocoenia stokesi</i>	?	?	?	?	?	?	?	?	?
<i>Diploria clivosa</i>	?	?	?	?	?	?	?	?	?
<i>D. labyrinthiformis</i>	?	?	?	?	?	?	?	?	?
<i>D. strigosa</i>	?	?	?	?	?	?	?	?	?
<i>Eusmilia fastigiata</i>	?	?	?	?	?	?	?	?	?
<i>Favia fragum</i>	?	?	?	?	?	?	?	?	?
<i>Isophyllia sinuosa</i>	?	?	?	?	?	?	?	?	?
<i>Leptoseris cucullata</i>	?	?	?	?	?	?	?	?	?
<i>Madracis decactis</i>	?	?	?	?	?	?	?	?	?
<i>M. formosa</i>	?	?	?	?	?	?	?	?	?
<i>M. mirabilis</i>	?	?	?	?	?	?	?	?	?
<i>Manicina areolata</i>	?	?	?	?	?	?	?	?	?
<i>Meandrina meandrites</i>	?	?	?	?	?	?	?	?	?
<i>Millepora alcicornis</i>	?	?	?	?	?	?	?	?	?
<i>M. complanata</i>	?	?	?	?	?	?	?	?	?
<i>Montastraea annularis</i>	?	?	?	?	?	?	?	?	?
<i>M. faveolata</i>	?	?	?	?	?	?	?	?	?
<i>M. franksii</i>	?	?	?	?	?	?	?	?	?
<i>M. annularis</i> sp.	?	?	?	?	?	?	?	?	?
<i>M. cavernosa</i>	?	?	?	?	?	?	?	?	?
<i>Mussa angulosa</i>	?	?	?	?	?	?	?	?	?
<i>Mycetophyllia aliciae</i>	?	?	?	?	?	?	?	?	?
<i>M. danaana</i>	?	?	?	?	?	?	?	?	?
<i>M. ferox</i>	?	?	?	?	?	?	?	?	?
<i>M. lamarckiana</i>	?	?	?	?	?	?	?	?	?
<i>Mycetophyllia</i> sp.	?	?	?	?	?	?	?	?	?
<i>Oculina diffusa</i>	?	?	?	?	?	?	?	?	?
<i>Phyllangia americana</i>	?	?	?	?	?	?	?	?	?
<i>Porites astreoides</i>	?	?	?	?	?	?	?	?	?
<i>P. branteri</i>	?	?	?	?	?	?	?	?	?
<i>P. porites divaricata</i>	?	?	?	?	?	?	?	?	?
<i>P. porites furcata</i>	?	?	?	?	?	?	?	?	?
<i>P. porites porites</i>	?	?	?	?	?	?	?	?	?
<i>Scolymia</i> sp.	?	?	?	?	?	?	?	?	?
<i>Siderastrea radians</i>	?	?	?	?	?	?	?	?	?
<i>S. siderea</i>	?	?	?	?	?	?	?	?	?
<i>S. bournoni</i>	?	?	?	?	?	?	?	?	?
<i>Stephanocoenia intersepta</i>	?	?	?	?	?	?	?	?	?
Total taxa	37	42	21	28	26	35	30	35	40