

Ecological Characterization of the Moriah Harbour Cay area

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Overview

This short report summarizes information on the marine environment surrounding Moriah Harbour Cay, Exuma. This information is drawn from data collected by the Perry Institute for Marine science and its partners over the past 5 years. In April 2002, The Perry Institute for Marine Science conducted a rapid ecological assessment of fish and benthic communities from Elizabeth Harbour to the east of George Town to Black Rocks off Little Exuma. These surveys included quantitative visual censuses of fish and benthic communities in mangroves, seagrass beds, inshore patch reefs and hardbottom areas (i.e., inshore from barrier islands), and coral reef and hardbottom areas along the platform margin (i.e., offshore from barrier islands). In addition to these surveys, data on the recruitment of post-larval Caribbean spiny lobster was collected from the Moriah Harbour Cay areas from 2002-2004. This report summarizes information from this research.

General Description

Moriah Harbour Cay is a low lying island situated between Exuma Sound and the channel separating great Exuma from Little Exuma. Moriah harbour Cay, like its neighbors to the west-northwest, Man O' War Cay and Crab Cay serves as a barrier island protecting the Great Exuma shoreline from wave energy from Exuma Sound. Moriah Harbour cay is protected itself, to an extent, by offshore rocks and shallow hardbottom reefs that taper off from the barrier islands that form Elizabeth Harbour.

The windward side of Moriah Harbour cay has beach, dune and rocky headland features similar to other barrier islands in the area. The Leeward side of Moriah Harbour cay is dominated by shifting intertidal sand bars that extend from land and may change based on tidal currents and storm events. There are also scattered mangroves on the Leeward side of Moriah Harbour Cay. The shoreline of Great and Little Exuma in this area is a mix of rocky shoreline and mangroves.

The marine habitats around Moriah Harbour Cay are dominated by seagrass beds and sandy areas. Between Moriah Harbour Cay and Man O' War Cay to the West are shallow sand bars interspersed with patches of sparse seagrass. On the windward side of Moriah Harbour Cay is a mix of sand and seagrass with several patches of rocky hardbottom. These hardbottom areas vary in their community structure from being dominated by turf algae to containing some hard and soft corals (sea fans and other gorgonians). Several hardbottom areas near Moriah harbour cay have coral reef communities associated with them. Between Moriah Harbour Cay and both Great and little Exuma are sand plains with occasional patches of hardbottom or seagrass, particularly in channels with high tidal currents. Habitats within these areas are suitable nursery habitats for a number of economically and ecologically important species, including Nassau grouper, spiny lobster, and several snapper species.

Key species & Ecological characteristics

The area around Moriah Harbour Cay is home to diverse fish and benthic communities and harbour many key species. Channels between Moriah Harbour Cay and the islands of Great and Little Exuma have some of the highest post-larval recruitment rates in the Bahamas for Caribbean spiny lobster and Nassau grouper. From 2003-2005, postlarval spiny lobster (and Nassau grouper) recruitment was measured at several locations throughout the Bahamas, including Moriah Harbour Cay, using modified "witham" collectors. These collectors are artificial settlement substrates that mimic natural settlement habitats for both spiny lobster and Nassau grouper. Preliminary results of this research indicate that the Moriah Harbour cay area had the highest recruitment rates of all sites surveyed in the Bahamas during this period (Figure 1), and are among the highest recruitment rates ever reported from the Bahamas (second only to studies conducted from Cat Island more than 10 years ago). Recruitment to Moriah Harbour Cay is likely to be so high because the area possesses the combination of high larval influx from oceanic gyres that retain larvae in the southern part of Exuma Sound, and a broad area containing high quality juvenile habitats. These nurseries are likely to support fisheries in the Great Exuma, Little Exuma and Long Island areas.

In addition to Nassau grouper and spiny lobster, bonefish of all ages and sizes have been reported from Moriah Harbour Cay. The low energy beaches and sand flats adjacent to seagrass, mangrove and channel habitats provide bonefish with the full range of habitats they require throughout their life cycle. This combination of habitats, and the hardbottom reef systems in the area support a wide range of species. A research expedition to this area in April 2002 surveyed several seagrass, mangrove and reef/hardbottom sites in the Elizabeth Harbour to Little Exuma area (sites shown in Figure 2). At each site, characteristics of the habitat and fish assemblage were assessed using standard visual census techniques. Diversity of fish ranged up to 24 species recorded in a 60 m x 2 m visual transect area, with some species, particularly grunts (*Haemulon* spp.) and parrotfish (*Scarus* spp. and *Sparisoma* spp.) being quite abundant at a number of sites. Several sites also had abundant grouper (*Epinephelus* spp.) and snapper (*Lutjanus* spp. and *Ocyurus chrysurus*) species.

Figure 1. Relative rate of Caribbean spiny lobster settlement to collectors around the Bahamas. Bars on each site indicate relative recruitment rates (% of total attributed to each site). Large Bars positioned near the label for Little Exuma are from sites between Horiah Harbour Cay, Great Exuma and Little Exuma

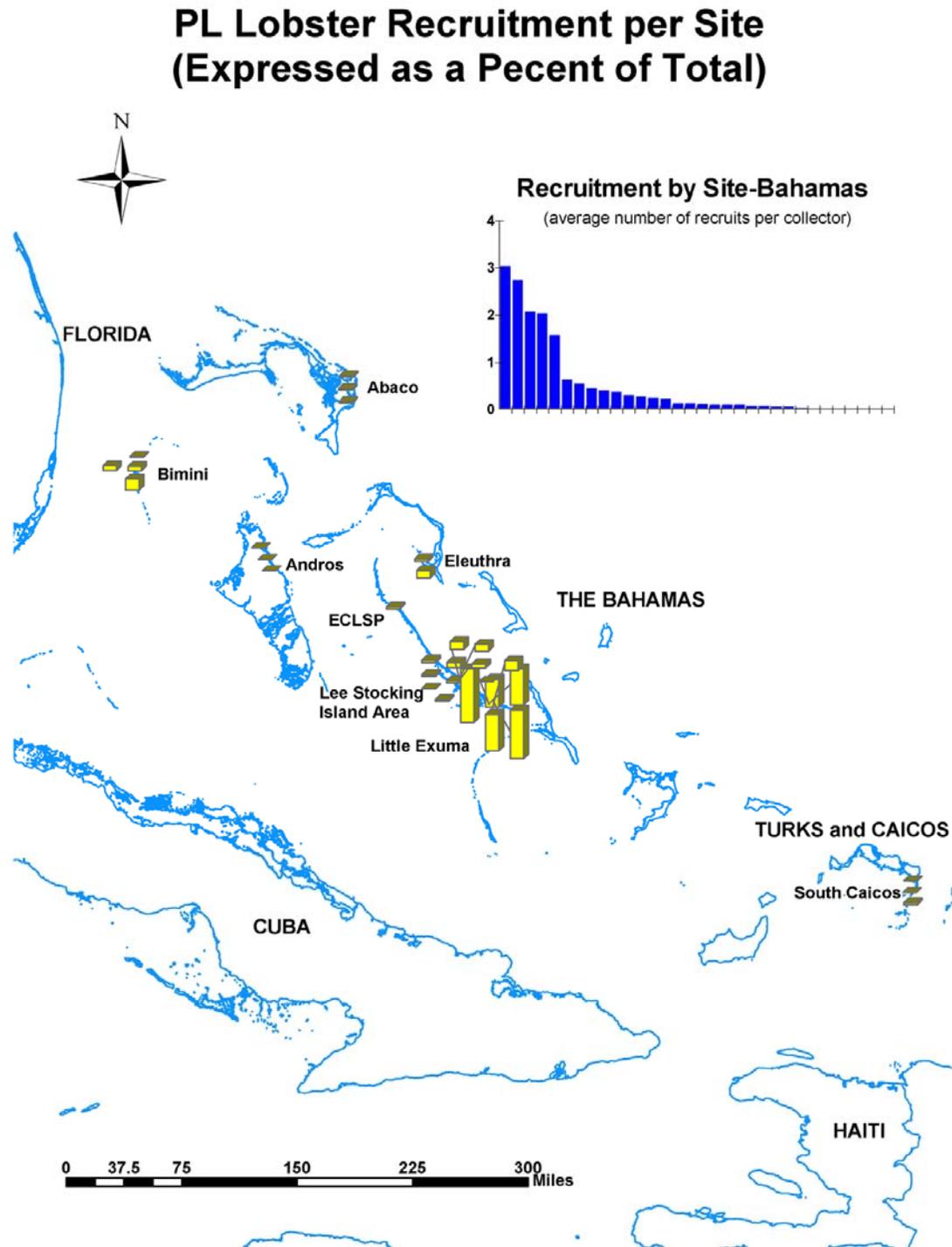


Figure 2. Map of sites surveyed in the Moriah Harbour Cay area during the April 2002 expedition.

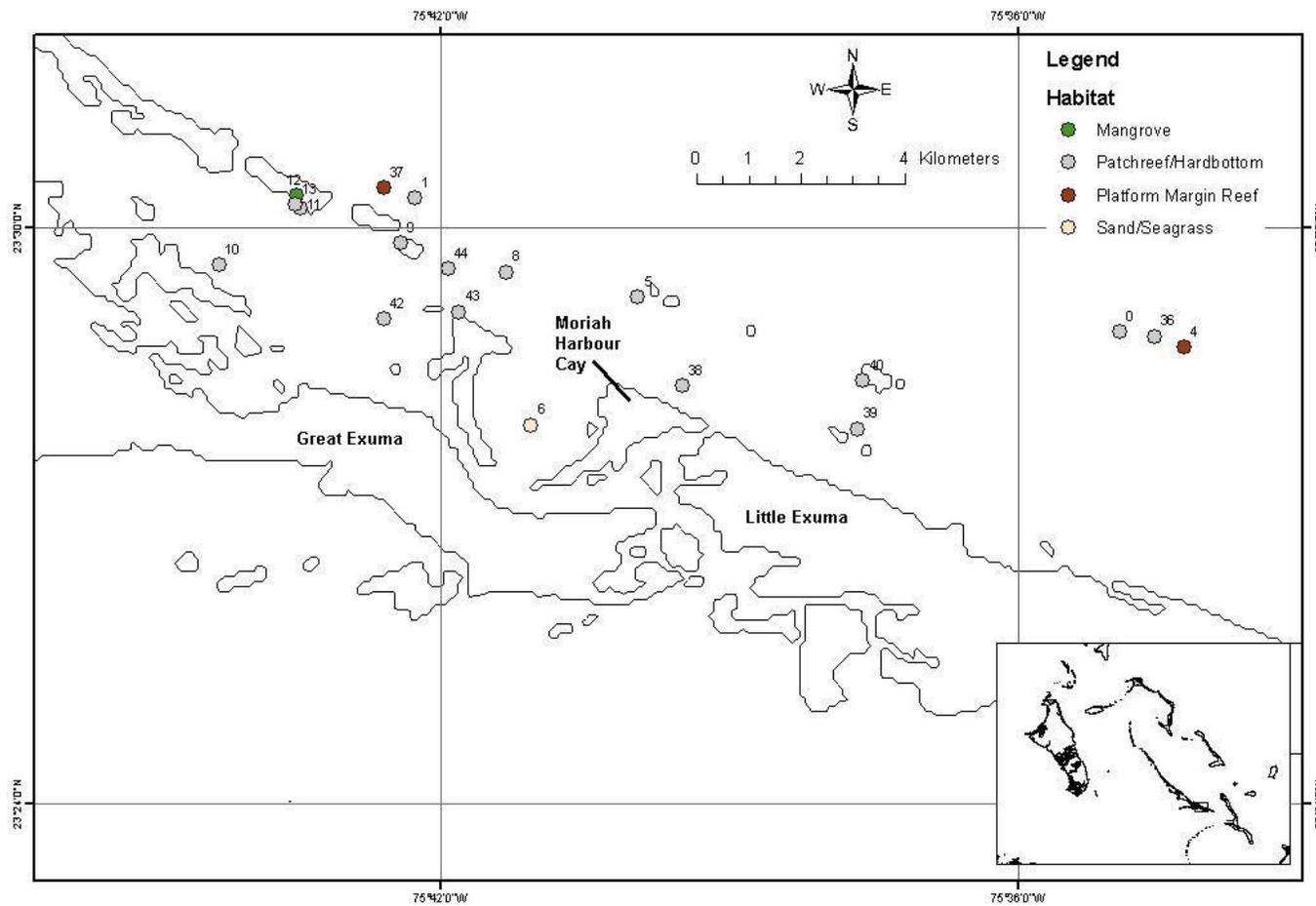


Table 1A. Abundance of fish (+ lobster and conch) species found at each site surveyed in April 2002.

Site	Habitat Type	<i>Abudefduf saxatilis</i>	<i>Acanthurus bahianus</i>	<i>Acanthurus coeruleus</i>	<i>Aulostomus maculatus</i>	<i>Balistes vetula</i>	<i>Bodianus pulehellus</i>	<i>Bodianus rufus</i>	<i>Canthigaster rostrata</i>	<i>Caranx ruber</i>	<i>Cephalopholis cruentatus</i>	<i>Cephalopholis fulvus</i>	<i>Chaetodon capistratus</i>	<i>Chromis striatus</i>	<i>Clepticus cyanea</i>	<i>Coryphopterus parrae</i>	<i>Coryphopterus glaucofraenum</i>	<i>Diodon hystrix</i>	<i>Epinephelus personatus</i>	<i>Epinephelus guttatus</i>	<i>Gerres cinereus</i>	<i>Gobiosoma genie</i>	<i>Haemulon loreto</i>	<i>Haemulon flavolineatum</i>	<i>Haemulon parra</i>	<i>Haemulon plumieri</i>	<i>Haemulon sciurus</i>	<i>Halichoeres bivittatus</i>		
44	patchreef/hardbottom	0	15	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	3	0	0	55		
43	patchreef/hardbottom	0	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	11		
40	patchreef/hardbottom	13	2	4	0	0	0	0	1	0	0	0	4	0	0	0	1	0	0	0	1	0	0	0	123	0	7	0	0	11
38	patchreef/hardbottom	0	0	6	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	71	0	2	0	0	3	
34	patchreef/hardbottom	0	7	3	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	26	
39	patchreef/hardbottom	0	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	1	0	0	15	
37	platform margin reef	0	2	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	1	0	0	0	
13	patchreef/hardbottom	1	1	3	0	0	0	0	0	0	0	1	0	0	0	0	0	0	19	0	0	0	159	0	3	5	0	0	6	
12	mangrove	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	16	0	15	
11	patchreef/hardbottom	1	1	3	1	0	0	0	1	0	0	0	1	0	0	0	0	0	1	0	0	0	0	5	0	0	14	0	2	
10	patchreef/hardbottom	0	1	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	1	0	0	0	82	0	6	5	0	0	42	
9	patchreef/hardbottom	7	4	6	0	0	0	0	2	1	0	0	0	0	0	0	0	0	0	0	0	6	2	0	0	3	0	0	1	
8	patchreef/hardbottom	0	4	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12	
42	platform margin reef	1	3	1	0	0	0	1	0	2	0	0	0	0	2	85	0	1	0	0	0	0	7	5	0	0	1	0	0	
6	sand/seagrass	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	
5	patchreef/hardbottom	0	0	6	0	0	0	7	0	0	0	1	0	0	27	0	0	0	0	0	0	1	1	10	0	0	0	0	0	
1	patchreef/hardbottom	1	2	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	15	2	0	1	1	0	1	
0	patchreef/hardbottom	0	5	4	0	3	0	0	0	0	1	0	0	12	0	0	0	0	0	0	0	7	54	0	0	2	0	0	1	
4	platform margin reef	0	2	1	1	0	0	0	0	0	0	0	0	23	6	0	0	1	0	0	0	0	10	0	0	1	0	0	0	
36	patchreef/hardbottom	0	3	3	0	1	0	0	0	0	2	1	0	4	0	0	0	0	0	1	0	0	1	1	0	0	0	0	0	

Table 1 (Continued)

Site	Habitat Type	<i>Halichoeres</i> <i>gerroni</i>	<i>Halichoeres</i> <i>maculipinna</i>	<i>Halichoeres</i> <i>radriatus</i>	<i>Heteropriacanthus</i> <i>cruentatus</i>	<i>Holocentrus</i> <i>tricolor</i>	<i>Holocentrus</i> <i>adscensionis</i>	<i>Hypoplectrus</i> <i>rufus</i>	<i>Lutjanus</i> <i>puella</i>	<i>Lutjanus</i> <i>apodus</i>	<i>Lutjanus</i> <i>griseus</i>	<i>Lutjanus</i> <i>mahogoni</i>	<i>Malacanthus</i> <i>synagris</i>	<i>Malacanthus</i> <i>plumieri</i>	<i>Microspathodon</i> <i>triangulatus</i>	<i>Mullidichthys</i> <i>chrysurus</i>	<i>Mycteroperca</i> <i>marginatus</i>	<i>Ocyurus</i> <i>chrysurus</i>	<i>Pomacanthus</i> <i>tigris</i>	<i>Pomacanthus</i> <i>chrysurus</i>	<i>Pomacanthus</i> <i>arcuatus</i>	<i>Pseudupeneus</i> <i>paru</i>	<i>Scarus</i> <i>iserti</i>	<i>Scarus</i> <i>taeniopterus</i>	<i>Scomberomorus</i> <i>vetula</i>	<i>Serranus</i> <i>tomoturus</i>	<i>Sparisoma</i> <i>regalis</i>	<i>Sparisoma</i> <i>tabacanus</i>	<i>Sparisoma</i> <i>atomarium</i>	<i>Sparisoma</i> <i>aurofrenatum</i>	<i>Sparisoma</i> <i>viride</i>
44	patchreef/hardbottom	3	23	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9	0	0	0	0	0	0	3	2	
43	patchreef/hardbottom	0	2	0	0	0	0	0	0	0	0	0	0	4	0	0	3	0	0	0	0	4	0	0	0	0	0	0	0	5	
40	patchreef/hardbottom	1	0	0	0	0	1	0	0	1	0	0	0	1	0	0	13	2	0	1	11	0	0	0	0	0	0	0	0	0	
38	patchreef/hardbottom	0	1	1	0	0	2	0	0	1	0	0	4	0	0	0	0	0	0	0	0	11	0	0	0	0	0	1	0	0	
34	patchreef/hardbottom	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	1	0	0	0		
39	patchreef/hardbottom	3	0	2	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	4	1		
37	platform margin reef	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	2	0	0	0	15	0	0	0	0	0	0	0	0	0	
13	patchreef/hardbottom	0	0	0	0	0	0	1	0	1	0	5	0	0	0	0	13	0	0	0	10	0	0	0	0	0	0	1	1		
12	mangrove	0	1	0	0	0	0	0	0	14	19	1	0	0	0	0	9	0	0	0	0	0	0	0	0	0	0	0	0	0	
11	patchreef/hardbottom	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	12	8	0	0	0	0	0	0	0	2	
10	patchreef/hardbottom	1	0	1	0	0	0	0	0	1	2	10	0	0	0	0	12	0	0	0	9	0	0	0	0	1	0	1	0	1	
9	patchreef/hardbottom	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	1	1	40	1	1	0	0	0	0	4	4		
8	patchreef/hardbottom	2	1	0	0	0	0	0	0	0	0	0	1	0	0	0	2	0	0	0	0	0	0	0	0	0	0	1	0	0	
42	platform margin reef	14	0	0	0	1	0	0	0	1	0	1	7	0	0	0	0	0	0	0	18	0	5	0	0	0	0	8	3		
6	sand/seagrass	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	
5	patchreef/hardbottom	3	0	0	2	1	1	1	1	0	0	2	0	0	2	0	3	0	0	0	5	0	2	0	0	0	0	1	8		
1	patchreef/hardbottom	33	1	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	
0	patchreef/hardbottom	4	3	0	0	14	5	0	0	0	0	0	0	0	5	0	7	1	0	0	11	0	0	1	0	0	3	2	0		
4	platform margin reef	0	1	1	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	
36	patchreef/hardbottom	12	0	0	0	1	0	0	0	1	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	1	0	0	

Table 1 (Continued).

Site	Habitat Type	<i>Sphyræna barracuda</i>	<i>Stegastes diencaeus</i>	<i>Stegastes fuscus</i>	<i>Stegastes leucostictus</i>	<i>Stegastes partitus</i>	<i>Stegastes planifrons</i>	<i>Synodus variabilis</i>	<i>Thalassoma intermedium</i>	<i>Urolophus bifasciatum</i>	Total Species	
44	patchreef/hardbottom	0	0	4	3	0	0	2	0	57	0	15
43	patchreef/hardbottom	0	0	10	2	0	0	0	0	52	0	12
40	patchreef/hardbottom	0	3	0	4	0	0	5	0	38	0	22
38	patchreef/hardbottom	0	1	0	5	0	0	0	0	30	0	16
34	patchreef/hardbottom	0	3	0	0	0	0	0	0	41	0	9
39	patchreef/hardbottom	0	1	12	14	0	0	0	0	28	0	14
37	platform margin reef	1	0	0	0	0	0	0	0	22	0	9
13	patchreef/hardbottom	0	0	1	11	1	0	2	0	29	0	21
12	mangrove	1	0	0	1	0	0	0	0	1	0	11
11	patchreef/hardbottom	0	0	3	4	0	0	2	0	13	1	19
10	patchreef/hardbottom	0	0	2	6	0	1	1	0	16	0	21
9	patchreef/hardbottom	0	0	0	1	0	0	1	1	48	0	22
8	patchreef/hardbottom	0	0	0	0	0	0	0	0	16	0	9
42	platform margin reef	0	0	0	4	1	0	4	0	9	0	24
6	sand/seagrass	0	0	0	1	0	0	0	0	0	0	3
5	patchreef/hardbottom	0	0	2	0	0	3	3	0	33	0	24
1	patchreef/hardbottom	0	0	1	2	0	0	0	0	10	0	17
0	patchreef/hardbottom	0	0	0	0	0	0	0	0	16	0	21
4	platform margin reef	0	0	0	0	0	0	0	0	0	0	12
36	patchreef/hardbottom	0	0	1	0	1	0	2	0	100	0	20

