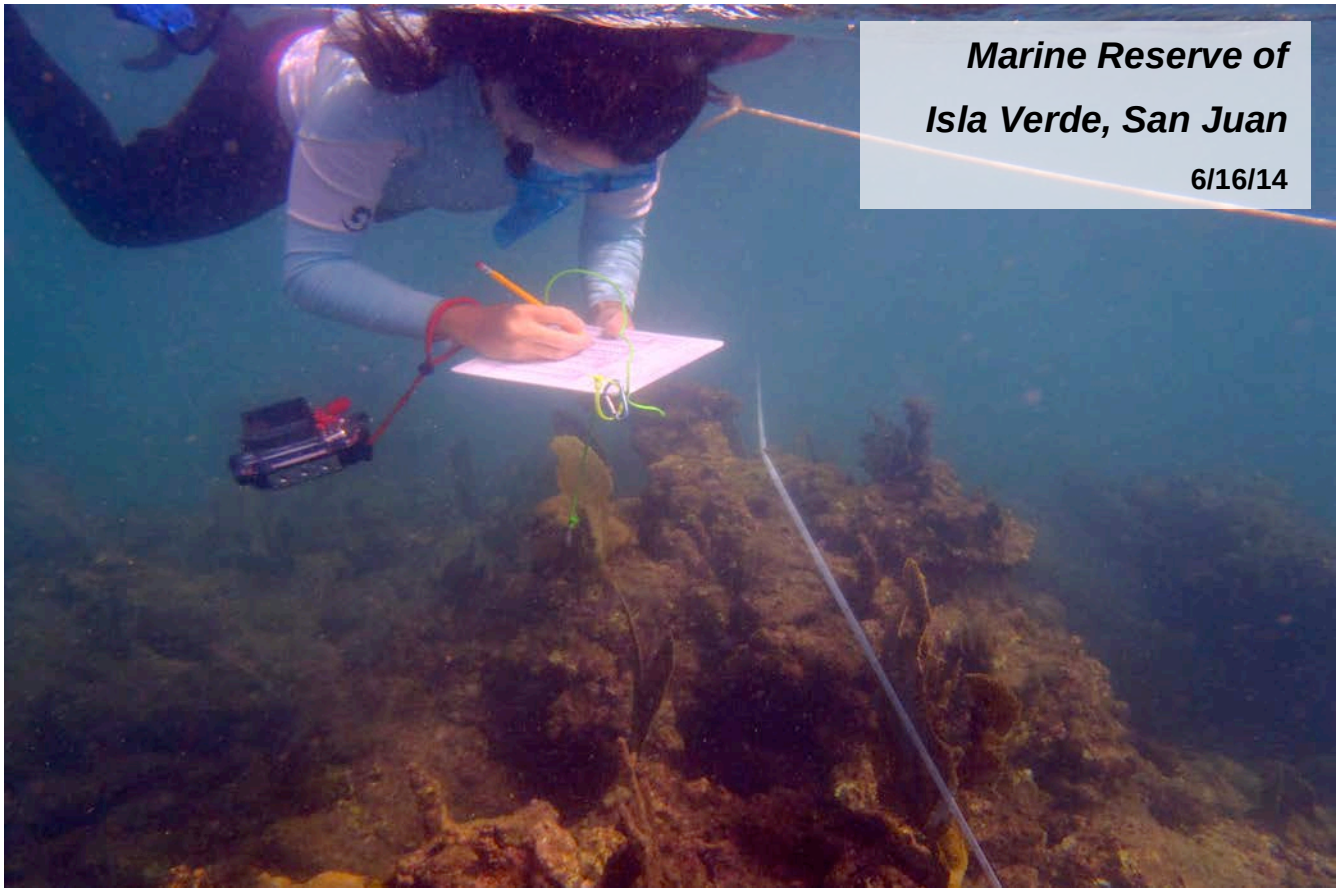


ISLA VERDE MARINE PROTECTED AREA ASSESSMENT REPORT

ISLA VERDE, SAN JUAN

“Reef check” monitoring was assessed on the north linear reef of Isla Verde metropolitan marine protected area at two different depths (shallow-<6ft, deep (>8ft)) for OPAS in order to fulfill Blue Flag Program criteria.

Assessment team- Paco López*, Alejandro Berberena*, Abimarie Otaño, Joel Meléndez, Norberto Quiñones, Verónica Rodriguez & Alfredo Montañez

Report edited by: Alfredo Montañez

Photos taken by Alfredo Montañez and Abimarie Otaño

ISLA VERDE MARINE PROTECTED AREA ASSESSMENT

MAP 1: STUDY SITES- BLACK(SHALLOW), BLUE(DEEP)

ISLA VERDE SHALLOW REEF

PHOTO 1: TEAM ABOUT TO ENTER AND EVALUATE ISLA VERDE REEF

PHOTO 2: SEAGRASS BED WITH NUTRIENT INDICATOR EPYPHYTE MACROALGAE JUST BEFORE THE SHALLOW LINEAR REEF

ISLA VERDE RESERVE

Study sites

North linear Shallow reef -<5ft (black)

- Linear reef
- 300m from shore
  Start of trancept:
- N18° 26.904'
  W66° 00.875'
  End of trancept:
- N18° 26.939'
  W66° 00.920'

North deep linear reef (blue)

- Linear reef
- 420m from shore
  Start of trancept:
- N18° 26.974'
  W66° 00.872'
  End of trancept
- N18° 26.997'
  W66° 00.923'

ARRECIFES PRO CIUDAD INC.

OPAS
ORGANIZACION PRO AMBIENTE SUSTENTABLE

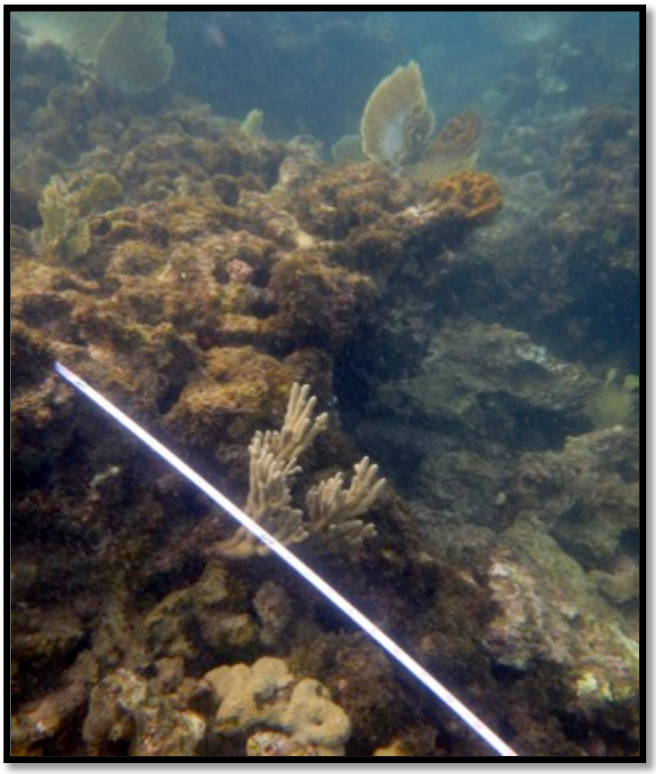


PHOTO 3: LINEAR REEF STRUCTURE- OLD DEAD *ACROPORA PALMATA* WITH OCTOCORAL AND MUSTARD CORAL (*P. ASTROIDES)* RECRUITMENT

PHOTO 4: ENDANGERED LOBED-STAR CORAL *(ORBICELLA ANNULARIS*) WITH LOW MORTALITY

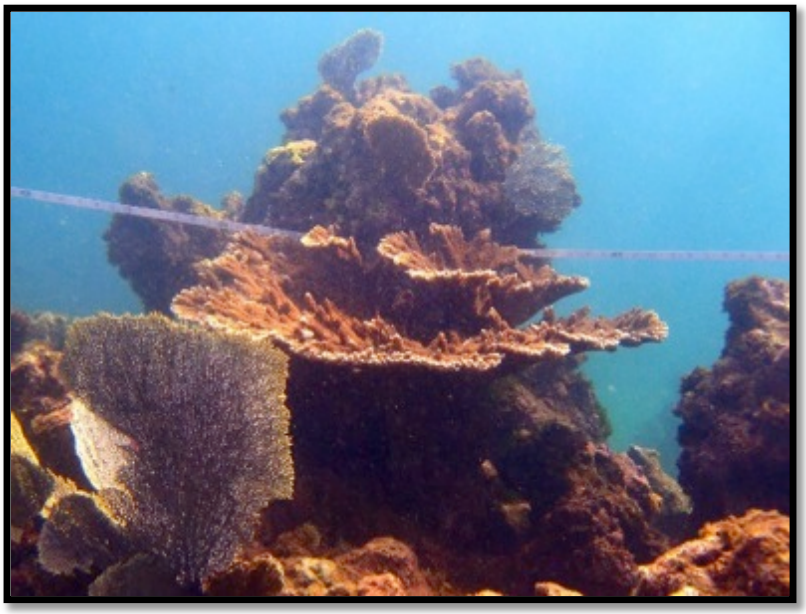


PHOTO 3: ENDANGERED ACROPORID (*ACROPORA PALMATA*) RECRUITMENT IN THE SHALLOW TRANCEPT

PHOTO 6: 75-95M ZONE OF THE SHALLOW TRANCEPT- SUBSTRATE DOMINATED BY A CONGLOMERATE OF NUTRIENT INDICATOR MACROALGAE (DYCTIOTA, SARGASSUM)

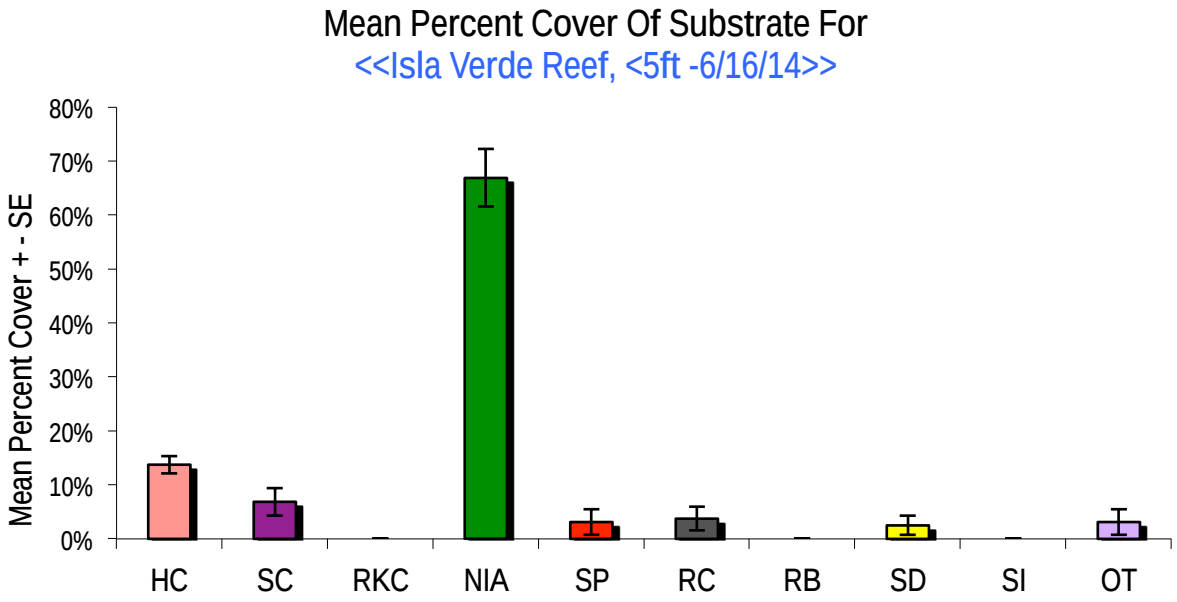
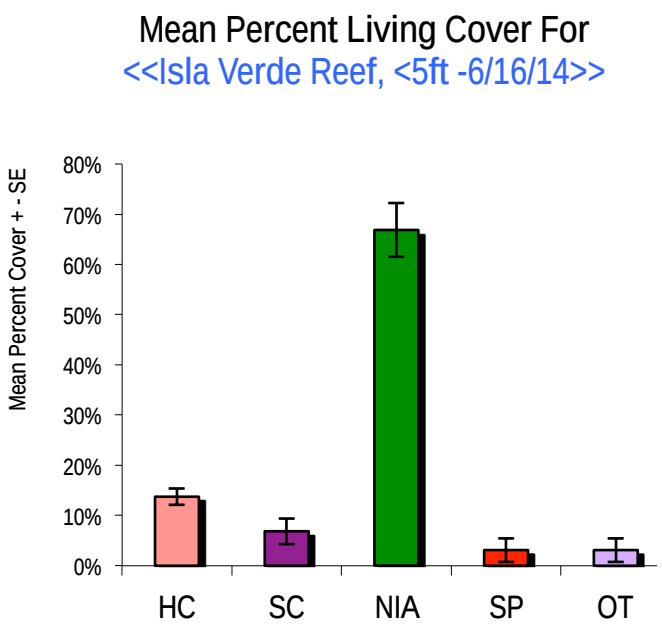


PHOTO 4: SHALLOW REEF DOMINATED BY NUTRIENT INDICATOR MACROALGAE WITH SOME RESILIENT CORAL SPECIES RECRUITMENT (*P. ASTREOIDES*) THE SITE'S VISIBILITY WAS FAIRLY LOW; POSSIBLY DUE TO SEDIMENT RESUSPENSION AND NUTRIENTS IN WATER COLUMN

PHOTO 8: MONTAÑEZ MONITORING SHALLOW REEF

PHOTO 9: HIGH BRAIN CORAL ABUNDANCE - SHALLOW REEF BRAIN CORAL DIVERSITY RANGED BETWEEN: P. STRIGOSA, P. CLIVOSA, AND D. LABERINTHIFORMIS



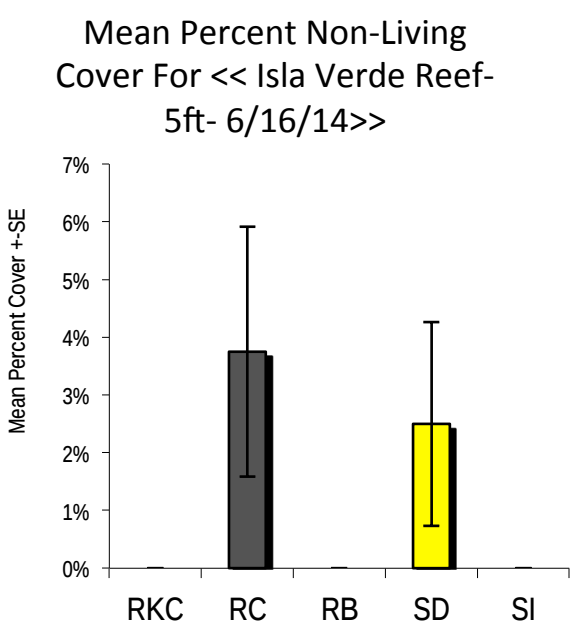


PHOTO 10: BRAIN CORAL (*PSEUDODIPLORIA CLIVOSA*) AFFECTED BY THE CYANOBACTERIA CONGLOMERATE BLACK BAND DISEASE AND COMPETING SARGASSUM SPP.

PHOTO 11: LINEAR REEF DOMINATED BY NUTRIENT INDICATOR BROWN MACROALGAE-*SARGASSUM SPP*; AND OCTOCORALS (SEA FANS- *GORGONIA VENTALLINA*)

IN NEAR SHORE REEFS, HIGH SARGASSUM COVER HAS BEEN CORRELATED WITH LOW HERBIVORE BIOMASS AND HIGH INPUT OF TERRESTRIAL NUTRIENTS AND SEDIMENTS (MCCOOK, 1996).

PHOTO 12-13: BRAIN CORALS SHOWING STRESS SIGNS

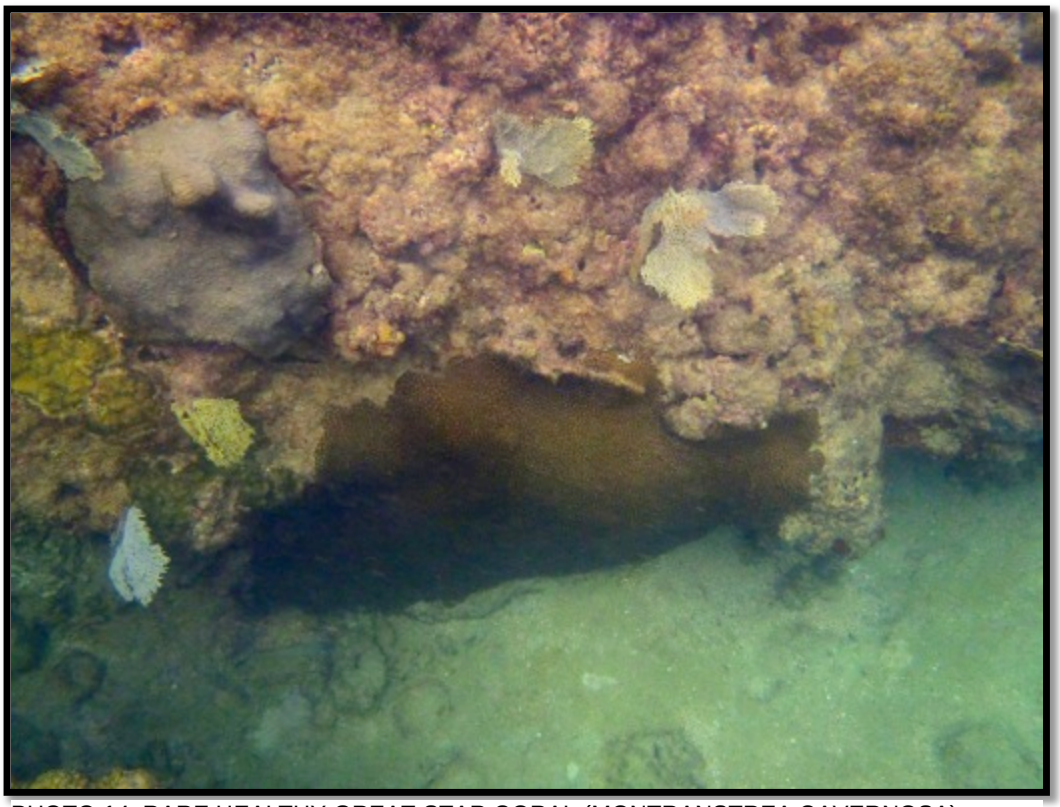
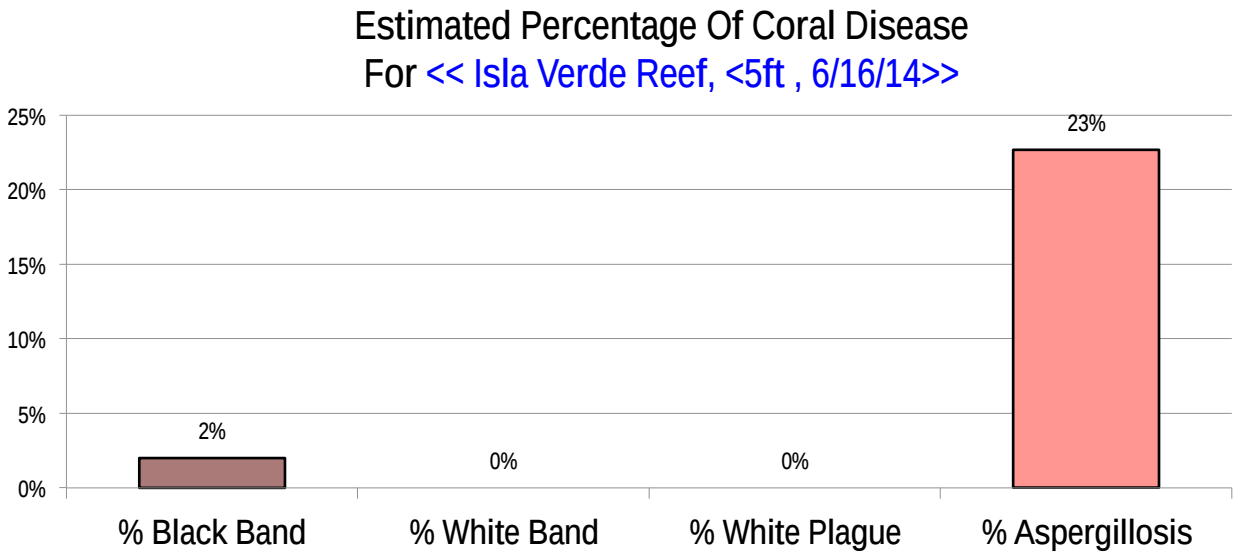


PHOTO 14: RARE HEALTHY GREAT STAR CORAL (MONTRANSTREA CAVERNOSA)



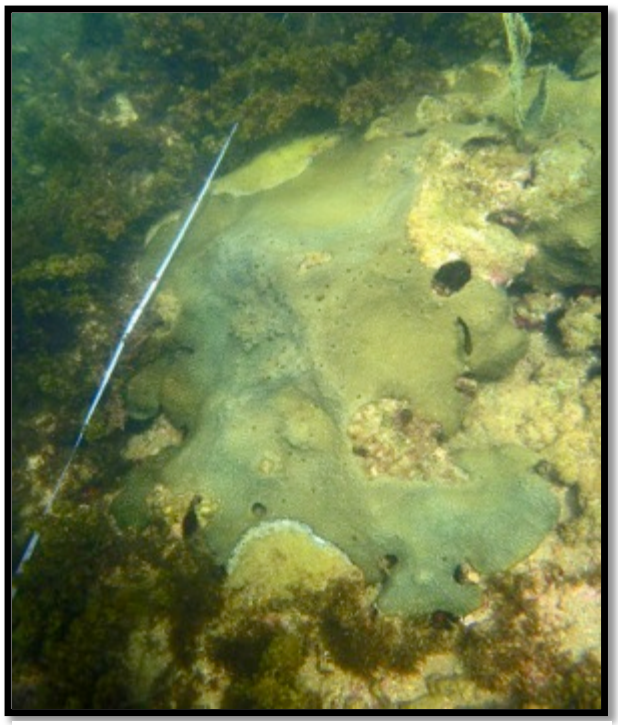


PHOTO 15-16: BRAIN CORAL SPECIE (*PSEUDODIPLORIA CLIVOSA*) WITH TWO BLACK BAND DISEASE SIGNS

PHOTO 17-18: SEA FAN OCTOCORAL (*GORGONIA VENTALLINA*) WITH ASPERGILLOTIC LESIONS AND MODERATE CYANOBACTERIA COVER. THE DISEASE MAKES THE GORGONIA MORE SUCEPTIBLE OF OTHER COMPETING ORGANISMS

PHOTO 19: SEA FAN (*GORGONIA VENTALLINA*) WITH SIGNS OF THE OPPORTUNISTIC PATHOGEN *ASPERGILLOSIS SIDOWI* , A SOIL FUNGUS

PHOTO 20 : FIREWORM (*HERMODICE CARUNCULATA*) EATING A BRAIN CORAL WITH SIGN OF BLACK BAND DISEASE AND TISSUE LOSS

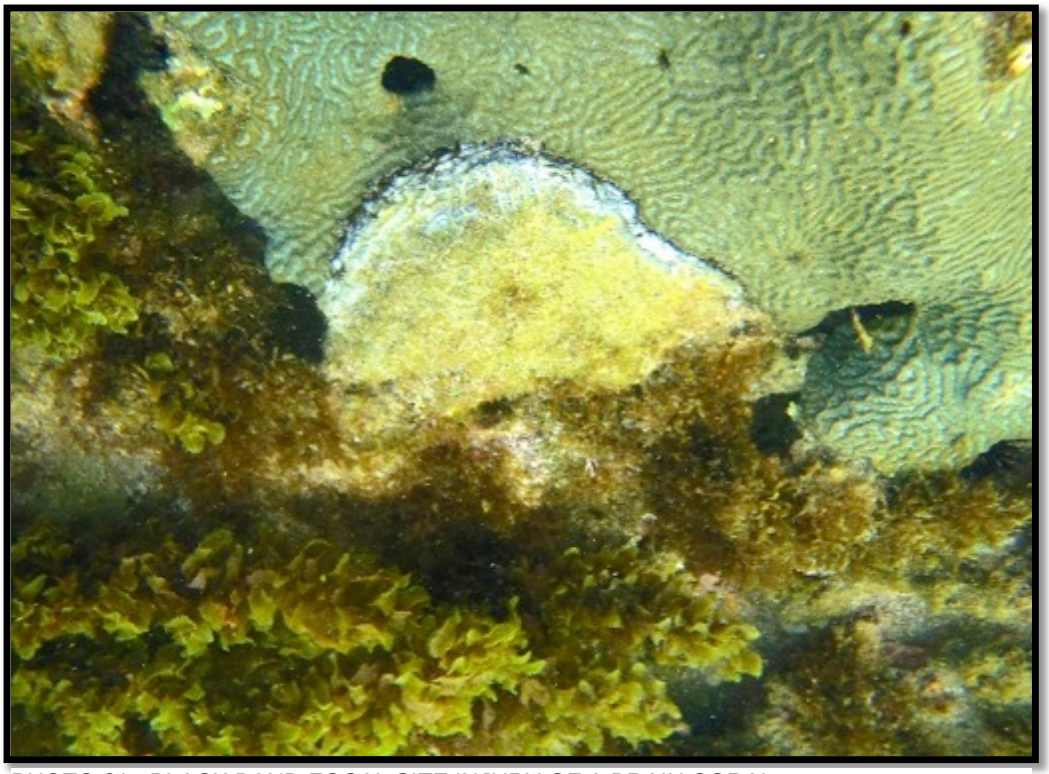
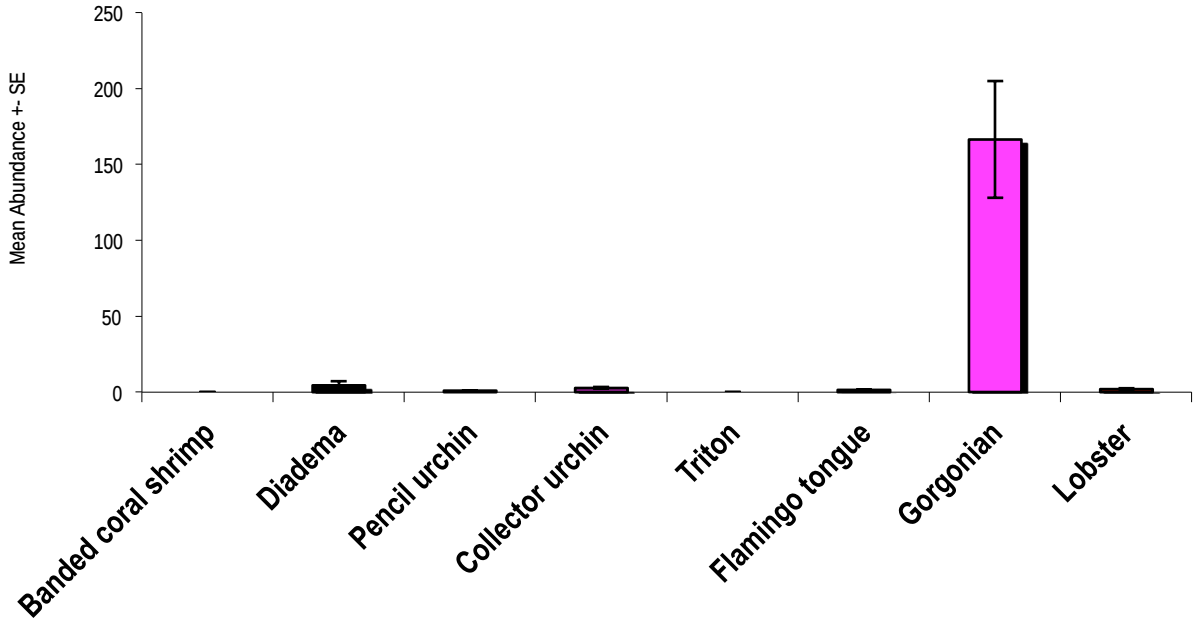


PHOTO 21: BLACK BAND FOCAL SITE INJURY OF A BRAIN CORAL

PHOTO 22: SEA FAN DOMINATED SUBSTRATE IN ONE OF THE ZONES OF THE SHALLOW REEF

Mean Abundance Of Invertebrates For << Isla verde Reef, <5ft , 6/16/14>>



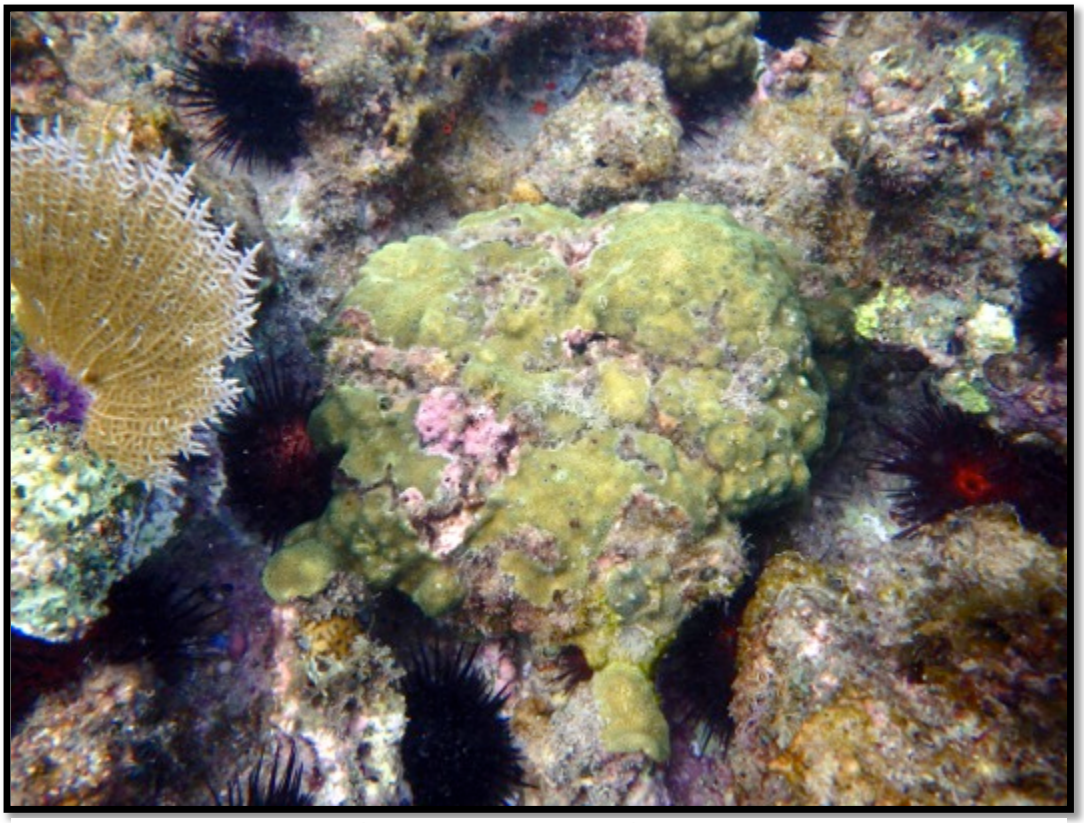


PHOTO 23: MUSTARD CORAL (*PORITES ASTREOIDES*) WITH ENCRUSTING MACROALGE AND SPONGES COMPETITORS

PHOTO 24: PREDATION OF FLAMINGO TONGUE (*CYPHOMA GIBBOSSUM*) ON SEA FAN (*GORGONIA VENTALLINA*)

PHOTO 25: SEA FAN (*GORGONIA VENTALLINA*) WITH ASPERGILLOTIC LESIONS AND OUTCOMPETED BY CYANOBACTERIA- INDICATOR OF HIGH NUTRIENT INPUTS

Mean Abundance Of Invertebrates For << Isla verde Reef, <5ft , 6/16/14>>

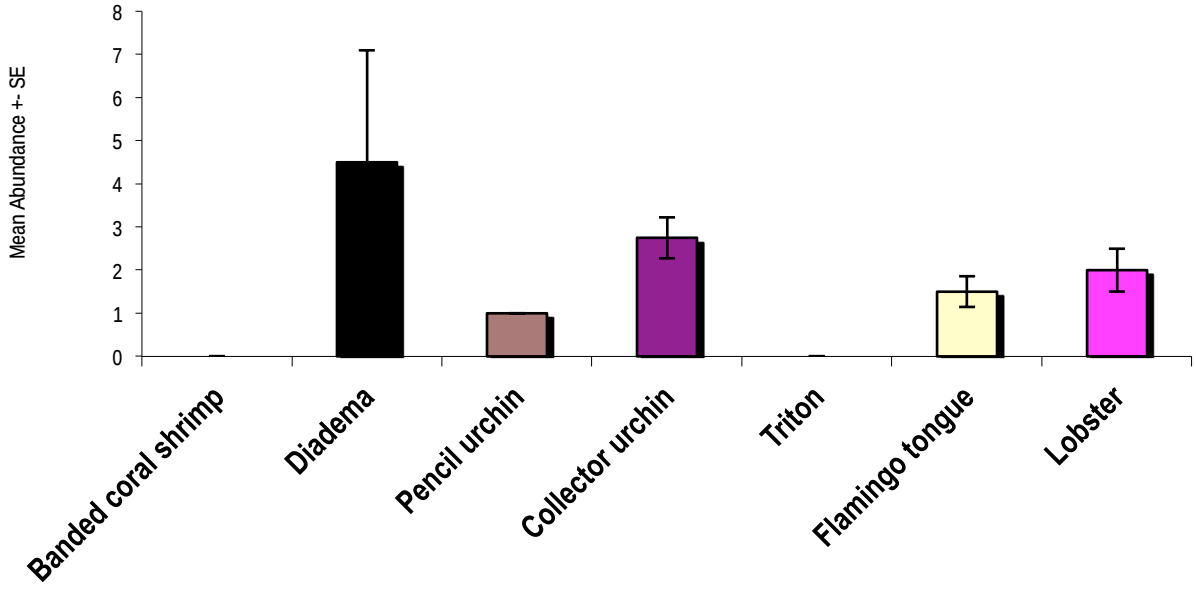


PHOTO 26-27: VARIOUS CARRIBBEAN LOBSTERS (*PANULIRUS ARGUS*) WERE ASSESSED IN THE SHALLOW REEF

PHOTO 28: PREDATION OF TWO FLAMINGO TONGUES (*CYPHOMA GIBBOSSUM*) ON A SEA FAN (*GORGONIA VENTALLINA*)

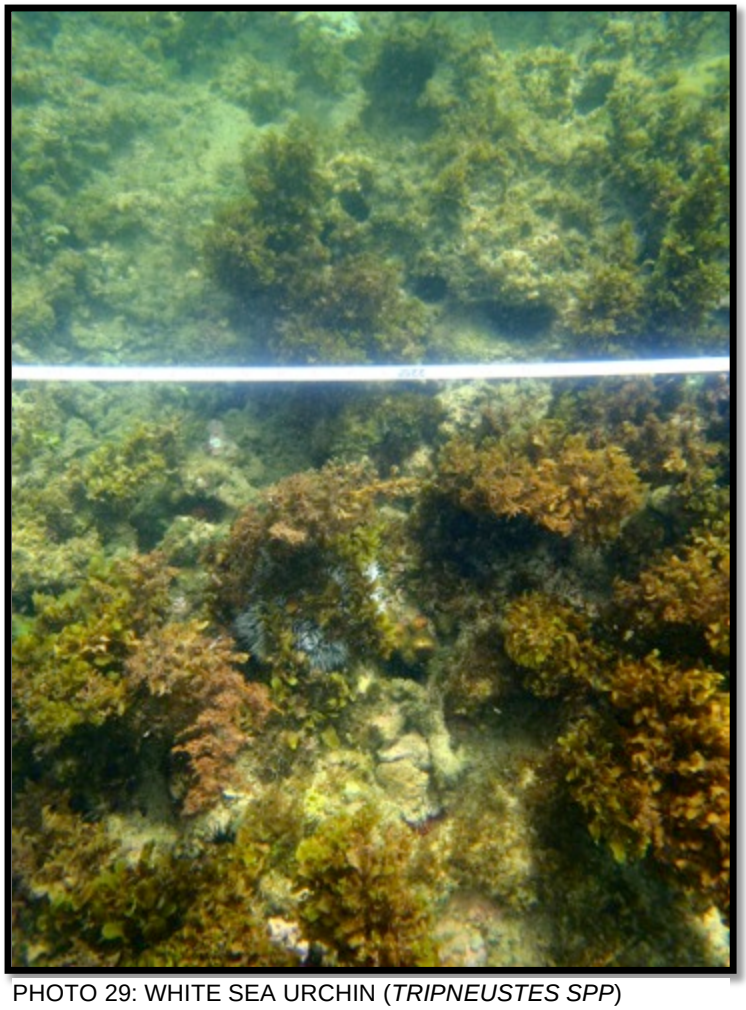


PHOTO 29: WHITE SEA URCHIN (*TRIPNEUSTES SPP*) SURROUNDED BY SARGASSUM

PHOTO 30: PREDATION OF FLAMINGO TONGUE

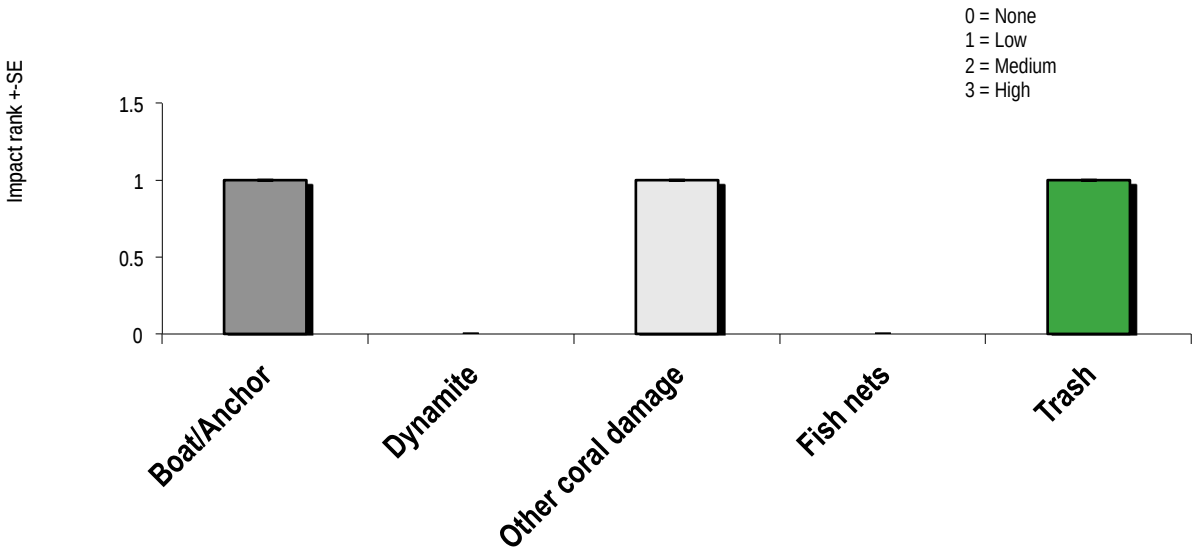
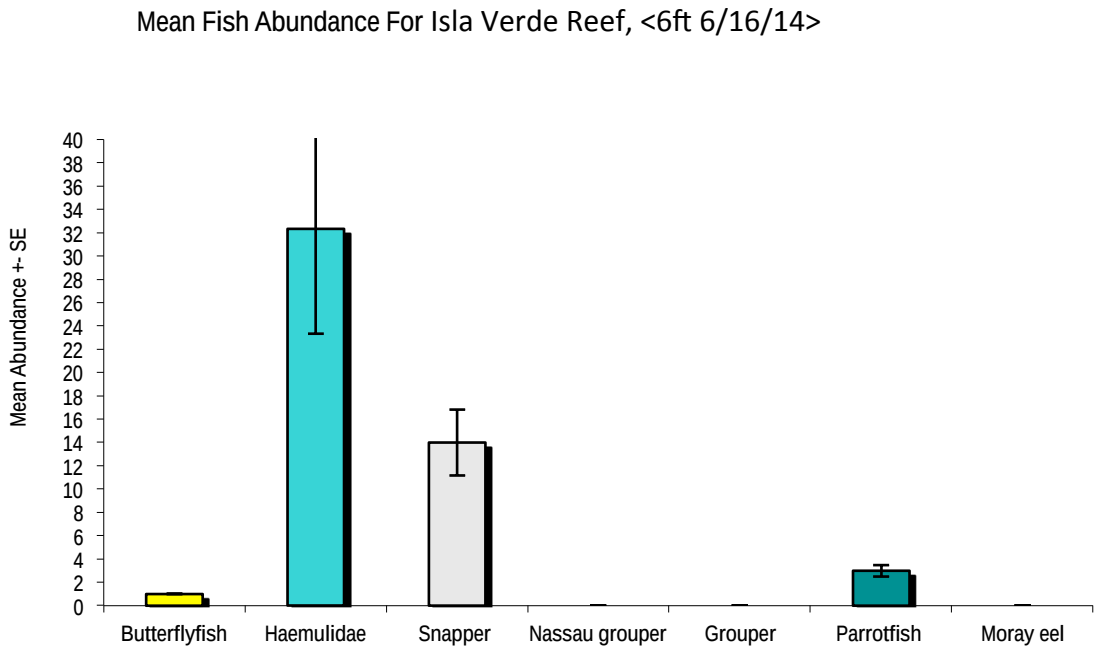


PHOTO 31: MARINE DEBRIS- PLASTIC BAG ENTANGLED IN SEA FAN

PHOTO 32: MARINE DEBRIS- OLD BOTTLE COLONIZED BY TURF IN THE SHALLOW REEF



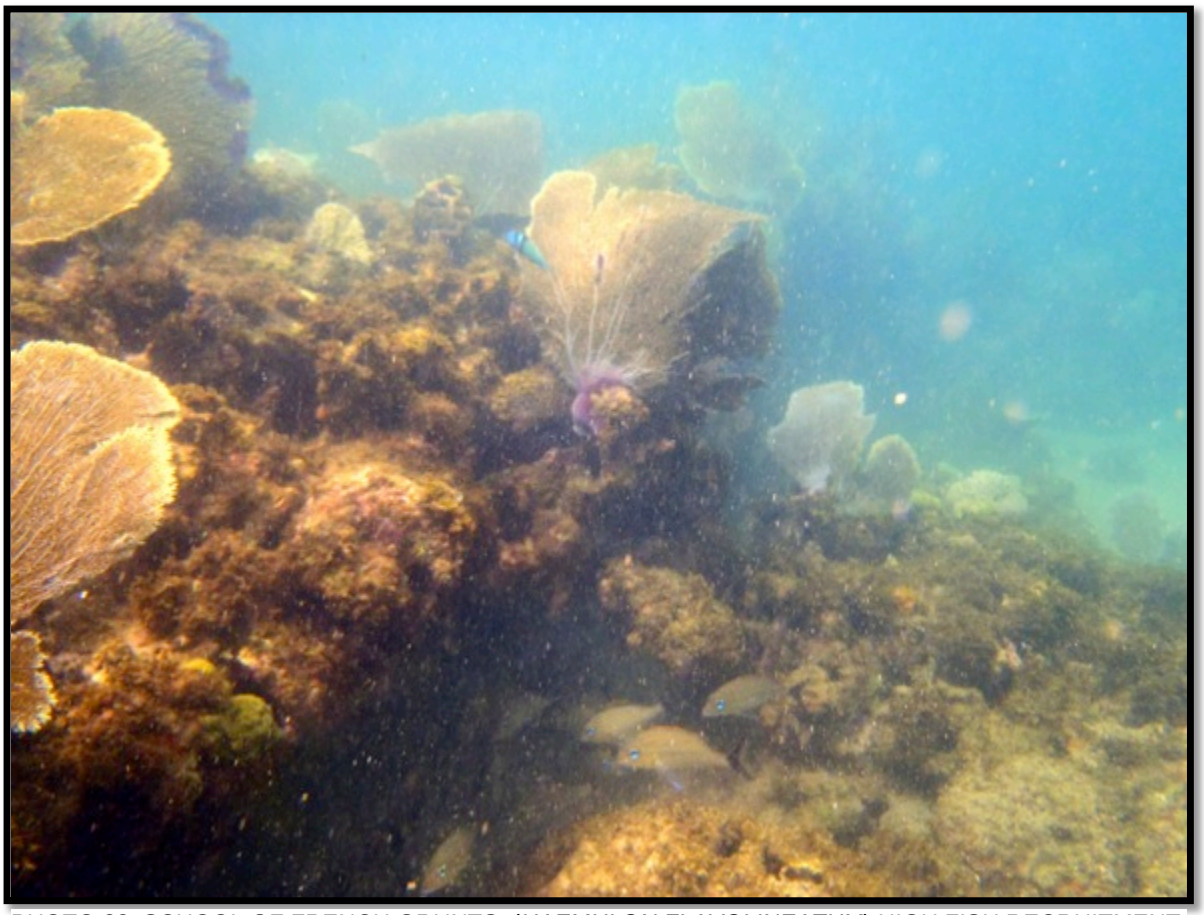


PHOTO 33: SCHOOL OF FRENCH GRUNTS (*HAEMULON FLAVOLINEATUM*) HIGH FISH RECRUITMENT WAS OBSERVED DURING THE ASSESSMENT

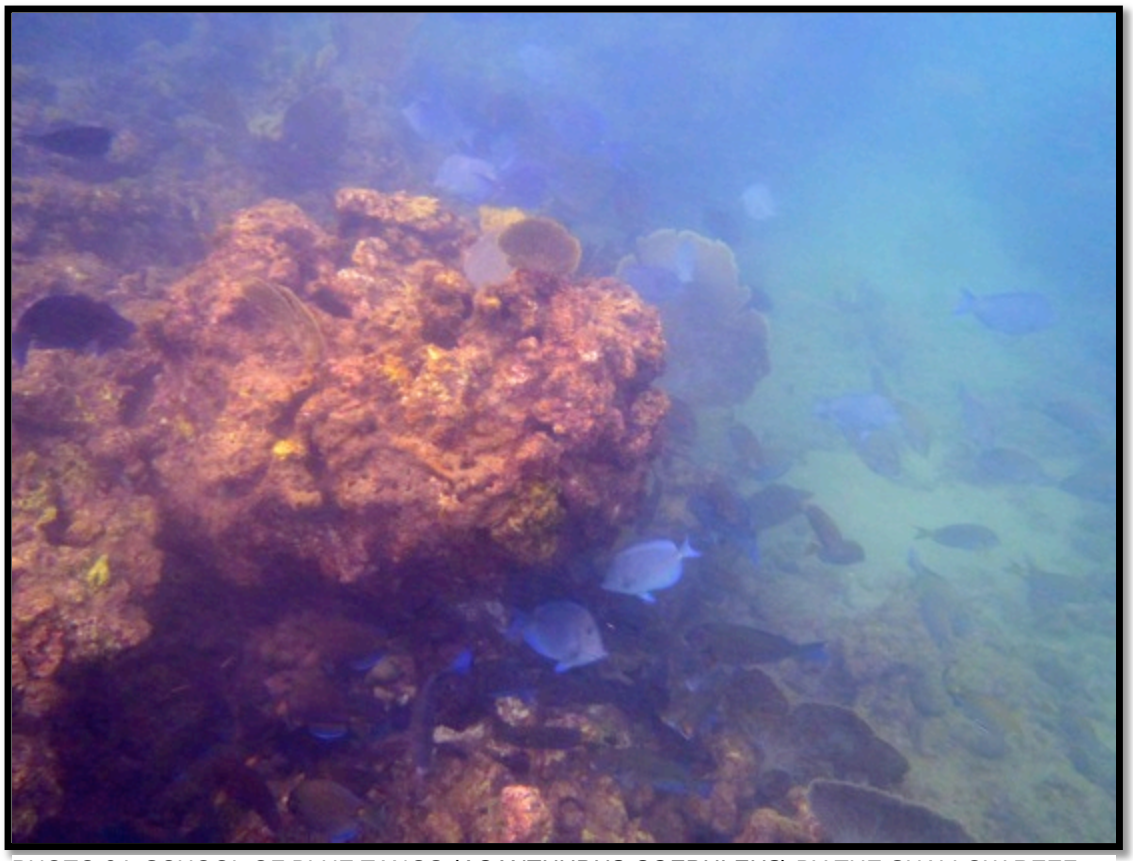


PHOTO 34: SCHOOL OF BLUE TANGS (*ACANTHURUS COERULEUS*) BY THE SHALLOW REEF

PHOTO 35: FRENCH ANGEL FISH (*POMACANTHUS PARU*) AND SNAPPERS SPP.

SCLERACTINIAN CORAL DIVERSITY IN POINT TRANCEPT (EACH 0.5M) OF 100M- SHALLOW REEF SITE

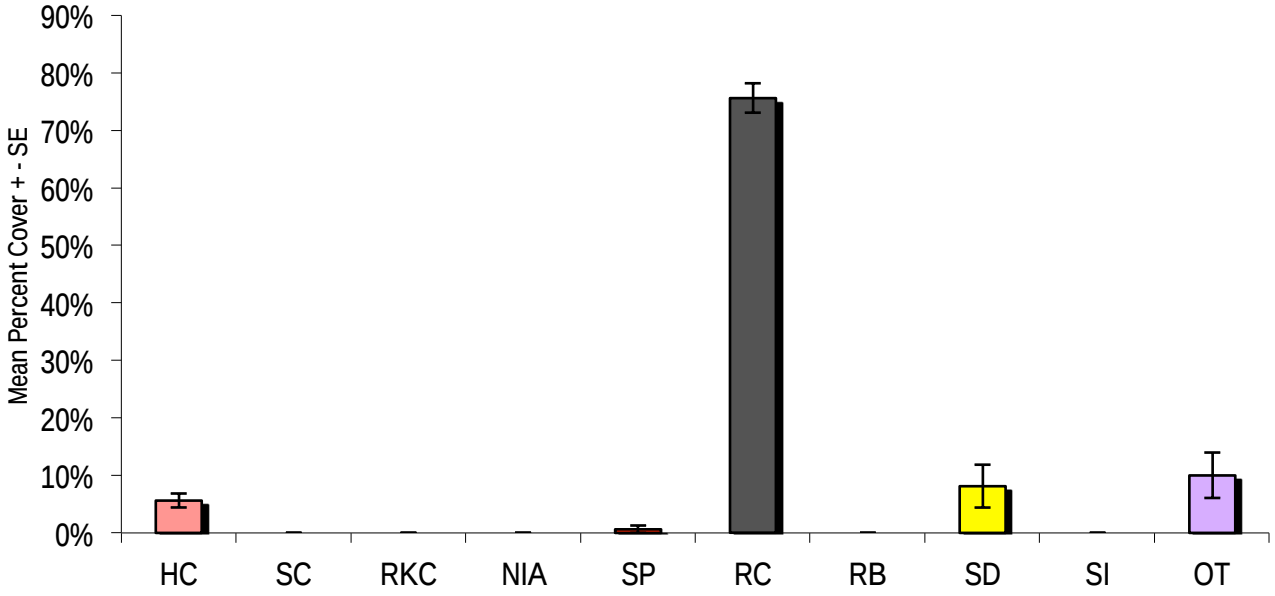
CORAL SPECIE	# OF POINTS
Porites astreoides	11
Porites porites	2
Orbicella annularis	1
Acropora palmata	1
Siderastrea radians	1
Montastraea cavernosa	2
Pseudodiploria strigosa	3
Pseudodiploria clivosa	5
Millepora alcicornis	2

ISLA VERDE DEEP REEF (>8FT)

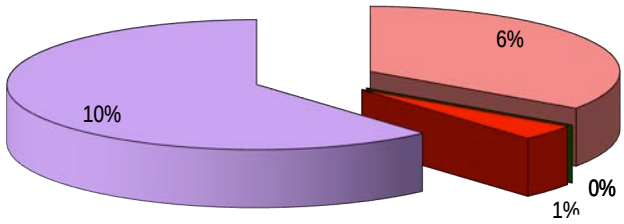
PHOTO 36: BERBERENA AND VERONICA SETTING THE 100M BELT LINE TRANCEPT ON NORTH DEEP REEF (>8FT)

PHOTO 37: BERBERENA SETTING UP THE TRANCEPT

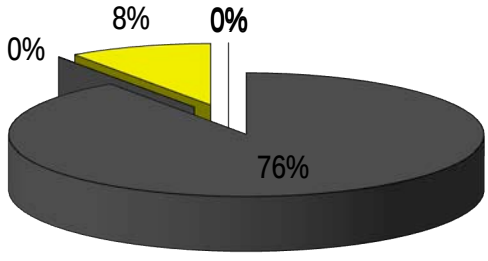
Mean Percent Cover Of Substrate For <<Isla Verde Reserve; >8ft>>



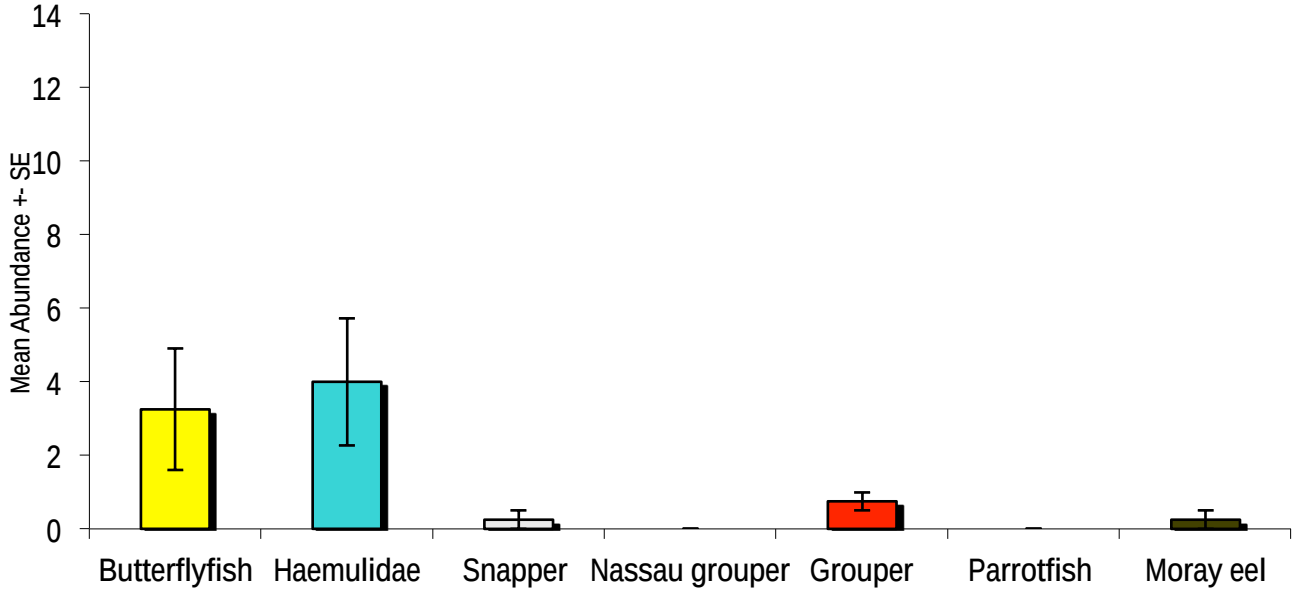
Mean Percent Living Cover For <<Isla Verde Reserve, >8ft 6/16/14>>



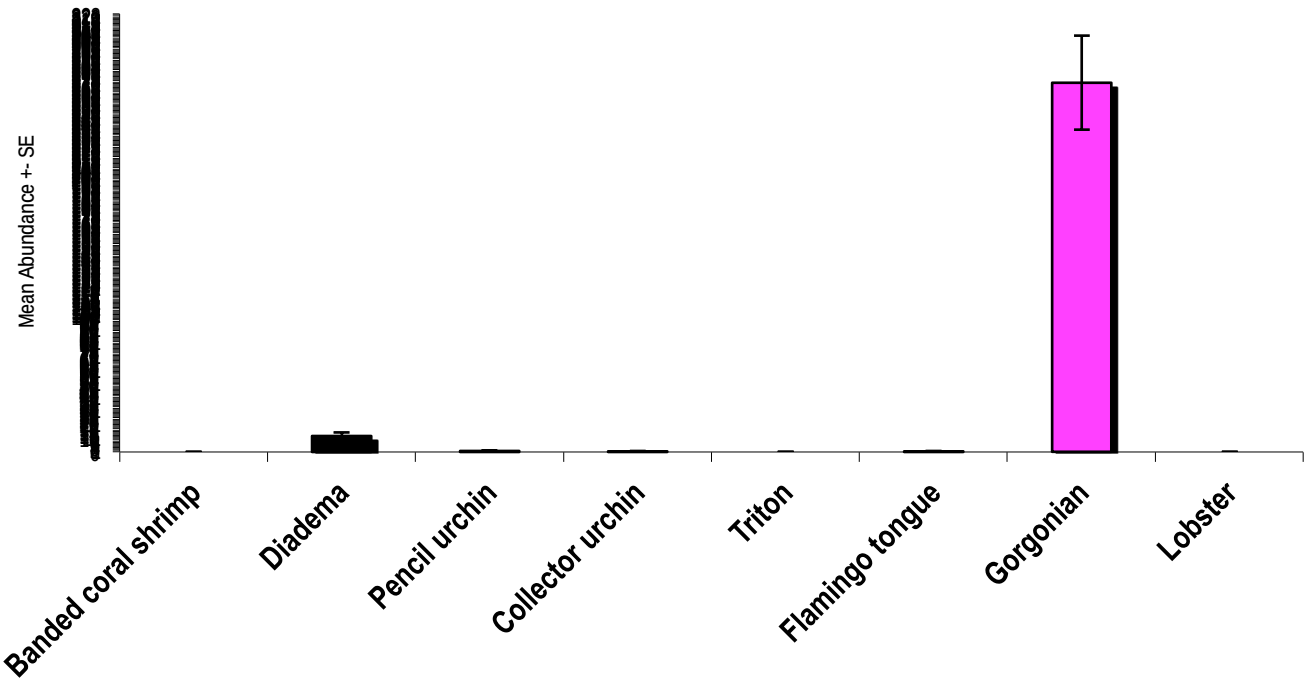
Mean Percent Non-Living Cover For << Isla Verde Reserve, >8ft 6/16/14 >>



Mean Fish Abundance For <<Isla Verde Reserve, >8ft, 6/16/14>>



Mean Abundance Of Invertebrates For << <Isla Verde Reserve, >8ft, 6/16/14 >>



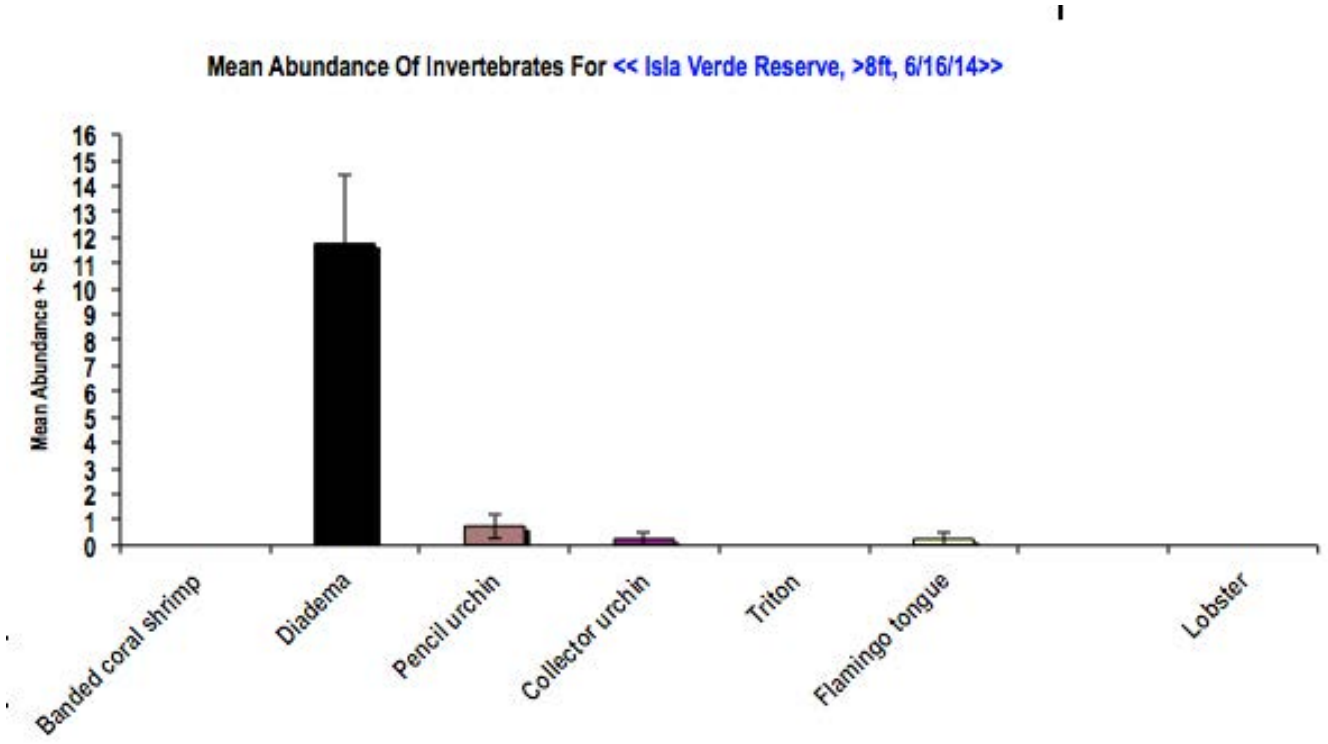
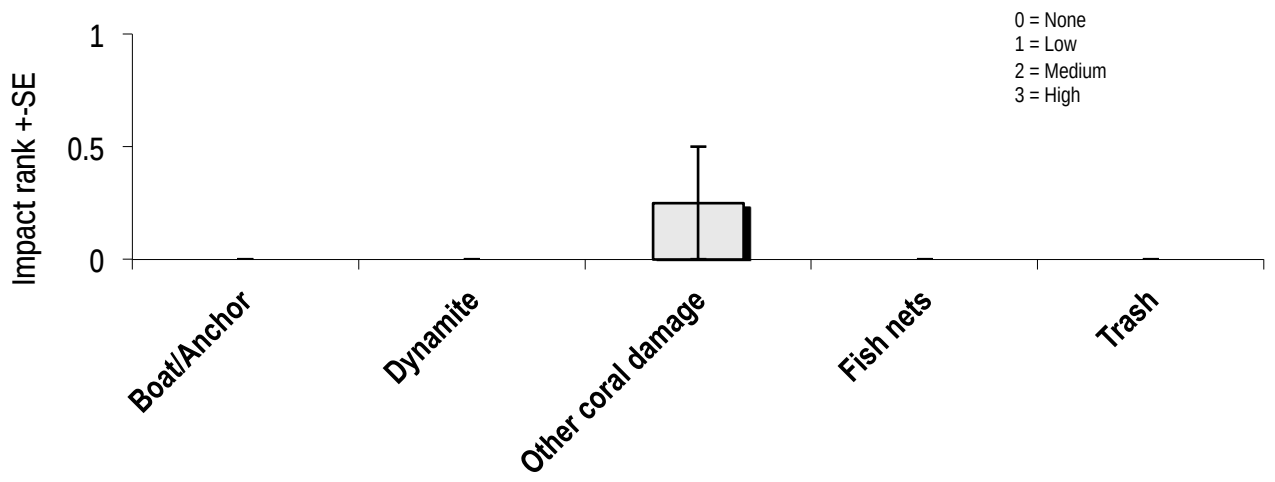


PHOTO38: HIGH ABUNDANCE OF SEA STARS BETWEEN THE SHALLOW TRANCEPT AND DEEP TRANCEPT (*OREASTHER RETICULATUM)*

Incidence Of Impacts For <<Isla Verde Reserve, >8ft, 6/16/14>>



Estimated Percentage Of Coral Disease For << Isla Verde reserve, >8ft, 6/16/14>>