Supporting Information. Lauren T. Toth, Anastasios Stathakopoulos, Ilsa B. Kuffner, Robert R. Ruzicka, Michael A. Colella, Eugene A. Shinn. 2019. The unprecedented loss of Florida's reef-building corals and the emergence of a novel coral-reef assemblage. *Ecology*.

Appendix S1

Supplemental Tables

Table S1. Average relative composition (± SE) of coral taxa in the Holocene reef framework within individual subregions of the Florida Keys Reef Tract (FKRT). Coral taxa are listed in descending order based on their average relative composition throughout the FKRT (FKRT Average). Subregions where particular taxa were not found are indicated with an 'x'.

	Dry Tortugas N.P. (N=57)	***Marquesas*** (N=8)	***Lower Keys*** (N=33)	***Middle Keys*** (N=20)	***Upper Keys*** (N=32)	***Biscayne N.P.*** (N=41)	**FKRT Average** (N=191)
Orbicella spp.	54.6±4.0	23.1±10.1	31.4±6.9	5.5±3.0	52.7±7.5	27.4±5.7	39.7±2.7
Acropora palmata	3.2±1.7	x	45.4±7.5	75.6±9.0	20.8±6.0	35.1±6.4	25.2±2.7
Pseudodiploria strigosa	21.1±3.1	26.0±10.0	1.4±0.7	2.4±1.8	1.9±1.5	2.4±1.5	10.0±1.4
Diploria labyrinthiformis	3.5±1.4	x	4.0±2.2	9.7±6.7	4.1±2.1	9.8±3.9	5.4±1.2
Colpophyllia natans	7.8±2.2	19.6±9.8	3.3±2.5	x	1.0±0.9	4.1±2.6	5.1±1.1
Montastraea cavernosa	0.2±0.2	14.2±12.4	4.0±3.1	x	6.3±4.3	5.3±2.3	3.2±1.0
Acropora cervicornis	1.6±0.8	x	3.1±1.5	0.8±0.8	2.7±2.1	3.2±2.4	2.2±0.7
Pseudodiploria clivosa	3.0±1.3	x	3.6±2.9	1.6±1.6	1.2±0.9	0.1±0.1	2.0±0.7
Porites astreoides	1.7±0.7	3.5±3.0	0.5±0.4	0.8±0.8	5.6±2.4	2.5±1.1	2.0±0.5
Siderastrea siderea	0.7±0.4	10.9±8.8	1.2±1.0	x	0.3±0.3	1.1±0.7	1.5±0.5
Millepora spp.	0.7±0.3	1.7±1.7	0.2±0.1	x	0.3±0.2	4.7±1.6	1.3±0.4
Dichocoenia stokesi	0.5±0.3	x	0.2±0.2	2.7±2.7	x	1.3±0.7	0.7±0.3
branching *Porites* spp.	0.1±0.1	x	0.7±0.4	0.8±0.7	2.5±1.4	0.3±0.3	0.7±0.2
Madracis spp.	x	x	x	x	x	1.1±0.8	0.2±0.2
Manicina areolata	0.2±0.2	x	0.1±0.1	x	x	x	0.1±0.1
Stephanocoenia intersepta	x	1.0±1.0	0.2±0.2	x	x	x	0.1±<0.1
Dendrogyra cylindrus	x	x	x	x	x	0.3±0.3	0.1±0.1
Solenastrea bournoni	<0.1±<0.1	x	0.2±0.2	x	0.1±0.1	0.1±0.1	<0.1±<0.1
Oculina spp.	x	x	0.1±0.1	x	x	<0.1±<0.1	<0.1±<0.1
Agaricia spp.	x	0.1±0.1	x	x	x	x	<0.1±<0.1
Eusmilia fastigiata	x	x	x	x	x	x	<0.1±<0.1
unidentified coral	x	x	x	x	x	0.2±0.2	<0.1±<0.1

Table S2. Average relative composition (± SE) of coral taxa in the Holocene reef framework (with paleodepths >10 m) during the Early, Middle, and Late Holocene. Coral taxa are listed in descending order based on their relative composition throughout the Holocene (Holocene Average). Periods during which particular taxa were not found are indicated with an 'x'.

	Early Holocene **>8200 yrs BP** (N=18)	***Middle Holocene*** **8200–4200 yrs BP** (N=158)	***Late Holocene*** **<4200 yrs BP** (N=32)	**Holocene Average** (N=191)
Orbicella spp.	7.2±5.6	40.5±3.1	57.6±7.2	39.7±2.7
Acropora palmata	72.6±8.0	22.9±3.1	16.0±5.3	25.2±2.7
Pseudodiploria strigosa	2.7±2.7	10.8±1.7	6.1±2.8	10.0±1.4
Diploria labyrinthiformis	x	6.7±1.6	3.3±2.3	5.4±1.2
Colpophyllia natans	x	5.5±1.4	2.0±1.3	5.1±1.1
Montastraea cavernosa	0.8±0.8	3.1±1.3	7.6±4.5	3.2±1.0
Acropora cervicornis	2.0±1.7	2.0±0.7	3.9±3.1	2.2±0.7
Pseudodiploria clivosa	2.1±2.1	2.4±0.9	0.6±0.5	2.0±0.7
Porites astreoides	1.9±1.4	2.0±0.9	1.5±1.4	2.0±0.5
Siderastrea siderea	2.2±2.2	1.1±0.4	0.6±0.6	1.5±0.5
Millepora spp.	7.1±2.6	0.9±0.4	<0.1±<0.1	1.3±0.4
Dichocoenia stokesi	x	1.0±0.4	x	0.7±0.3
branching *Porites* spp.	0.1±0.1	0.9±0.3	<0.1±<0.1	0.7±0.2
Madracis spp.	x	0.3±0.2	x	0.2±0.2
Manicina areolata	x	0.1±0.1	x	0.1±0.1
Stephanocoenia intersepta	x	<0.1±<0.1	x	0.1±<0.1
Dendrogyra cylindrus	0.7±0.7	x	x	0.1±0.1
Solenastrea bournoni	0.1±0.1	<0.1±<0.1	x	<0.1±<0.1
Oculina spp.	x	<0.1±<0.1	<0.1±<0.1	<0.1±<0.1
Agaricia spp.	x	x	x	<0.1±<0.1
Eusmilia fastigiata	x	x	x	<0.1±<0.1
unidentified coral	0.4±0.4	x	5.5±2.8	<0.1±<0.1

Table S3. Summary of which of the 21 coral taxa found in the Holocene reef cores from the FKRT were included in the analysis comparing the composition of the middle Holocene reef framework to data from modern reef surveys. Eleven taxa were excluded based on potential for breakdown/transport of the coral skeletons (Enos and Perkins 1977; Hubbard et al. 1990; Hubbard 2011), poor recovery in core records (Hubbard 2011), and/or absence from either the middle Holocene reef framework or the modern reef surveys (Table S3).

	Included ? (Y/N)	***Reason for exclusion***
Orbicella spp.	Y	
Acropora palmata	Y	
Pseudodiploria strigosa	Y	
Diploria labyrinthiformis	Y	
Colpophyllia natans	Y	
Montastraea cavernosa	Y	
Acropora cervicornis	N	Branching morphology; susceptible to mechanical breakage and transport; poorly recovered in rotary cores records; ~2% of middle Holocene reef framework
Pseudodiploria clivosa	Y	
Porites astreoides	Y	
Siderastrea siderea	Y	
Millepora spp.	N	Fragile, encrusting, branching, or platy morphology; susceptible to mechanical breakage and transport and/or erosion; poorly recovered in rotary core records; <1% of middle Holocene reef framework
Dichocoenia stokesi	N	Small colony size; susceptible to mechanical breakage and transport and/or erosion; ~1% of middle Holocene reef framework
branching *Porites* spp.	N	Fragile, branching morphology; susceptible to mechanical breakage and transport and/or erosion; poorly recovered in rotary core records; <1% middle Holocene reef framework
Madracis spp.	N	Fragile branching morphology; susceptible to mechanical breakage and transport and/or erosion; poorly recovered in rotary core records; <0.5% of middle Holocene reef framework
Manicina areolata	N	Small, solitary colonies; susceptible to mechanical breakage and transport and/or erosion; poorly recovered in rotary core records; <0.5% of middle Holocene reef framework
Stephanocoenia intersepta	Y	
Dendrogyra cylindrus	N	Not found in the middle Holocene reef framework
Solenastrea bournoni	N	<0.1% of middle Holocene reef framework; not observed in the modern surveys at our sites
Oculina spp.	N	Fragile, branching morphology; susceptible to mechanical breakage and transport and/or erosion; poorly recovered in rotary core records; not found in the middle Holocene reef framework
Agaricia spp.	N	Fragile, encrusting or platy morphology; susceptible to mechanical breakage and transport and/or erosion; not found in the middle Holocene framework
Eusmilia fastigiata	N	Fragile, branching morphology; susceptible to mechanical breakage and transport and/or erosion; not found in the Holocene reef framework

Table S4. Relative abundance of all corals observed in the CREMP surveys in 1996, 2015, and across both survey years, listed in descending order of overall relative abundance. The corals that were included in our comparative analysis of the relative composition of the middle Holocene reef framework and the modern surveys are bolded.

	1996	***2015***	***1996 & 2015***
Porites astreoides	8.3 ± 0.6	26.2 ± 1.1	17.2 ± 0.6
Millepora alcicornis	8.5 ± 4.7	22 ± 2.3	15.2 ± 2.8
***Orbicella* spp.**	12.5 ± 0.9	14.5 ± 0.4	13.5 ± 0.5
Acropora palmata	22 ± 1.9	5 ± 1.5	13.5 ± 1.2
Millepora complanata	24.3 ± 0.5	1.1 ± 0.2	12.7 ± 0.3
Siderastrea siderea	5.4 ± 0.9	16.8 ± 0.7	11.1 ± 0.6
Montastraea cavernosa	5.1 ± 0.3	2 ± 0	3.6 ± 0.2
Dendrogyra cylindrus	2.3 ± 0	1.5 ± 0.1	1.9 ± 0.1
Diploria labyrinthiformis	1.9 ± 0	1.2 ± 0.2	1.6 ± 0.1
Acropora cervicornis	1 ± 0.4	2.1 ± 0.2	1.5 ± 0.2
Agaricia spp.	1.1 ± 2.4	1.9 ± 3.2	1.5 ± 2.1
Colpophyllia natans	2 ± 4.3	0.5 ± 0.4	1.2 ± 2.5
Unidentified coral	2.2 ± 1.5	0 ± 0.9	1.1 ± 0.9
Branching *Porites* spp.	0.4 ± 0	1.8 ± 0.1	1.1 ± 0
Pseudodiploria strigosa	0.4 ± 0	1.6 ± 0	1 ± 0
Pseudodiploria clivosa	0.8 ± 3.4	0.8 ± 3.6	0.8 ± 2.5
Dichocoenia stokesi	0.8 ± 1.7	0.2 ± 4.9	0.5 ± 2.7
Meandrina meandrites	0.6 ± 0.3	0.2 ± 0.6	0.4 ± 0.3
Favia fragum	0.4 ± 0.5	0 ± 0.7	0.2 ± 0.4
Stephanocoenia intersepta	0 ± 0.2	0.2 ± 1	0.1 ± 0.5
Manicina areolata	0 ± 0.7	0.2 ± 0	0.1 ± 0.3
Siderastrea radians	0.1 ± 0.1	0.1 ± 0.1	0.1 ± 0.1
Madracis spp.	0 ± 1.7	0.1 ± 3	0.1 ± 1.8
Mycetophyllia aliciae	0 ± 0	0.1 ± 0.1	0 ± 0.1
Mycetophyllia lamarckiana complex	0 ± 0.4	0 ± 0.7	0 ± 0.4

Table S5. Average relative composition (± SE) of coral taxa from sites in the Lower, Middle, and Upper Florida Keys in the middle Holocene reef framework (cores), in 1996 (CREMP surveys), and in 2015 (CREMP surveys). Coral taxa are listed in descending order based on their relative composition in the middle Holocene reef framework. Periods during which particular taxa were not found are indicated with an 'x'.

	Middle Holocene (N=74)	***1996*** (N=47)	***2015*** (N=48)
Acropora palmata	46.1±5.3	27.4±5.6	7.5±3.4
Orbicella spp.	35.3±4.9	16.7±3.9	18.1±4.2
Diploria labyrinthiformis	6.3±2.2	3.5±1.6	2.2±1.3
Porites astreoides	3.2±1.2	21.5±4.7	32.4±5.5
Pseudodiploria clivosa	2.4±1.4	1.3±0.9	1.4±1.3
Pseudodiploria strigosa	2.3±0.9	0.8±0.6	3.2±1.8
Colpophyllia natans	1.9±1.2	2.9±1.4	0.7±0.7
Montastraea cavernosa	1.8±1.4	10.2±3.0	2.5±1.0
Siderastrea siderea	0.7±0.5	11.6±3.6	29.7±5.2
Stephanocoenia intersepta	0.1±0.1	<0.1±<0.1	0.3±0.2
Dendrogyra cylindrus	x	2.6±2.1	1.8±1.8
Meandrina meandrites	x	1.4±0.9	0.4±0.3

Table S6. Results of ANOSIM and SIMPER analyses comparing the composition of the middle Holocene reef framework across the five main subregions of the FKRT (paleodepths <10 m). The results include the average relative percent (%) abundance of each taxon in each subregion, the average and standard deviation (SD) of the percent contribution of each taxon to the dissimilarity between subregions, the ratio of the average to the standard deviation, and the cumulative percent contribution of each taxon to the dissimilarity. An 'x' indicates that a taxon was not found in the middle Holocene reef framework at one or more of the subregions.

Dry Tortugas N.P. vs. Lower Keys (ANOSIM: R=0.690, p=0.01, SIMPER average dissimilarity: 78.2%)						
Taxon	**Average abundance (%)**		**Average contribution (%)**	**Contribution SD (%)**	**Ratio**	**Cumulative contribution (%)**
	Dry Tortugas N.P.	***Lower Keys***				
Orbicella spp.	52.11	29.97	23.08	16.18	1.43	29.52
Acropora palmata	3.11	45.40	22.96	21.35	1.08	58.89
Pseudodiploria strigosa	22.73	1.53	11.48	13.89	0.83	73.58
Colpophyllia natans	8.57	3.49	5.59	11.84	0.47	80.73
Diploria labyrinthiformis	3.71	4.21	3.66	8.41	0.44	85.41
Pseudodiploria clivosa	3.01	3.81	3.28	10.11	0.32	89.61
Acropora cervicornis	1.64	3.28	2.31	5.47	0.42	92.57
Montastraea cavernosa	0.28	4.28	2.27	9.05	0.25	95.48
Siderastrea siderea	0.56	1.28	0.90	3.27	0.28	96.63
Porites astreoides	1.27	0.58	0.88	2.19	0.40	97.75
Millepora spp.	0.82	0.19	0.49	1.58	0.31	98.38
Branching *Porites* spp.	0.15	0.78	0.47	1.31	0.36	98.97
Dichocoenia stokesi	0.66	0.17	0.40	1.71	0.24	99.49
Manicina areolata	0.27	0.07	0.17	0.76	0.22	99.70
Solenastrea bournoni	<0.01	0.17	0.09	0.47	0.19	99.82
Stephanocoenia intersepta	x	0.17	0.09	0.47	0.18	99.93
Oculina spp.	x	0.11	0.06	0.32	0.18	100.00
Madracis spp.	x	x	x	x	x	x
Dry Tortugas N.P. vs. Middle Keys (ANOSIM: R=1.000, p=.012, SIMPER average dissimilarity: 91.3%)						
Taxon	**Average abundance (%)**		**Average contribution (%)**	**Contribution SD (%)**	**Ratio**	**Cumulative contribution (%)**
	Dry Tortugas N.P.	***Middle Keys***				
Acropora palmata	3.11	74.31	36.67	20.59	1.78	40.15
Orbicella spp.	52.11	5.80	24.50	16.43	1.49	66.98
Pseudodiploria strigosa	22.73	2.57	11.60	13.81	0.84	79.68
Diploria labyrinthiformis	3.71	10.24	6.63	15.38	0.43	86.94
Colpophyllia natans	8.57	0.00	4.29	10.51	0.41	91.63
Pseudodiploria clivosa	3.01	1.69	2.26	6.88	0.33	94.10
Dichocoenia stokesi	0.66	2.87	1.74	6.24	0.28	96.01
Acropora cervicornis	1.64	0.79	1.18	4.05	0.29	97.30

Taxon	Average abundance (%)		Average contribution (%)	Contribution SD (%)	Ratio	Cumulative contribution (%)
Porites astreoides	1.27	0.87	1.01	2.50	0.40	98.40
Branching *Porites* spp.	0.15	0.86	0.49	1.56	0.32	98.94
Millepora spp.	0.82	0.00	0.41	1.57	0.26	99.39
Siderastrea siderea	0.56	0.00	0.28	1.51	0.18	99.70
Montastraea cavernosa	0.28	0.00	0.14	0.88	0.16	99.85
Manicina areolata	0.27	0.00	0.13	0.75	0.18	100.00
Solenastrea bournoni	<0.01	x	<0.01	0.01	0.12	100.00
Stephanocoenia intersepta	x	x	x	x	x	x
Oculina spp.	x	x	x	x	x	x
Madracis spp.	x	x	x	x	x	x
Dry Tortugas N.P. vs. Upper Keys (ANOSIM: R=0.317, p=0.043, SIMPER average dissimilarity: 65.0%)						
Taxon	**Average abundance (%)**		**Average contribution (%)**	**Contribution SD (%)**	**Ratio**	**Cumulative contribution (%)**
	Dry Tortugas N.P.	***Upper Keys***				
Orbicella spp.	52.11	54.52	21.85	16.01	1.37	33.61
Pseudodiploria strigosa	22.73	2.59	11.73	13.98	0.84	51.64
Acropora palmata	3.11	19.03	10.56	17.25	0.61	67.88
Colpophyllia natans	8.57	1.39	4.76	10.53	0.45	75.19
Diploria labyrinthiformis	3.71	5.50	4.18	8.25	0.51	81.61
Porites astreoides	1.27	7.45	4.04	7.41	0.55	87.83
Acropora cervicornis	1.64	3.65	2.54	7.35	0.35	91.74
Pseudodiploria clivosa	3.01	1.05	1.97	6.54	0.30	94.77
Branching *Porites* spp.	0.15	3.31	1.72	4.42	0.39	97.41
Millepora spp.	0.82	0.38	0.58	1.59	0.36	98.30
Siderastrea siderea	0.56	0.37	0.46	1.71	0.27	99.00
Dichocoenia stokesi	0.66	x	0.33	1.68	0.20	99.51
Montastraea cavernosa	0.28	x	0.14	0.88	0.16	99.72
Manicina areolata	0.27	x	0.13	0.75	0.18	99.93
Solenastrea bournoni	<0.01	0.09	0.05	0.22	0.22	100.00
Stephanocoenia intersepta	x	x	x	x	x	x
Oculina spp.	x	x	x	x	x	x
Madracis spp.	x	x	x	x	x	x
Dry Tortugas N.P. vs. Biscayne N.P. (ANOSIM: R=0.546, p=0.024, SIMPER average dissimilarity: 65.0%)						
Taxon	**Average abundance (%)**		**Average contribution (%)**	**Contribution SD (%)**	**Ratio**	**Cumulative contribution (%)**
	Dry Tortugas N.P.	***Biscayne N.P.***				
Orbicella spp.	52.11	35.37	22.45	15.94	1.41	30.24
Pseudodiploria strigosa	22.73	3.75	11.91	13.97	0.85	46.27

Taxon	Average abundance (%)		Average contribution (%)	Contribution SD (%)	Ratio	Cumulative contribution (%)
	Dry Tortugas N.P.	***Biscayne N.P.***				
Diploria labyrinthiformis	3.71	18.68	10.36	16.59	0.62	60.23
Colpophyllia natans	8.57	9.25	7.87	14.04	0.56	70.82
Acropora palmata	3.11	7.61	5.15	13.74	0.37	77.75
Montastraea cavernosa	0.28	8.94	4.61	10.03	0.46	83.96
Siderastrea siderea	0.56	4.51	2.48	4.83	0.51	87.30
Millepora spp.	0.82	3.86	2.27	5.75	0.39	90.36
Dichocoenia stokesi	0.66	2.95	1.77	3.77	0.47	92.74
Pseudodiploria clivosa	3.01	0.29	1.63	6.23	0.26	94.93
Madracis spp.	0.00	2.42	1.27	3.89	0.33	96.64
Porites astreoides	1.27	1.12	1.14	2.88	0.39	98.17
Acropora cervicornis	1.64	x	0.82	3.85	0.21	99.28
Branching *Porites* spp.	0.15	0.61	0.38	1.32	0.29	99.78
Manicina areolata	0.27	x	0.13	0.75	0.18	99.96
Oculina spp.	x	0.04	0.02	0.09	0.24	99.99
Solenastrea bournoni	<0.01	0.01	0.01	0.02	0.27	100.00
Stephanocoenia intersepta	x	x	x	x	x	x
Lower Keys vs. Middle Keys (ANOSIM: R=0.056, p=0.343 SIMPER average dissimilarity: 62.2%)						
Taxon	**Average abundance (%)**		**Average contribution (%)**	**Contribution SD (%)**	**Ratio**	**Cumulative contribution (%)**
	Lower Keys	***Middle Keys***				
Acropora palmata	45.40	74.31	25.51	20.37	1.25	41.00
Orbicella spp.	29.97	5.80	15.56	17.96	0.87	66.00
Diploria labyrinthiformis	4.21	10.24	6.80	15.14	0.45	76.92
Pseudodiploria clivosa	3.81	1.69	2.66	8.89	0.30	81.19
Montastraea cavernosa	4.28	0.00	2.14	8.98	0.24	84.64
Acropora cervicornis	3.28	0.79	1.92	4.48	0.43	87.72
Pseudodiploria strigosa	1.53	2.57	1.90	4.23	0.45	90.78
Colpophyllia natans	3.49	0.00	1.75	7.26	0.24	93.59
Dichocoenia stokesi	0.17	2.87	1.51	6.09	0.25	96.02
Branching *Porites* spp.	0.78	0.86	0.77	1.85	0.42	97.27
Porites astreoides	0.58	0.87	0.70	2.15	0.33	98.40
Siderastrea siderea	1.28	x	0.64	2.98	0.21	99.43
Millepora spp.	0.19	x	0.09	0.37	0.25	99.58
Stephanocoenia intersepta	0.17	x	0.09	0.47	0.18	99.71
Solenastrea bournoni	0.17	x	0.09	0.47	0.18	99.85
Oculina spp.	0.11	x	0.06	0.31	0.18	99.94
Manicina areolata	0.07	x	0.04	0.20	0.18	100.00

Taxon	Average abundance (%)		Average contribution (%)	Contribution SD (%)	Ratio	Cumulative contribution (%)
	Lower Keys	***Middle Keys***				
Madracis spp.	x	x	x	x	x	x
Lower Keys vs. Upper Keys (ANOSIM: R=-0.094, p=0.629, SIMPER average dissimilarity: 70.9%)						
Taxon	**Average abundance (%)**		**Average contribution (%)**	**Contribution SD (%)**	**Ratio**	**Cumulative contribution (%)**
	Lower Keys	***Upper Keys***				
Orbicella spp.	29.97	54.52	24.46	18.57	1.32	34.48
Acropora palmata	45.40	19.03	22.81	19.54	1.17	66.65
Diploria labyrinthiformis	4.21	5.50	4.36	8.11	0.54	72.79
Porites astreoides	0.58	7.45	3.86	7.43	0.52	78.24
Acropora cervicornis	3.28	3.65	3.20	7.29	0.44	82.75
Pseudodiploria clivosa	3.81	1.05	2.37	8.67	0.27	86.10
Colpophyllia natans	3.49	1.39	2.36	7.60	0.31	89.42
Montastraea cavernosa	4.28	0.00	2.15	9.01	0.24	92.45
Pseudodiploria strigosa	1.53	2.59	1.95	4.83	0.40	95.20
Branching *Porites* spp.	0.78	3.31	1.94	4.35	0.45	97.93
Siderastrea siderea	1.28	0.37	0.81	3.05	0.27	99.07
Millepora spp.	0.19	0.38	0.27	0.64	0.43	99.45
Solenastrea bournoni	0.17	0.09	0.13	0.50	0.25	99.63
Stephanocoenia intersepta	0.17	x	0.09	0.47	0.18	99.75
Dichocoenia stokesi	0.17	x	0.08	0.46	0.18	99.87
Oculina spp.	0.11	x	0.06	0.31	0.18	99.95
Manicina areolata	0.07	x	0.04	0.20	0.18	100.00
Madracis spp.	x	x	x	x	x	x
Lower Keys vs. Biscayne N.P. (ANOSIM: R=-0.074, p=0.486, SIMPER average dissimilarity: 81.7%)						
Taxon	**Average abundance (%)**		**Average contribution (%)**	**Contribution SD (%)**	**Ratio**	**Cumulative contribution (%)**
	Lower Keys	***Biscayne N.P.***				
Acropora palmata	45.40	7.61	22.90	20.85	1.10	28.02
Orbicella spp.	29.97	35.37	20.79	18.18	1.14	53.45
Diploria labyrinthiformis	4.21	18.68	10.41	16.28	0.64	66.19
Montastraea cavernosa	4.28	8.94	6.14	12.21	0.50	73.70
Colpophyllia natans	3.49	9.25	5.96	13.07	0.46	80.99
Siderastrea siderea	1.28	4.51	2.74	5.17	0.53	84.35
Pseudodiploria strigosa	1.53	3.75	2.50	6.11	0.41	87.40
Pseudodiploria clivosa	3.81	0.29	2.03	8.48	0.24	89.89
Millepora spp.	0.19	3.86	2.01	5.69	0.35	92.34
Acropora cervicornis	3.28	0.00	1.65	4.41	0.37	94.35
Dichocoenia stokesi	0.17	2.95	1.57	3.56	0.44	96.28

Taxon	Average abundance (%)		Average contribution (%)	Contribution SD (%)	Ratio	Cumulative contribution (%)
	Lower Keys	***Biscayne N.P.***				
Madracis spp.	0.00	2.42	1.26	3.86	0.33	97.82
Porites astreoides	0.58	1.12	0.83	2.59	0.32	98.84
Branching *Porites* spp.	0.78	0.61	0.66	1.70	0.39	99.65
Solenastrea bournoni	0.17	0.01	0.09	0.47	0.19	99.76
Stephanocoenia intersepta	0.17	x	0.09	0.47	0.18	99.86
Oculina spp.	0.11	0.04	0.08	0.32	0.24	99.95
Manicina areolata	0.07	x	0.04	0.20	0.18	100.00
Middle Keys vs. Upper Keys (ANOSIM: R=0.333 p=0.114, SIMPER average dissimilarity: 80.1%)						
Taxon	**Average abundance (%)**		**Average contribution (%)**	**Contribution SD (%)**	**Ratio**	**Cumulative contribution (%)**
	Middle Keys	***Upper Keys***				
Acropora palmata	74.31	19.03	32.23	20.06	1.61	40.21
Orbicella spp.	5.80	54.52	26.26	19.24	1.37	72.97
Diploria labyrinthiformis	10.24	5.50	7.32	14.81	0.49	82.11
Porites astreoides	0.87	7.45	3.95	7.43	0.53	87.03
Pseudodiploria strigosa	2.57	2.59	2.41	5.80	0.42	90.04
Acropora cervicornis	0.79	3.65	2.15	6.63	0.32	92.72
Branching *Porites* spp.	0.86	3.31	1.95	4.41	0.44	95.16
Dichocoenia stokesi	2.87	0.00	1.44	6.12	0.24	96.96
Pseudodiploria clivosa	1.69	1.05	1.32	4.20	0.31	98.60
Colpophyllia natans	x	1.39	0.70	3.02	0.23	99.47
Millepora spp.	x	0.38	0.20	0.58	0.34	99.71
Siderastrea siderea	x	0.37	0.19	0.90	0.21	99.94
Solenastrea bournoni	x	0.09	0.05	0.22	0.21	100.00
Montastraea cavernosa	x	x	x	x	x	x
Stephanocoenia intersepta	x	x	x	x	x	x
Manicina areolata	x	x	x	x	x	x
Oculina spp.	x	x	x	x	x	x
Madracis spp.	x	x	x	x	x	x
Middle Keys vs. Biscayne N.P. (ANOSIM: R=0.074, p=0.400, SIMPER average dissimilarity: 81.7%)						
Taxon	**Average abundance (%)**		**Average contribution (%)**	**Contribution SD (%)**	**Ratio**	**Cumulative contribution (%)**
	Middle Keys	***Biscayne N.P.***				
Acropora palmata	74.31	7.61	35.30	20.52	1.72	39.76
Orbicella spp.	5.80	35.37	17.60	18.29	0.96	59.58
Diploria labyrinthiformis	10.24	18.68	12.52	19.07	0.66	73.68
Colpophyllia natans	0.00	9.25	4.62	12.02	0.38	78.89
Montastraea cavernosa	0.00	8.94	4.49	9.98	0.45	83.95

Taxon	Average abundance (%)		Average contribution (%)	Contribution SD (%)	Ratio	Cumulative contribution (%)
	Middle Keys	***Biscayne N.P.***				
Pseudodiploria strigosa	2.57	3.75	2.94	6.82	0.43	87.26
Dichocoenia stokesi	2.87	2.95	2.79	6.51	0.43	90.41
Siderastrea siderea	0.00	4.51	2.29	4.75	0.48	92.98
Millepora spp.	0.00	3.86	1.93	5.72	0.34	95.15
Madracis spp.	0.00	2.42	1.26	3.85	0.33	96.57
Pseudodiploria clivosa	1.69	0.29	0.97	3.58	0.27	97.67
Porites astreoides	0.87	1.12	0.95	2.87	0.33	98.74
Branching *Porites* spp.	0.86	0.61	0.69	1.89	0.37	99.52
Acropora cervicornis	0.79	0.00	0.40	1.69	0.24	99.97
Oculina spp.	0.00	0.04	0.02	0.09	0.24	99.99
Solenastrea bournoni	0.00	0.01	<0.01	0.02	0.24	100.00
Stephanocoenia intersepta	x	x	x	x	x	x
Manicina areolata	x	x	x	x	x	x
Upper Keys vs. Biscayne N.P. (ANOSIM: R=-0.019, p=0.429, SIMPER average dissimilarity: 74.8%)						
Taxon	**Average abundance (%)**		**Average contribution (%)**	**Contribution SD (%)**	**Ratio**	**Cumulative contribution (%)**
	Upper Keys	***Biscayne N.P.***				
Orbicella spp.	54.52	35.37	24.02	17.95	1.34	32.10
Acropora palmata	19.03	7.61	11.76	17.76	0.66	47.82
Diploria labyrinthiformis	5.50	18.68	10.70	15.84	0.68	62.12
Colpophyllia natans	1.39	9.25	5.10	12.00	0.43	68.94
Montastraea cavernosa	0.00	8.94	4.51	10.02	0.45	74.96
Porites astreoides	7.45	1.12	4.06	7.50	0.54	80.38
Pseudodiploria strigosa	2.59	3.75	2.97	7.23	0.41	84.35
Siderastrea siderea	0.37	4.51	2.40	4.71	0.51	87.56
Millepora spp.	0.38	3.86	2.09	5.65	0.37	90.35
Branching *Porites* spp.	3.31	0.61	1.88	4.42	0.42	92.86
Acropora cervicornis	3.65	x	1.84	6.63	0.28	95.31
Dichocoenia stokesi	x	2.95	1.52	3.59	0.42	97.34
Madracis spp.	x	2.42	1.26	3.86	0.33	99.03
Pseudodiploria clivosa	1.05	0.29	0.66	2.54	0.26	99.91
Solenastrea bournoni	0.09	0.01	0.05	0.22	0.23	99.97
Oculina spp.	x	0.04	0.02	0.09	0.24	100.00
Stephanocoenia intersepta	x	x	x	x	x	x
Manicina areolata	x	x	x	x	x	x

Table S7. Results of ANOSIM and SIMPER analyses comparing the relative composition of coral assemblages among the middle Holocene reef framework (paleodepth <10 m), the 1996 CREMP dataset, and the 2015 CREMP dataset. Only data from the Lower, Middle, and Upper Keys were included in these analyses. The results include the average relative percent (%) abundance of each taxon in each time period, the average and standard deviation (SD) of the percent contribution of each taxon to the dissimilarity between time periods, the ratio of the average to the standard deviation, and the cumulative percent contribution of each taxon to the dissimilarity.

Mid-Holocene vs. 1996 (ANOSIM: R=0.275, p=0.001, SIMPER average dissimilarity: 77.1%)						
Taxon	**Average abundance (%)**		**Average contribution (%)**	**Contribution SD (%)**	**Ratio**	**Cumulative contribution (%)**
	Middle Holocene	***1996***				
Acropora palmata	46.10	28.12	23.47	20.46	1.15	30.43
Orbicella spp.	35.30	16.73	19.09	18.43	1.04	55.17
Porites astreoides	3.16	21.62	11.20	15.53	0.72	69.69
Siderastrea siderea	0.67	14.46	7.38	14.56	0.51	79.26
Montastraea cavernosa	1.79	10.40	5.82	11.12	0.52	86.80
Diploria labyrinthiformis	6.29	3.61	4.56	10.17	0.45	92.71
Colpophyllia natans	1.94	2.91	2.30	6.59	0.35	95.69
Pseudodiploria clivosa	2.38	1.35	1.79	6.49	0.28	98.02
Pseudodiploria strigosa	2.30	0.78	1.48	4.24	0.35	99.93
Stephanocoenia intersepta	0.08	0.02	0.05	0.34	0.15	100.00
Mid-Holocene vs. 2015 (ANOSIM: R=0.478, p=0.001, SIMPER average dissimilarity: 86.3%)						
Taxon	**Average abundance (%)**		**Average contribution (%)**	**Contribution SD (%)**	**Ratio**	**Cumulative contribution (%)**
	Middle Holocene	***2015***				
Acropora palmata	46.10	7.85	23.19	22.22	1.04	26.87
Orbicella spp.	35.30	18.08	19.34	18.79	1.03	49.27
Porites astreoides	3.16	32.39	16.17	18.17	0.89	68.00
Siderastrea siderea	0.67	31.47	15.69	18.20	0.86	86.18
Diploria labyrinthiformis	6.29	2.15	3.98	9.89	0.40	90.79
Pseudodiploria strigosa	2.30	3.23	2.61	6.81	0.38	93.81
Montastraea cavernosa	1.79	2.46	2.05	6.53	0.31	96.18
Pseudodiploria clivosa	2.38	1.36	1.82	7.17	0.25	98.29
Colpophyllia natans	1.94	0.71	1.29	5.42	0.24	99.79
Stephanocoenia intersepta	0.08	0.29	0.18	0.90	0.21	100.00

1996 vs. 2015 (ANOSIM: R=0.140, p=0.001, SIMPER average dissimilarity: 77.2%)						
Taxon	**Average abundance (%)**		**Average contribution (%)**	**Contribution SD (%)**	**Ratio**	**Cumulative contribution (%)**
	1996	***2015***				
Porites astreoides	21.62	32.39	18.07	17.48	1.03	23.40
Siderastrea siderea	14.46	31.47	17.11	18.18	0.94	45.55
Acropora palmata	28.12	7.85	15.50	19.56	0.79	65.63
Orbicella spp.	16.73	18.08	12.96	14.47	0.90	82.41
Montastraea cavernosa	10.40	2.46	5.70	9.97	0.57	89.80
Diploria labyrinthiformis	3.61	2.15	2.70	6.57	0.41	93.30
Pseudodiploria strigosa	0.78	3.23	1.95	6.30	0.31	95.82
Colpophyllia natans	2.91	0.71	1.75	5.10	0.34	98.09
Pseudodiploria clivosa	1.35	1.36	1.32	5.09	0.26	99.79
Stephanocoenia intersepta	0.02	0.29	0.16	0.85	0.19	100.00

Table S8. Results of ANOSIM and SIMPER analyses comparing the relative composition of coral assemblages among the Lower, Middle, and Upper Keys subregions in the middle Holocene reef framework (paleodepth <10 m), the 1996 CREMP dataset, and the 2015 CREMP dataset. The results include the average relative percent (%) abundance of each taxon in each subregion, the average and standard deviation (SD) of the percent contribution of each taxon to the dissimilarity between subregions, the ratio of the average to the standard deviation, and the cumulative percent contribution of each taxon to the dissimilarity. An 'x' indicates that a taxon was not found in the middle Holocene reef framework at one or more of the subregions.

Lower Keys vs. Middle Keys (ANOSIM: R=0.164, p=0.002, SIMPER average dissimilarity: 78.9%)						
Taxon	**Average abundance (%)**		**Average contribution (%)**	**Contribution SD (%)**	**Ratio**	**Cumulative contribution (%)**
	Lower Keys	***Middle Keys***				
Acropora palmata	33.41	36.60	22.55	21.71	1.04	28.58
Orbicella spp.	27.93	9.76	15.23	16.56	0.92	47.89
Porites astreoides	21.05	8.19	12.19	16.63	0.73	63.34
Siderastrea siderea	4.24	21.53	11.48	16.94	0.68	77.89
Montastraea cavernosa	4.74	7.64	5.55	11.13	0.50	84.92
Diploria labyrinthiformis	2.56	7.55	4.77	11.58	0.41	90.97
Pseudodiploria strigosa	0.86	5.22	2.93	7.11	0.41	94.68
Colpophyllia natans	2.34	2.18	2.16	6.64	0.33	97.42
Pseudodiploria clivosa	2.72	1.07	1.84	6.97	0.26	99.75
Stephanocoenia intersepta	0.13	0.26	0.20	0.93	0.21	100.00
Lower Keys vs. Upper Keys (ANOSIM: R=0.123, p=0.002, SIMPER average dissimilarity: 74.9%)						
Taxon	**Average abundance (%)**		**Average contribution (%)**	**Contribution SD (%)**	**Ratio**	**Cumulative contribution (%)**
	Lower Keys	***Upper Keys***				
Orbicella spp.	27.93	34.33	20.32	18.19	1.12	27.14
Acropora palmata	33.41	20.87	19.56	20.14	0.97	53.26
Porites astreoides	21.05	17.59	14.53	17.07	0.85	72.67
Siderastrea siderea	4.24	18.37	9.99	15.84	0.63	86.01
Diploria labyrinthiformis	2.56	4.16	3.11	6.92	0.45	90.16
Montastraea cavernosa	4.74	1.23	2.77	7.30	0.38	93.85
Pseudodiploria clivosa	2.72	1.18	1.90	7.13	0.27	96.39
Colpophyllia natans	2.34	0.96	1.59	5.69	0.28	98.52
Pseudodiploria strigosa	0.86	1.31	1.04	3.49	0.30	99.91
Stephanocoenia intersepta	0.13	x	0.07	0.38	0.18	100.00

Middle Keys vs. Upper Keys (ANOSIM: R=0.258, p=0.001, SIMPER average dissimilarity: 80.8%)						
Taxon	**Average abundance (%)**		**Average contribution (%)**	**Contribution SD (%)**	**Ratio**	**Cumulative contribution (%)**
	Middle Keys	***Upper Keys***				
Acropora palmata	36.60	20.87	20.92	22.05	0.95	25.90
Orbicella spp.	9.76	34.33	18.21	19.96	0.91	48.45
Siderastrea siderea	21.53	18.37	15.54	19.29	0.81	67.69
Porites astreoides	8.19	17.59	10.67	15.11	0.71	80.89
Diploria labyrinthiformis	7.55	4.16	5.38	11.57	0.46	87.55
Montastraea cavernosa	7.64	1.23	4.21	9.77	0.43	92.76
Pseudodiploria strigosa	5.22	1.31	3.11	7.50	0.42	96.62
Colpophyllia natans	2.18	0.96	1.52	4.85	0.31	98.49
Pseudodiploria clivosa	1.07	1.18	1.09	3.90	0.28	99.84
Stephanocoenia intersepta	0.26	x	0.13	0.87	0.15	100.00

Table S9. Results of ANOSIM and SIMPER analyses comparing the relative composition of coral assemblages among middle Holocene reef framework (paleodepth <10 m), the 1996 CREMP dataset, and the 2015 CREMP dataset, and the Lower Middle, and Upper Keys only including data from sites sampled by both the middle Holocene reef framework and the CREMP monitoring program. The results include the average relative percent (%) abundance of each taxon in each time period, the average and standard deviation (SD) of the percent contribution of each taxon to the dissimilarity between time periods, the ratio of the average to the standard deviation, and the cumulative percent contribution of each taxon to the dissimilarity. An 'x' indicates that a taxon was not found during one or more of the time periods.

Mid-Holocene vs. 1996 (ANOSIM: R=0.371, p=0.001, SIMPER average dissimilarity: 77.5%)						
Taxon	**Average abundance (%)**		**Average contribution (%)**	**Contribution SD (%)**	**Ratio**	**Cumulative contribution (%)**
	Middle Holocene	***1996***				
Acropora palmata	34.35	20.83	20.09	21.30	0.94	25.93
Orbicella spp.	24.69	30.64	19.22	19.09	1.01	50.74
Siderastrea siderea	13.86	15.84	12.26	18.18	0.67	66.56
Porites astreoides	12.98	17.34	12.04	15.84	0.76	82.10
Montastraea cavernosa	2.39	7.38	4.62	11.57	0.40	88.06
Diploria labyrinthiformis	5.09	3.88	4.10	9.08	0.45	93.36
Pseudodiploria strigosa	2.50	2.20	2.21	5.94	0.37	96.22
Pseudodiploria clivosa	2.29	1.20	1.70	6.51	0.26	98.41
Colpophyllia natans	1.66	0.68	1.13	4.68	0.24	99.88
Stephanocoenia intersepta	0.19	x	0.09	0.64	0.15	100.00
Mid-Holocene vs. 2015 (ANOSIM: R=0.590, p=0.001, SIMPER average dissimilarity: 76.2%)						
Taxon	**Average abundance (%)**		**Average contribution (%)**	**Contribution SD (%)**	**Ratio**	**Cumulative contribution (%)**
	Middle Holocene	***2015***				
Acropora palmata	34.35	26.14	20.69	20.32	1.02	27.16
Orbicella spp.	24.69	21.68	16.43	16.50	1.00	48.73
Porites astreoides	12.98	27.73	15.68	17.39	0.90	69.32
Siderastrea siderea	13.86	8.70	9.39	14.39	0.65	81.64
Montastraea cavernosa	2.39	7.88	4.63	7.76	0.60	87.72
Diploria labyrinthiformis	5.09	2.49	3.57	9.18	0.39	92.40
Colpophyllia natans	1.66	3.70	2.55	6.75	0.38	95.75
Pseudodiploria strigosa	2.50	0.89	1.64	5.20	0.31	97.90
Pseudodiploria clivosa	2.29	0.77	1.49	5.86	0.25	99.85

Stephanocoenia intersepta	0.19	0.04	0.11	0.64	0.17	100.00
1996 vs. 2015 (ANOSIM: R=0.260, p=0.001, SIMPER average dissimilarity: 76.0%)						
Taxon	**Average abundance (%)**		**Average contribution (%)**	**Contribution SD (%)**	**Ratio**	**Cumulative contribution (%)**
	1996	***2015***				
Orbicella spp.	30.64	21.68	18.15	17.21	1.06	23.88
Acropora palmata	20.83	26.14	17.38	19.17	0.91	46.74
Porites astreoides	17.34	27.73	15.98	16.73	0.96	67.76
Siderastrea siderea	15.84	8.70	10.35	15.88	0.65	81.37
Montastraea cavernosa	7.38	7.88	6.62	10.95	0.60	90.08
Diploria labyrinthiformis	3.88	2.49	2.96	6.41	0.46	93.97
Colpophyllia natans	0.68	3.70	2.11	5.57	0.38	96.75
Pseudodiploria strigosa	2.20	0.89	1.49	4.63	0.32	98.71
Pseudodiploria clivosa	1.20	0.77	0.96	3.56	0.27	99.98
Stephanocoenia intersepta	x	0.04	0.02	0.10	0.18	100.00

Table S10. Results of ANOSIM and SIMPER analyses comparing the relative composition of coral assemblages among the Lower, Middle, and Upper Keys subregions in the middle Holocene reef framework (paleodepth <10 m), the 1996 CREMP dataset, and the 2015 CREMP dataset only including data from sites sampled by both the middle Holocene reef framework and the CREMP monitoring program. The results include the average relative percent (%) abundance of each taxon in each subregion, the average and standard deviation (SD) of the percent contribution of each taxon to the dissimilarity between subregions, the ratio of the average to the standard deviation, and the cumulative percent contribution of each taxon to the dissimilarity. An 'x' indicates that a taxon was not found in the middle Holocene reef framework at one or more of the subregions.

Lower Keys vs. Middle Keys (ANOSIM: R=0.122, p=0.003, SIMPER average dissimilarity: 78.2%)						
Taxon	**Average abundance (%)**		**Average contribution (%)**	**Contribution SD (%)**	**Ratio**	**Cumulative contribution (%)**
	Lower Keys	***Middle Keys***				
Acropora palmata	29.31	30.57	20.52	21.04	0.98	26.25
Orbicella spp.	17.17	26.15	16.01	17.04	0.94	46.73
Porites astreoides	11.69	27.84	15.55	17.77	0.87	66.61
Siderastrea siderea	24.93	4.50	12.93	17.62	0.73	83.15
Montastraea cavernosa	6.38	2.37	4.05	9.86	0.41	88.33
Diploria labyrinthiformis	4.09	4.29	3.94	10.18	0.39	93.38
Pseudodiploria clivosa	1.74	2.23	1.93	7.19	0.27	95.84
Pseudodiploria strigosa	2.70	1.17	1.85	5.60	0.33	98.21
Colpophyllia natans	1.73	0.86	1.26	5.15	0.24	99.82
Stephanocoenia intersepta	0.27	0.02	0.14	0.76	0.19	100.00
Lower Keys vs. Upper Keys (ANOSIM: R=0.297, p=0.001, SIMPER average dissimilarity: 74.9%)						
Taxon	**Average abundance (%)**		**Average contribution (%)**	**Contribution SD (%)**	**Ratio**	**Cumulative contribution (%)**
	Lower Keys	***Upper Keys***				
Orbicella spp.	17.17	41.21	21.23	19.56	1.09	27.07
Acropora palmata	29.31	31.65	20.80	20.85	1.00	53.59
Siderastrea siderea	24.93	3.54	13.08	18.57	0.70	70.27
Porites astreoides	11.69	7.09	7.92	12.89	0.61	80.37
Montastraea cavernosa	6.38	3.62	4.48	9.52	0.47	86.08
Diploria labyrinthiformis	4.09	5.13	4.14	8.02	0.52	91.37
Colpophyllia natans	1.73	3.93	2.71	7.30	0.37	94.82
Pseudodiploria strigosa	2.70	2.66	2.51	6.44	0.39	98.03
Pseudodiploria clivosa	1.74	1.17	1.41	5.94	0.24	99.83

Stephanocoenia intersepta	0.27	x	0.13	0.76	0.18	100.00
Middle Keys vs. Upper Keys (ANOSIM: R=0.415, p=0.001, SIMPER average dissimilarity: 74.0%)						
Taxon	**Average abundance (%)**		**Average contribution (%)**	**Contribution SD (%)**	**Ratio**	**Cumulative contribution (%)**
	Middle Keys	***Upper Keys***				
Orbicella spp.	26.15	41.21	21.78	18.98	1.15	29.44
Acropora palmata	30.57	31.65	21.18	21.59	0.98	58.08
Porites astreoides	27.84	7.09	14.53	17.04	0.85	77.72
Diploria labyrinthiformis	4.29	5.13	4.38	10.21	0.43	83.65
Siderastrea siderea	4.50	3.54	3.60	7.29	0.49	88.51
Montastraea cavernosa	2.37	3.62	2.72	5.67	0.48	92.20
Colpophyllia natans	0.86	3.93	2.30	5.79	0.40	95.30
Pseudodiploria strigosa	1.17	2.66	1.83	5.09	0.36	97.77
Pseudodiploria clivosa	2.23	1.17	1.64	5.25	0.31	99.99
Stephanocoenia intersepta	0.02	x	0.01	0.07	0.13	100.00

Supplemental Figures

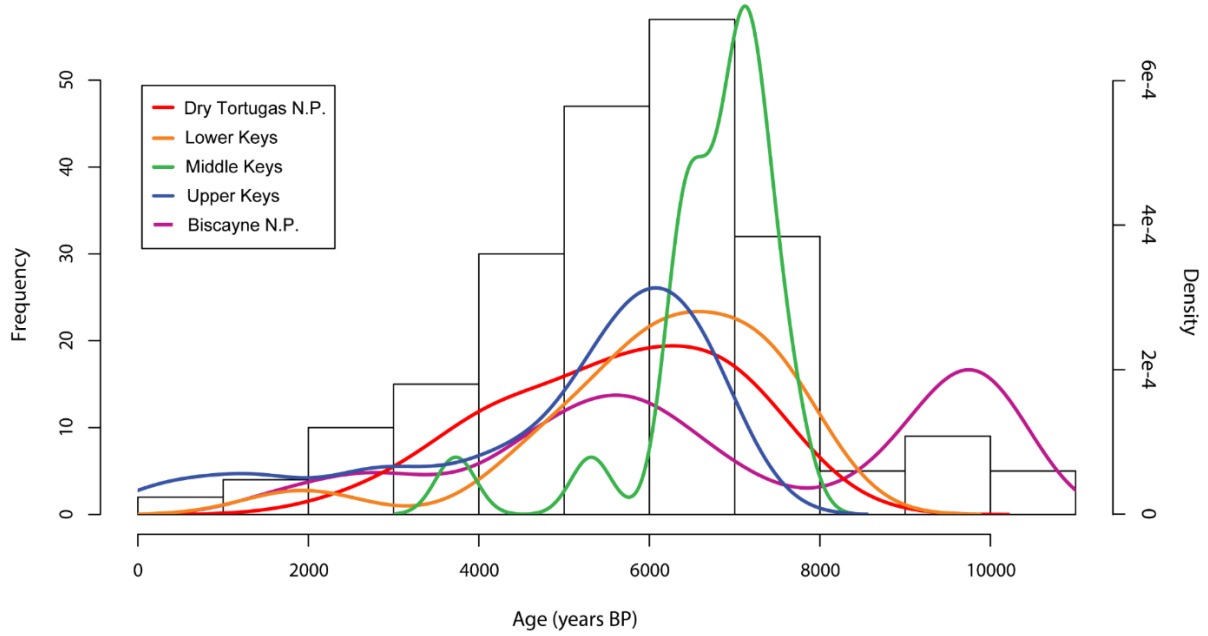

Figure S1. Histogram of estimated average ages (yrs BP) of intervals in the Holocene core records after removing intervals with paleodepths > 10 m. Colored lines provide density plots representing the distribution of ages among the five main subregions.

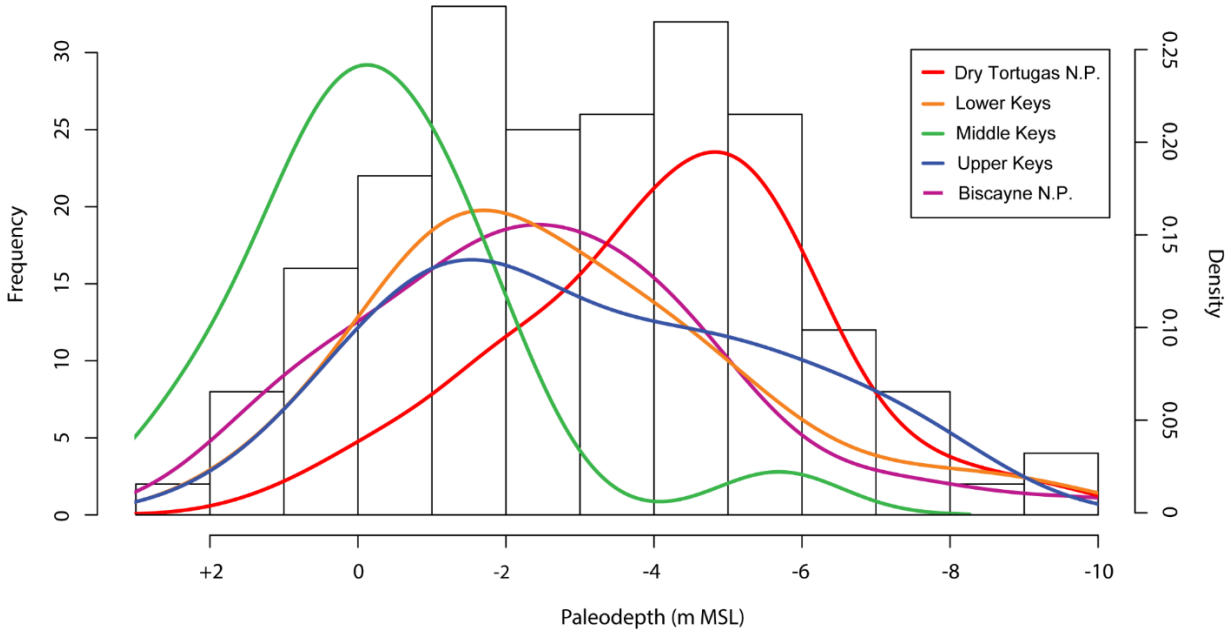

Figure S2. Histogram of estimated average paleodepths in meters relative to mean sea level (m MSL) of intervals in the Holocene core records after removing intervals with paleodepths > 10 m. Colored lines provide density plots representing the distribution of ages among the five main subregions.

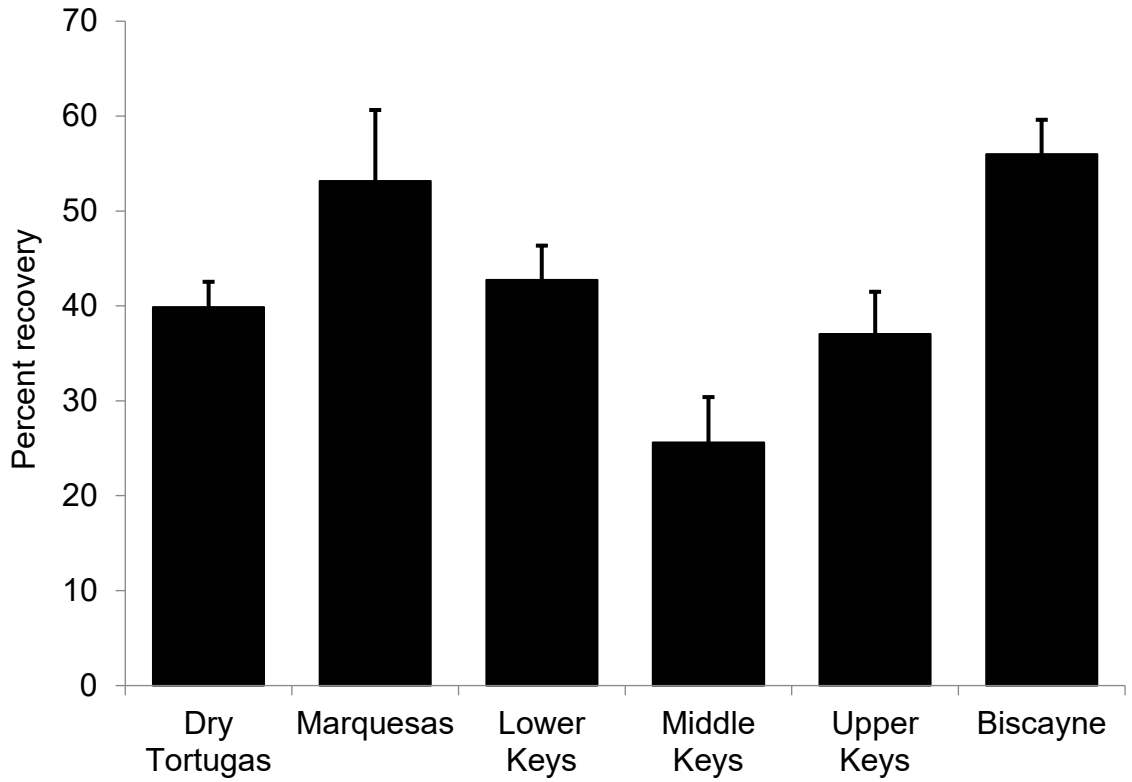

Figure S3. Average (± SE) percent recovery in the Holocene reef cores from the six subregions of the FKRT.

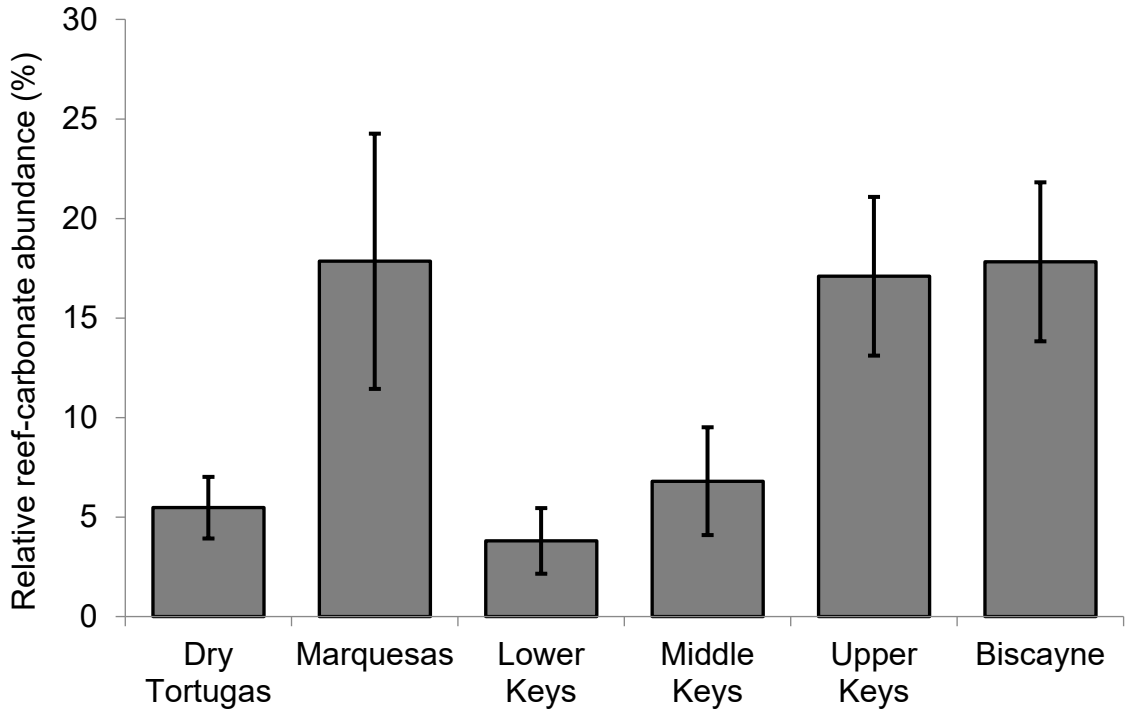

Figure S4. Average (± SE) percent of recovered material in reef cores composed of non-coral, carbonate reef rock in the Holocene reef framework from the six subregions of the FKRT.

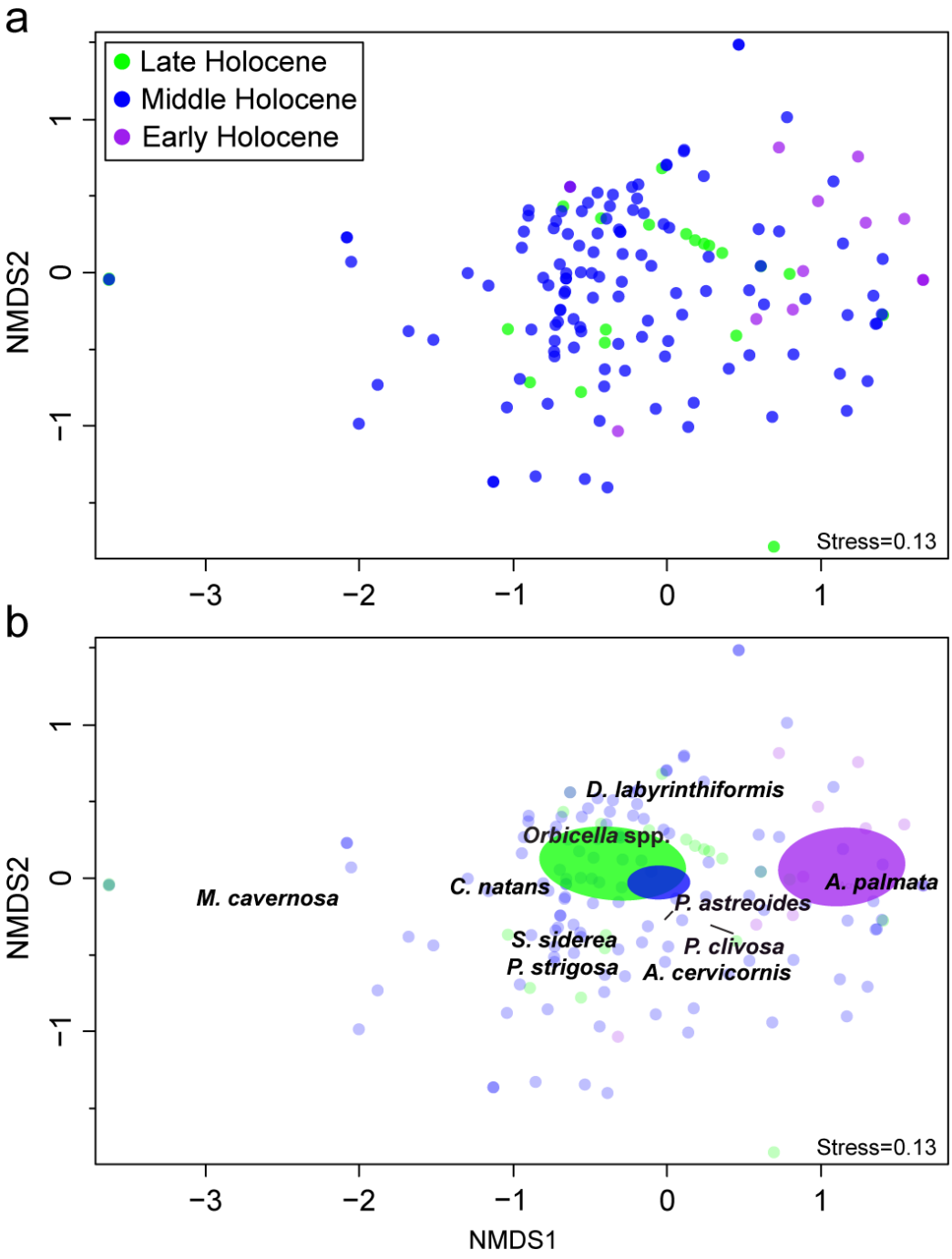

Figure S5. Nonmetric multidimensional scaling (NMDS) ordination of the relative composition of the 21 coral taxa found in the Holocene reef framework. Site scores of intervals in the cores are plotted in (a) with colors representing the period of the Holocene in which they were deposited. In (b), the colors of the site scores are faded so that trends in the data can be more clearly displayed. Colored ellipses represent 95% confidence intervals around the weighted average of site scores for each subregion. The names of the 10 most abundant taxa are plotted at the weighted average of their species scores.

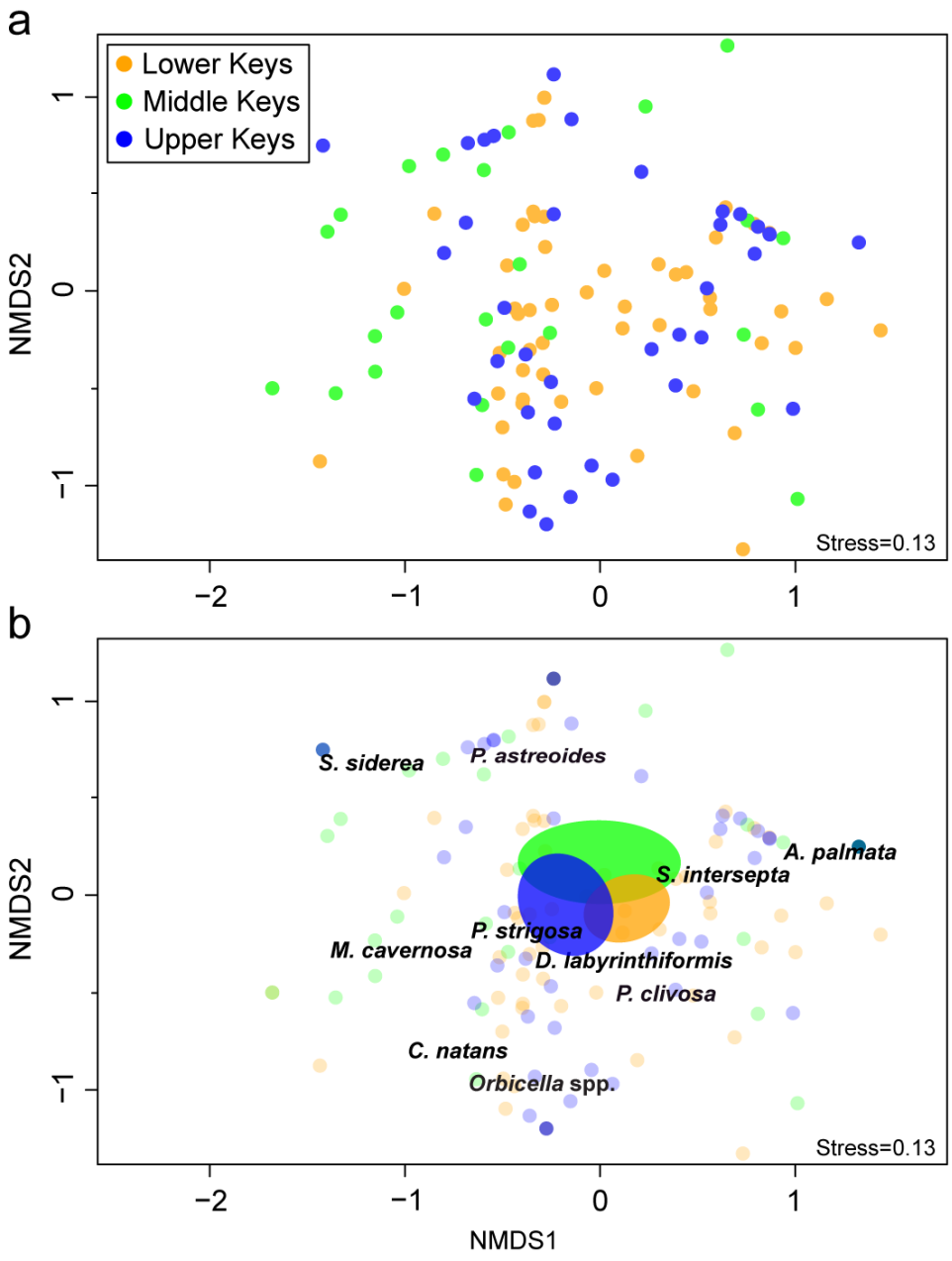

Figure S6. NMDS ordination of the relative composition of the 10 coral taxa included in the comparative analysis of the middle Holocene reef framework (cores) and contemporary (CREMP) assemblages of the Lower, Middle, and Upper Keys. Site scores of intervals in the cores are plotted in (a) with colors representing the subregion where the data were collected. In (b), the colors of site scores are faded so that trends in the data can be more clearly displayed. Colored ellipses represent 95% confidence intervals around the weighted average of site scores for each subregion. The names of the 10 most abundant taxa are plotted at the weighted average of their species scores.

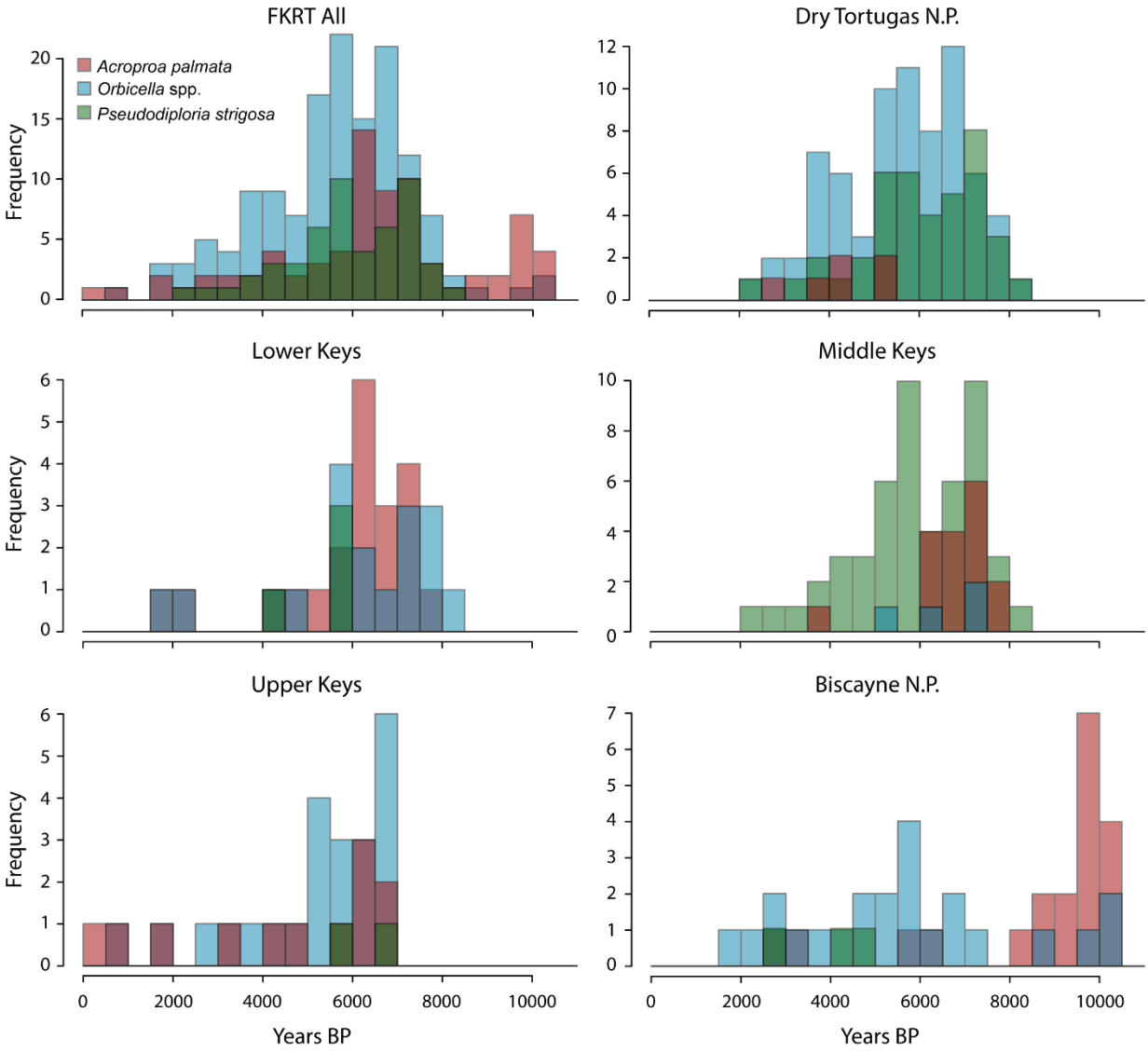

Figure S7. Histograms summarizing the frequency at which the three dominant taxa were observed in intervals within the cores from the FKRT over time.

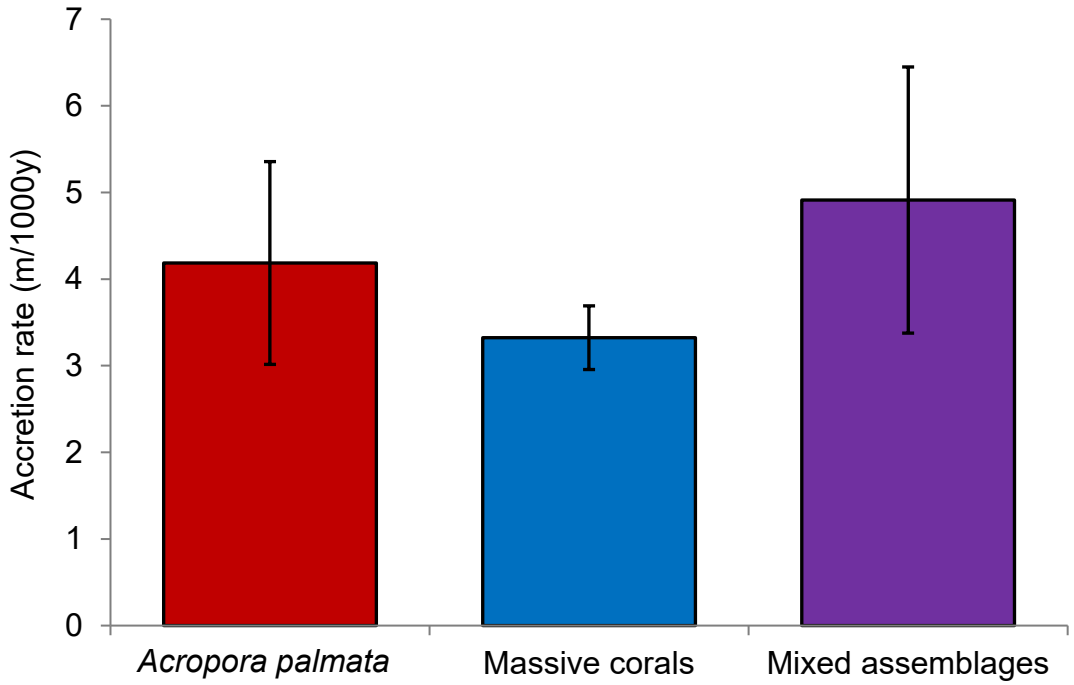

Figure S8. Average (±SE) vertical reef accretion rate of intervals in the cores dominated (>75% composition) by *Acropora palmata*, massive coral taxa, and those composed of mixed assemblages.

Supplemental Analyses

We evaluated the possibility that differences in paleodepth were responsible for any observed spatial variability in reef composition by comparing the distribution of paleodepths and the average paleodepths among subregions using a Chi-Squared Test and a general linear model analysis of variance (ANOVA). Those data met the assumptions of homoscedasticity (Levene's Test: $F_{4,203}$=1.33, P=0.26) and normality of residuals (Shapiro–Wilk Test: W=0.99, P=0.05) without transformation. Although there was considerable overlap in the distribution of paleodepths among subregions (Fig. S2; Chi-Squared Test: X^2_{828}=832, P=0.45), on *average*, paleodepths were significantly shallower in the Middle Keys (average paleodepth: -0.29±0.40 m MSL; ANOVA: $F_{4,203}$=12.88, P<0.001; Tukey test: p<0.01). In contrast, because the underlying Pleistocene bedrocks of the FKRT is tilted to the southwest (Lidz et al. 2003), average paleodepths of sampled reefs were deepest in the Dry Tortugas N.P. (-4.19±0.24 m MSL; P<0.05; Toth et al. 2018a).

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