

microhabitats within the reef. Pelagic species observed included the Bar Jack, *Carangoides ruber*.

1.5 Las Pargas Reef

Las Pargas Reef is a shallow rock reef system located at the western margin of Ensenada Las Pargas, at a western cove in Bahía de Guánica. The reef emerges from a sandy substrate at a depth of 6 meters as a fringing formation along the shoreline. Hard ground at La Parda Reef was almost completely covered by a dense algal turf composed by a mixed assemblage of short articulated coralline and fleshy brown macroalgae (*Dyctiota* sp.) (Plate 7). Tufts of calcareous macroalgae (*Halimeda* sp.) were also attached to the rocky substrate. Large extensions of hard substrate were covered by the encrusting colonial zoanthid, *Palythoa* sp. (Plate 8). Stony corals were present in very low abundance. Live coral cover was visually estimated at 1-3 %. Encrusting colonies of the Knobby Brain Coral, *Diploria clivosa* were the most abundant stony coral species observed. This coral is typical of reefs subjected to active sand movement and associated abrasion stress. More than one colony of the Mustard Hill Coral, *Porites astreoides* was observed. A total of 7 species of stony corals, including the hydrocorals, *Millepora alcicornis* and *M. complanata* were identified at Las Pargas Reef. Soft corals (gorgonians) were observed in low abundance.

A total of 34 species of reef fishes were identified during the spot dive at Las Pargas Reef (Table 3), evidencing the high value of this rock reef habitat for marine communities in Guánica Bay. Herbivorous parrotfishes (Scaridae) and doctorfishes (Acanthuridae) were observed in large schools over the algae covered reef. The Yellowtail Parrotfish (*Sparisoma rubripinne*) was the most abundant parrotfish observed. Juvenile Lane, Schoolmaster and Mahogany Snappers (*Lutjanus synagris*, *L. apodus*, *L. mahogany*) were present in low amounts. The Dusky damselfish (*Stegastes dorsopunicans*) occupied demersal territories in the reef. Small opportunistic carnivores, typical of high-energy reef environments, such as the Slippery Dick and Clown Wrasses (*Halichoeres maculipinna*, *H. bivittatus*) were common. One individual of the pelagic Cero Mackerel (*Scomberomorus regalis*) was also present at Las Pargas Reef. The Long-spined Sea Urchin, *Diadema antillarum* was common in crevices and depressions.

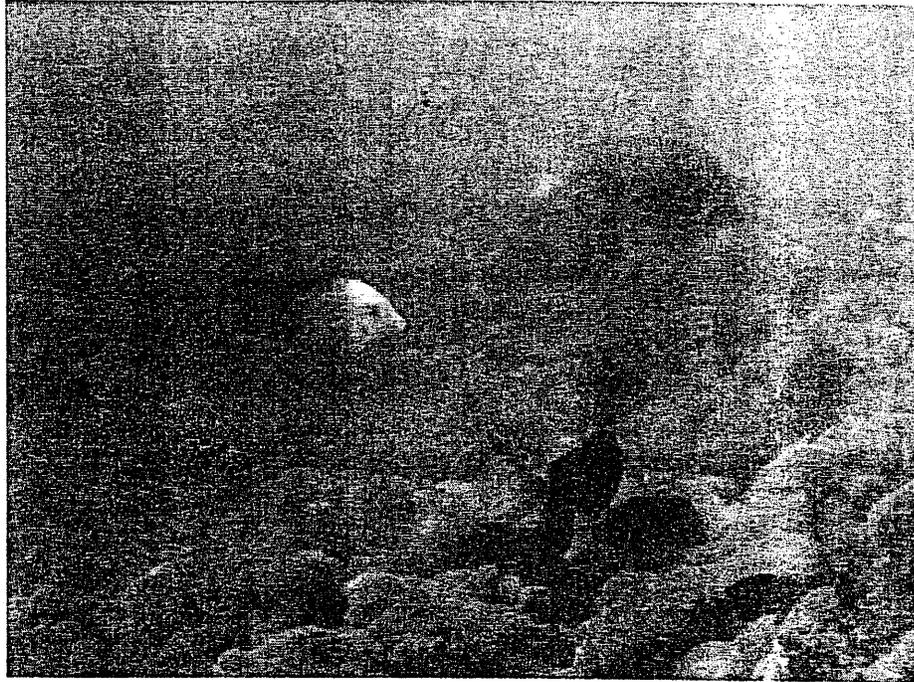


Plate 7. Shallow rock reef covered by a mixed assemblage of short macroalgae or "algal turf" and herbivorous doctorfishes at La Parda Reef.

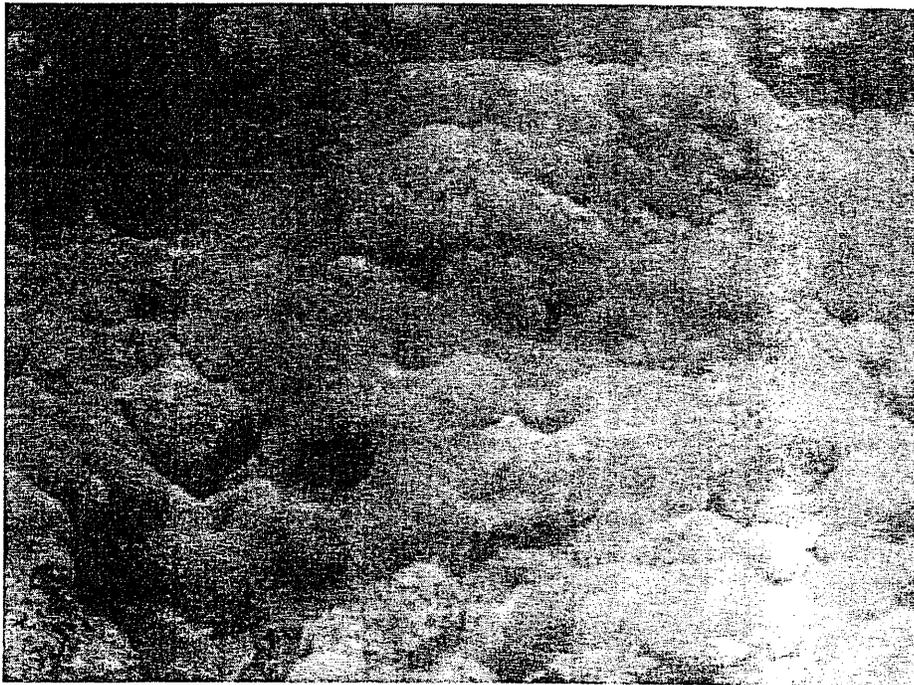


Plate 8. The zoanthid, *Palythoa* sp. encrusting over available hard substrate at La Parda Reef

1.6 Punta Pescadores Reef

Punta Pescadores Reef is an underwater extension of the rocky shoreline at the western margin of the mouth of Guánica Bay. This fringing reef can be classified as a rock reef because stony corals have not contributed significantly to the reef topographic relief and are only present as encrusting colonies overlying what appear to be erosional features of the shelf. A total of 14 species of coral, including the hydrocorals, *Millepora alcicornis* and *M. complanata* were identified during our spot dive at Punta Pescadores (Table 2). Boulder Star Coral (*Montastrea annularis*) displaying encrusting growth over hard substrate was the most common stony coral present (Plate 9). The Mustard Hill Coral (*Porites astreoides*) and the Knobby Brain Coral (*Diploria clivosa*) were also common. Soft corals, including the encrusting species, *Erythropodium caribbaeorum*, were abundant (Plate 10). Most of the hard substrate was covered by a dense algal turf, composed of a mixed assemblage of red and brown macroalgae. Tufts of calcareous algae, *Halimeda* sp. was also observed on the reef. The taxonomic structure of the sessile-benthic community present at Punta Pescadores is indicative of a reef under severe stress associated with conditions of low light penetration and abrasion. Such conditions appear to have favored development of vertically projected soft corals and encrusting biota over stony corals.

A total of 32 reef fishes were identified during our spot dive at Punta Pescadores (Table 3). The territorial Dusky Damselfish (*Stegastes dorsopunicans*) was one of the most abundant species. Other herbivores, such as parrotfishes (6 spp) and doctorfishes (2 spp) were also common at this reef. Commercially important species observed included the Hogfish (*Lachnolaimus maximus*) and the Schoolmaster Snapper (*Lutjanus apodus*).

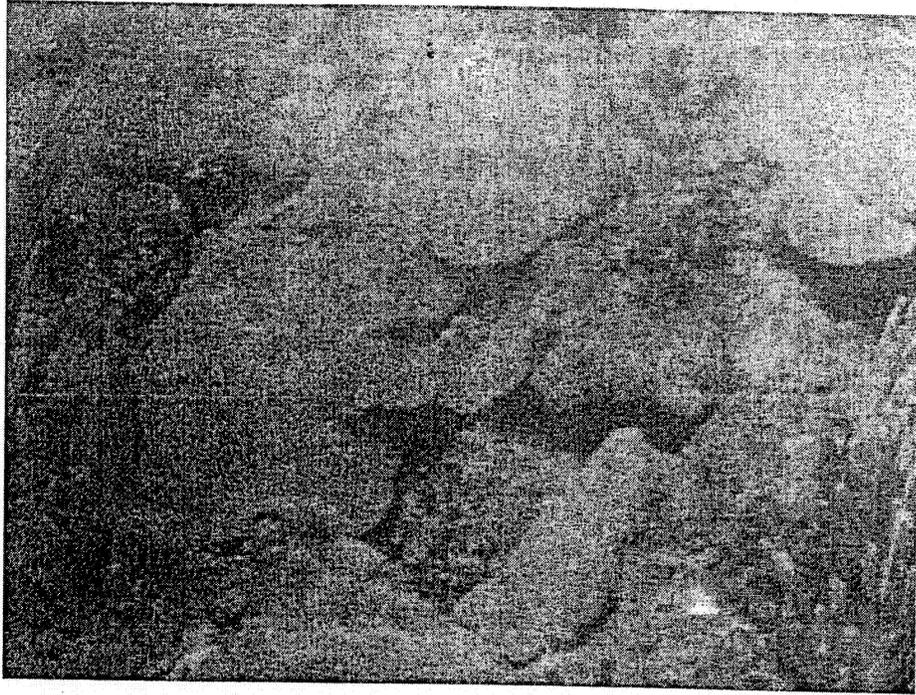


Plate 9. Encrusting growth of Boulder Star Coral, *Montastrea annularis* at Punta Pescadores Reef



Plate 10. Encrusting gorgonian, *Erythropodium caribaeorum* at Punta Pescadores Reef.

1.7 Balneario Reef

Along the eastern margin of the shoreline, about the middle section of Guánica Bay is small cove with a sandy beach used by the public as a recreational area (Balneario). Adjacent to the sandy beach is a rocky shoreline that extends all the way to the mouth of the bay. Balneario Reef is a rock reef system consisting of a series of submerged boulders that seem to be detached sections from the rocky shoreline. The submerged structures were found at a depth of three meters. These were almost completely covered by short filamentous algae "algal turf" and fleshy brown macroalgae (*Dyctiota* spp.). Bundles of calcareous algae (*Halimeda* sp.) were also observed. Only two species of stony corals were observed, these were the Mustard Hill Coral, *Porites astreoides* and the Massive Starlet Coral, *Siderastrea siderea* (Table 2). Live coral cover was less than 1% at Balneario Reef. A few soft coral colonies, including the encrusting species, *Erythropodium caribbaeorum* were present. Turtle seagrass, *Thalassia testudinum* was found growing at depths between 2-3 meters adjacent to the submerged rock reef.

A total of 11 fish species were observed to be associated with the rock reef. These included the territorial Dusky Damselfish, *Stegastes dorsopunicans* and several species of parrotfishes and wrasses (Table 3).

Table 2. Taxonomic composition of sessile-benthic invertebrates identified at coral reef habitats in Guánica Bay

Coral Site References:

Cayo Coral -1; Caña Gorda -2; Frontón La Brea -3; La Laja -4; Las Pardas -5; Punta Pescadores -6; Balneario -7

| Sessile-benthic Invertebrates | Reef Site |
|--|---------------------|
| <u>Hydrocorals (Fire Corals)</u> | |
| <i>Millepora alcicornis</i> | 1, 2, 3, 5, 6 |
| <i>Millepora complanata</i> | 2, 4, 5, 6 |
| <u>Scleractinian Corals (Stony Corals)</u> | |
| <i>Acropora cervicornis</i> | 4 |
| <i>Agaricia agaricites</i> | 1, 2, 4 |
| <i>Agaricia sp.</i> | 1, 2, 4, 6 |
| <i>Colpophyllia natans</i> | 1, 4, 6 |
| <i>Dendrogyra cylindricus</i> | 1 |
| <i>Dichocoenia stokesii</i> | 1, 2, 3 |
| <i>Diploria clivosa</i> | 1, 2, 3, 5 |
| <i>Diploria labyrinthiformis</i> | 1, 2, 3 |
| <i>Diploria strigosa</i> | 1, 2, 3, 4, 5 |
| <i>Eusmilia fastigiata</i> | 1 |
| <i>Favia fragum</i> | 3 |
| <i>Isophyllia rigida</i> | 1, 6 |
| <i>Isophyllia sinuosa</i> | 1, 2 |
| <i>Leptoseris cucullata</i> | 1 |
| <i>Madracis decactis</i> | 1 |
| <i>Manicina areolata</i> | 1 |
| <i>Meandrina meandrites</i> | 1, 2, 3, 4, 6 |
| <i>Montastrea annularis</i> | 1, 2, 4, 6 |
| <i>Montastrea cavernosa</i> | 1, 2, 3, 5 |
| <i>Mussa angulosa</i> | 6 |
| <i>Mycetophyllia aliciae</i> | 1, 2 |
| <i>Mycetophyllia lamarkiana</i> | 2 |
| <i>Mycetophyllia sp.</i> | 1, 2, 3, 4, 6 |
| <i>Oculina diffusa</i> | 3 |
| <i>Porites astreoides</i> | 1, 2, 3, 4, 5, 6, 7 |
| <i>Porites porites</i> | 1, 2, 4, 6 |
| <i>Scolimia cubensis</i> | 6 |
| <i>Siderastrea radians</i> | 2, 3, 6 |
| <i>Siderastrea siderea</i> | 1, 2, 3, 4, 5, 7 |
| <i>Stephanocoenia michilini</i> | 1, 2 |

Table 2. Taxonomic composition of sessile-benthic invertebrates identified at coral reef habitats in Guánica Bay

Coral Site References:

Cayo Coral -1; Caña Gorda -2; Frontón La Brea -3; La Laja -4; Las Paldas -5; Punta Pescadores -6; Balneario -7

| Sessile-benthic Invertebrates | Reef Site |
|--------------------------------------|------------------|
| <u>Anthozoans (Soft Corals)</u> | |
| <i>Ellisella sp.</i> | 1, 2, 4 |
| <i>Eunicea spp.</i> | 1, 2, 4 |
| <i>Erythropodium caribaeorum</i> | 1, 2, 3, 5, 6 |
| <i>Gorgonia ventalina</i> | 1, 2, 4, 5, 6, 7 |
| <i>Muricea spp.</i> | 1, 2 |
| <i>Plexaura spp.</i> | 1, 2, 4 |
| <i>Plexaurella spp.</i> | 1, 2, 4 |
| <i>Pseudoplexaura spp.</i> | 1, 2, 4 |
| <i>Pseudopterogorgia spp.</i> | 1, 2, 4 |
| <u>Zoanthids</u> | |
| <i>Zoanthus sociatus</i> | 2, 3, 4 |
| <i>Palythoa caribaeorum</i> | 1, 2, 5, 6 |
| <u>Sea Urchins</u> | |
| <i>Diadema antillarum</i> | 4 |
| <u>Lobsters</u> | |
| <i>Panulirus argus</i> | 2 |
| <u>Octopus</u> | |
| <i>Octopus vulgaris</i> | A |

1,2 data from García et al., 2000

A data from Pacheco et al. 1999

Table 3. Taxonomic composition of fishes identified at coral reef and seagrass habitats in Guánica Bay

Coral Site References:

Cayo Coral -1; Caña Gorda Reef -2; Frontón La Brea Reef-3; La Laja Reef -4; Las Pargas Reef -5; Punta Pescadores Reef -6; Balneario Reef -7; Balneario Seagrass -8; Caña Gorda Seagrass -9

| Fish Species | Common Name | Reef Site |
|---------------------------------|-------------------------|------------------------|
| <i>Abudefduf sexatilis</i> | Sargent Major | 1, 6 |
| <i>Acanthurus coeruleus</i> | Blue Tang | 1, 2, 4, 5, 6 |
| <i>Acanthurus bahianus</i> | Ocean Surgeon | 1, 2, 3, 4, 5, 6, 7, 8 |
| <i>Acanthurus chirurgus</i> | Doctorfish | 1, 2, 3, 4, 5 |
| <i>Aluthera scriptus</i> | Scrawled Filefish | 1 |
| <i>Amblycirrhitos pinnos</i> | Redspotted Hawkfish | 2 |
| <i>Anisotremus virginicus</i> | Porkfish | 1, 4, 6 |
| <i>Apogon sp.</i> | Cardinalfish | 1 |
| <i>Archosargus rhomboidalis</i> | Sea Bream | 7, 8 |
| <i>Aulostomus maculatus</i> | Trumpetfish | 1 |
| <i>Bodianus rufus</i> | Spanish Hogfish | 1, 4 |
| <i>Calamus bajonao</i> | Jolted Porgy | A |
| <i>Cantherhines pullus</i> | Tail-light Filefish | 4 |
| <i>Canthigaster rostrata</i> | Caribbean Puffer | 1, 2, 4, 5 |
| <i>Caranx bartholomaei</i> | Yellow Jack | 1 |
| <i>Caranx crysus</i> | Blue Runner | A |
| <i>Caranx latus</i> | Horse-eye jack | A |
| <i>Carangoides ruber</i> | Bar Jack | 3, 5, 6 |
| <i>Cephalopholis cruentatus</i> | Graysbe | 4, 6 |
| <i>Cephalopholis fulva</i> | Coney | 2, 3 |
| <i>Chaetodon capistratus</i> | Four-Eyed Butterflyfish | 1, 2, 3, 4 |
| <i>Chaetodon striatus</i> | Banded Butterflyfish | 1, 2, 6 |
| <i>Chromis cyanea</i> | Blue Chromis | 1, 4 |
| <i>Chromis multilineata</i> | Brown Chromis | 1, 3, 4, 5 |
| <i>Dasyatis americana</i> | Southern Stingray | A |
| <i>Diodon hystrix</i> | Porcupinefish | 5 |
| <i>Epinephelus adscensionis</i> | Rock Hind | A |
| <i>Epinephelus guttatus</i> | Red Hind | 2, 3, 4, A |
| <i>Epinephelus itajara</i> | Jewfish | A |
| <i>Epinephelus striatus</i> | Nassau Grouper | 4 |
| <i>Equetus punctatus</i> | Spotted Drum | 6 |
| <i>Eucinostomus argenteus</i> | Silver Jenny | 9 |
| <i>Gerres cinereus</i> | Yellowfin Mojarra | 1 |
| <i>Gramma loreto</i> | Fairy Basslet | 1, 4 |

Table 3. Taxonomic composition of fishes identified at coral reef and seagrass habitats in Guánica Bay

Coral Site References:

Cayo Coral -1; Caña Gorda Reef -2; Frontón La Brea Reef-3; La Laja Reef -4; Las Pargas Reef -5; Punta Pescadores Reef -6; Balneario Reef -7; Balneario Seagrass -8; Caña Gorda Seagrass -9

| Fish Species | Common Name | Reef Site |
|---------------------------------|------------------------|------------------------|
| <i>Gymnothorax funbris</i> | Green Moray | A |
| <i>Gymnothorax vicinus</i> | Purplemouth Moray | A |
| <i>Haemulon macrostomum</i> | Spanish Grunt | 1, 4, 5, 7, 8 |
| <i>Haemulon aurolineatum</i> | Tomtate | 1, 5, 7, 8 |
| <i>Haemulon carbonarium</i> | Caesar Grunt | 5 |
| <i>Haemulon chrysargyreum</i> | Smallmouth Grunt | 5 |
| <i>Haemulon flavolineatum</i> | French Grunt | 1, 2, 4, 5, 6, 7, 8, A |
| <i>Haemulon parrae</i> | Sailors Choice | A |
| <i>Haemulon plumieri</i> | White Grunt | 1, 6, 7, 8, A |
| <i>Haemulon sciurus</i> | Bluestriped Grunt | 7, 8 |
| <i>Haemulon steindachneri</i> | Latin Grunt | 1 |
| <i>Halichoeres bivittatus</i> | Slippery Dick | 2, 5, 7, 8, A |
| <i>Halichoeres garnoti</i> | Yellowhead Wrasse | 1, 2, 3, 5 |
| <i>Halichoeres maculipinna</i> | Clown Wrasse | 3, 5, 7, 8 |
| <i>Halichoeres radiatus</i> | Puddinwife | 1, A |
| <i>Halichoeres pictus</i> | Painted Wrasse | 9 |
| <i>Holacanthus ciliaris</i> | Queen Angelfish | 5, 6 |
| <i>Holacanthus tricolor</i> | Rock Beauty | 1, 2 |
| <i>Holocentrus adsensionis</i> | Longspined Squirelfish | 1, 4 |
| <i>Holocentrus rufus</i> | Squirelfish | 1, 2, 3 |
| <i>Hemiramphus brasiliensis</i> | Ballyhoo | A |
| <i>Hypoplectrus aberrans</i> | Yellowbelly Hamlet | 1 |
| <i>Hypoplectrus chlorurus</i> | Yellowtail Hamlet | 4 |
| <i>Hypoplectrus nigricans</i> | Black Hamlet | 1 |
| <i>Hypoplectrus unicolor</i> | Shy Hamlet | 4 |
| <i>Hypoplectrus cyanea</i> | Indigo Hamlet | 6 |
| <i>Labrisoma nuchipinnis</i> | Hairy Blenny | A |
| <i>Lachnolaimus maximus</i> | Hogfish | 6 |
| <i>Lactophrys triqueter</i> | Smooth Trunkfish | 2 |
| <i>Lutjanus analis</i> | Mutton Snapper | A |
| <i>Lutjanus apodus</i> | Schoolmaster Snapper | 1, 4, 5, 6, A |
| <i>Lutjanus griseus</i> | Gray Snapper | 6, A |
| <i>Lutjanus jocu</i> | Dog Snapper | A |
| <i>Lutjanus mahogani</i> | Mahogany Snapper | 5 |
| <i>Lutjanus synagris</i> | Lane Snapper | 5, 6 |

Table 3. Taxonomic composition of fishes identified at coral reef and seagrass habitats in Guánica Bay

Coral Site References:

Cayo Coral -1; Caña Gorda Reef -2; Frontón La Brea Reef-3; La Laja Reef -4; Las Pardas Reef -5; Punta Pescadores Reef -6; Balneario Reef -7; Balneario Seagrass -8; Caña Gorda Seagrass -9

| Fish Species | Common Name | Reef Site |
|---------------------------------|-----------------------|------------------------|
| <i>Microspathodon chrysurus</i> | Yellowtail Damselfish | 1, 2, 4, 5, 6 |
| <i>Mulloides martinicus</i> | Yellowtail Goatfish | 1, 4, 5, 6, 7, 8 |
| <i>Myripristis jacobus</i> | Black-bar Soldierfish | 2, 4 |
| <i>Ocyurus chrysurus</i> | Yellowtail Snapper | 1, 3, 4, 6, 7, 8, A |
| <i>Odontoscion dentex</i> | Reef Croaker | 1 |
| <i>Cephalopholis cruentatus</i> | Graysbe | 3 |
| <i>Pomacanthus arcuatus</i> | Gray Angelfish | 1, 2, 4 |
| <i>Priacanthus cruentatus</i> | Glasseye | 1 |
| <i>Priacanthus arenatus</i> | Bigeye | 4 |
| <i>Pseudupeneus maculatus</i> | Spotted Goatfish | 1, 4 |
| <i>Scarus iserti</i> | Striped Parrotfish | 1, 2, 3, 5, 6, 7, 8 |
| <i>Scarus taeniopterus</i> | Princess Parrotfish | 2, 4, 6, 7, 8 |
| <i>Scarus vetula</i> | Queen Parrotfish | 1, 4, 5, 6, 7, 8 |
| <i>Scomberomorus cavalla</i> | King Mackerel | A |
| <i>Scomberomorus regalis</i> | Cero Mackerel | 2, 5 |
| <i>Serranus tigrinus</i> | Harlequin Bass | 1, 2, 3 |
| <i>Sparisoma aurofrenatum</i> | Redband Parrotfish | 1, 2, 3, 4, 5, 6 |
| <i>Sparisoma radians</i> | Bucktooth Parrotfish | 1, 2, 4, 7, 8, 9 |
| <i>Sparisoma rubripinne</i> | Yellowtail Parrotfish | 2, 3, 5 |
| <i>Sparisoma viride</i> | Stoplight Parrotfish | 1, 3, 4, 5, 6 |
| <i>Sphaeroides testudineus</i> | Checked Puffer | A |
| <i>Sphyraena barracuda</i> | Great Barracuda | A |
| <i>Stegastes dorsopunicans</i> | Dusky Damselfish | 1, 2, 3, 4, 5, 6, 7, 8 |
| <i>Stegastes leucostictus</i> | Beaugregory | 1, 2 |
| <i>Stegastes partitus</i> | Bicolor Damselfish | 1, 2, 3, 4, 5, 6 |
| <i>Stegastes planifrons</i> | Yellow-eye Damselfish | 4 |
| <i>Stegastes variabilis</i> | Cocoa Damselfish | 3, 5, 9 |
| <i>Stegastes planifrons</i> | Yellow-eye Damselfish | 1 |
| <i>Synodus intermedius</i> | Sand Diver | 5 |
| <i>Thalassoma bifasciatum</i> | Bluehead Wrasse | 1, 2, 3, 4, 5, 6 |

1,2 data from García et al., 2000

A data from Pacheco et al. 1999

2. Seagrass Beds

Seagrass beds are critically important habitats for a vast array of marine populations, many of which are associated with reef systems in coastal embayments of Puerto Rico. The reef fish assemblage reported by García and Castro (1997) from seagrass beds in Jobos Bay (Guayama) included a total of 54 species. The occurrence of post-settlement and juvenile fishes in Jobos Bay supports the contention that seagrass beds are important recruitment and nursery habitats for reef fishes (García and Castro, 1997). A trend of higher abundance of sea urchins and juvenile reef fishes and lobsters was associated with the presence of scattered coral heads in seagrass beds of Palo Seco (García and Castro, 1995) and Guayanilla Bay (Castro and García, 1996). Seagrass beds are also the main habitat for a wide variety of resident fishes and motile-megabenthic invertebrates. Of particular relevance is the role of seagrass beds as residence habitats for small pelagic schooling fishes, such as anchovies and sardines. These in turn, serve as forage for a rich assemblage of reef fish predators that include jacks, houndfishes, mackerels, small tunas, snappers, sharks and barracudas, among many others (García and Castro, 1997). The Brown Pelican (*Pelecanus occidentalis*) also forages upon sardines and anchovies at seagrass beds. Prominent grazers of seagrasses include the Queen Conch (*Strombus gigas*), Green Turtle (*Chelonia midas*) and the Manatee (*Trichechus manatus*). Motile-megabenthic invertebrates that have been previously reported from seagrasses in coastal embayments of Puerto Rico include sea stars, sea cucumbers, corals, lobsters, sea urchins, upside jellyfishes, crabs, gastropods, pelecypods, cephalopods and polychaetes (García and Castro, 1995, 1997; Castro and García, 1996; García et al, 2000).

Seagrasses have a very limited distribution in Guánica Bay. A small seagrass bed was detected at depth of 2-3 meters at a cove mid section along the eastern shoreline of the bay, off from the Balneario (Playa de Guánica) (Station 8, see Table 1). A larger seagrass system was present at the backreef of Cayos de Caña Gorda (Station 12, see Table 1).

2.1 Balneario Seagrass

The seagrass bed at this station is a mono stand of Turtle Grass, *Thalassia testudinum*. The maximum depth distribution of the seagrass was 3 meters. No epiphytic algae, or motile megabenthic invertebrates were observed in association with this seagrass. Our snapshot survey, however, was somewhat limited by poor visibility conditions which seem to prevail at

this site. Several juvenile species of reef fishes were observed on the seagrass bed. These included the grunts (*Haemulon* spp.) and the Yellowtail Snapper (*Ocyurus chrysurus*). The Bucktooth Parrotfish (*Sparisoma radians*) appears to be one of the resident species of this seagrass, as it is common in many seagrass systems in Puerto Rico. Adult parrotfishes (*Scarus iserti*; *S. vetula*; *S. taeniopterus*) were also observed in the seagrass. It is possible that these parrotfishes were foraging at the algae covered rock reefs intermixed in the seagrass. Fishes observed at the Balneario seagrass site have been included in Table 3.

2.2 Caña Gorda Seagrass

A mixed stand of Turtle (*Thalassia testudinum*) and Manatee Grass (*Syringodium filiforme*) was observed growing at depths down to 4 meters in the backreef of the Cayos de Caña Gorda Reef. The shoreline extension of seagrasses in this area could not be evaluated. Several species of calcareous macroalgae were observed associated with the mixed seagrass stand. These included *Penicillus* sp., *Udotea* sp. and *Halimeda* sp. One adult specimen of the Queen Conch, *Strombus gigas* and the sea cucumber, *Holothuria mexicana* were present in the seagrass. The Painted Wrasse (*Halichoeres pictus*) and the Bucktooth Parrotfish (*Sparisoma radians*) were seen foraging in the seagrass bed. The Silver Jenny Mojarra (*Eucinostomus argenteus*) was observed over sandy mounds adjacent to the seagrass bed. Fishes observed at the Caña Gorda seagrass have been included in Table 3.

3. Fringing Mangrove Communities

Red Mangroves (*Rhizophora mangle*) fringe extensive sections of the shoreline in Guánica Bay. Most of the mangroves occur as a relatively narrow band within the intertidal zone, but significant sections where aerial roots penetrate the water column forming what is known as "mangrove root communities" were not found. Thus, mangroves play the important roles of stabilizing the shoreline and contributing with organic matter inputs to the marine environment, but do not seem to provide any large scale nursery habitat to marine populations in Guánica Bay, as they do in other estuarine systems of the south coast of Puerto Rico, such as La Parguera, Guayanilla Bay (Castro and García, 1996) and Jobos Bay (García and Castro, 1997).

4. Hard Ground Habitats

Unvegetated hard ground habitats prevail throughout the outer and mid sections of Guánica Bay, including most of the navigation channel from the mouth of the bay to the Fertilizer Company dock, where silty-sand sediments were found. The substrate was essentially flat and consolidated with loose sandy sediment pockets. Soft corals were observed in low densities at Buoy # 3, north of La Laja Reef. No sessile-benthic or motile megabenthic invertebrates or fishes were observed. Visibility was marginal near the bottom throughout the outer and mid bay sections.

5. Soft Sediment Habitats

Soft sediment habitats are distributed throughout the inner section of Guánica Bay, from the navigation channel in front of the Fertilizer Company to the Bahía del Noroeste, at the northern boundary of the bay. Bahía del Noroeste is a mangrove fringed estuarine environment that serves as the river mouth of Río Loco. Marine communities associated with soft sediment habitats could not be directly evaluated during our survey due to the poor underwater visibility that prevails at this estuarine environment. Spot dives were performed during our survey at stations 9 -11 (Figure 1, Table 1). The bottom at these stations was unconsolidated and devoid of vegetation. Depth increases toward the midsections of the channel to a maximum of 7.5 meters and to a maximum of 6.0 meters at Bahía del Noroeste.

Fish communities of soft sediment habitats have been reported for Laguna Joyuda by Stoner (1986) and García (1993). The fish community includes marine juveniles that use the estuarine habitat as nursery, such as snappers, barracudas and jacks, and marine predators that forage upon small fishes and crustaceans, such as large groupers, snappers, barracudas and jacks. There is also a varied assemblage of resident populations that include anchovies, sardines, ladyfish, tarpon, croakers, flatfishes and mojarras, among others. Amphidromous populations, such as freshwater shrimps of the families Palaemonidae and Atyidae, and fishes in the Gobiidae and Eleotridae families have been reported in river estuaries of Puerto Rico (Villamil, 1976; Ching-Morales, 1982; March et al., 1998; Montero-Oliver, 1987; Benstead et al., 1998; Holmquist et al. 1999; García et al., 1998). Marine species that use rivers as spawning grounds (anadromous), such as the gobiid fish, *Sycidium plumieri* (Erdman, 1961, 1972) and freshwater fishes that spawn in the marine environment (catadromous), such as the American Eel, *Anguilla rostrata* have been reported for estuarine systems of Puerto Rico (see Garcia et al. 1998, and references therein).

The plankton community of coastal lagoons has been described by García and López (1989), García (1990) and García and Durbin (1993). Eurihaline copepod species, such as *Acartia tonsa* and zooplankton predators, such as ctenophores (*Mnemiopsis* sp.) and scyphozoan medusae (*Phyllorhiza punctata*), along with larval stages of anchovies (Pisces: Engraulidae) represent major components of the estuarine environment. A more diverse plankton assemblage, comprised by marine copepods and a multispecies assemblage of reef and river invertebrate and fish larvae (meroplankton) has been found in outer sections of coastal embayments, such as Jobos Bay (Youngbluth, 1976), San Juan Bay (García, 1995), Guayanilla Bay (García et al., 1996), and Mayaguez Bay (García et al., 1999).

6. Fishery Resources

A brief account of the recreational fishery resources in Guánica Bay has been prepared as part of a sport fisheries development program by Pacheco et al. (1999). The most important species in the fisheries during 1998-1999 were the Mutton Snapper, King Mackerel and Yellowtail Snapper. Another 22 fish species have been reported in the creel census data. Species included in the sport fisheries reported by Pacheco et al. (1999) for Guánica Bay have been

included in Tables 2 and 3. The fisheries show strong seasonal variations with peaks during June and August for shoreline and San Jacinto Access Points, respectively. Of particular interest is the use of sardines as one of the principal bait, suggesting that sardines are one of the key populations in Guánica Bay, as well as in other coastal embayments of Puerto Rico (García, 1995; García et al., 1996).

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