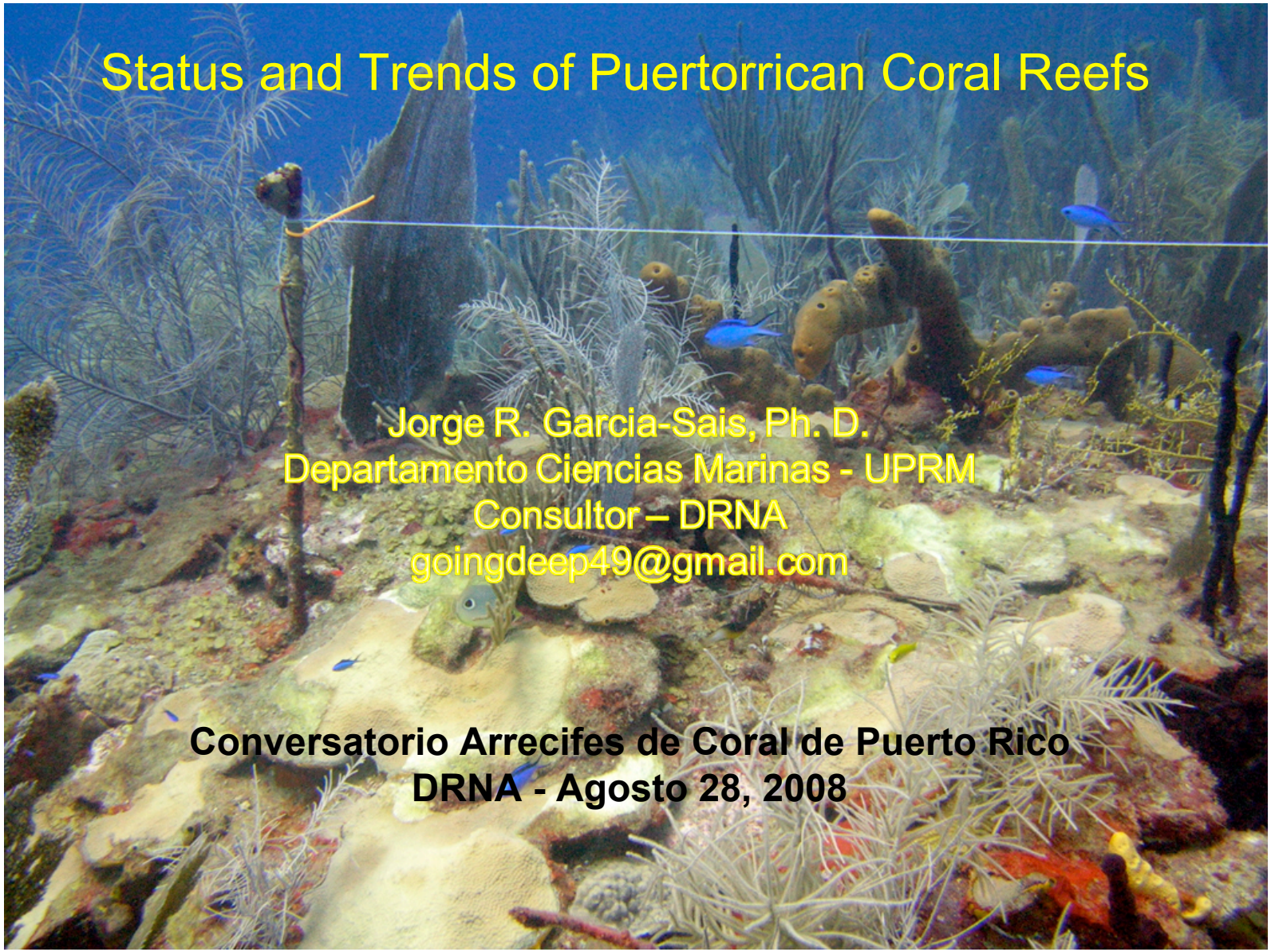

# Status and Trends of Puertorrican Coral Reefs

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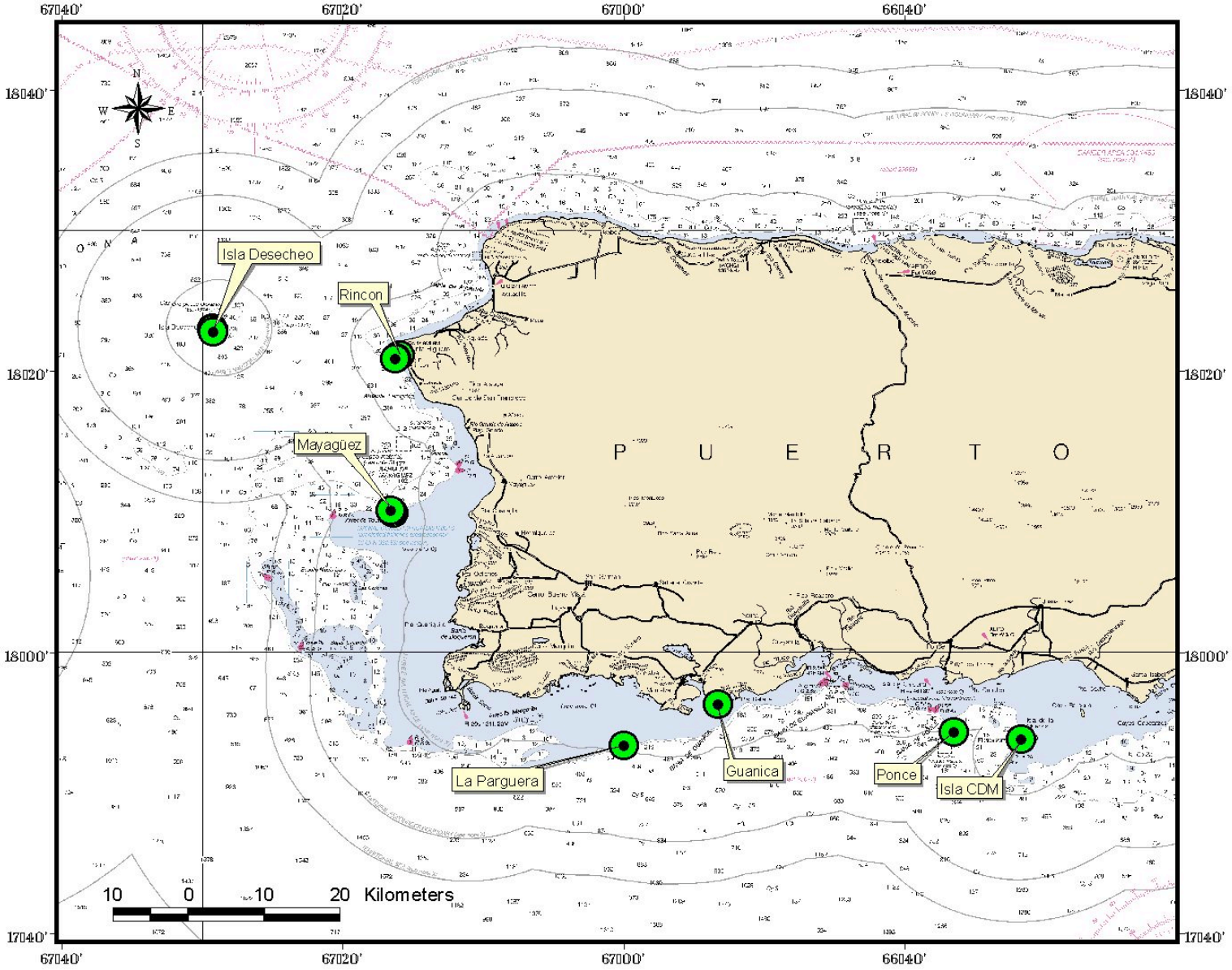
**Conversatorio Arrecifes de Coral de Puerto Rico**
**DRNA - Agosto 28, 2008**

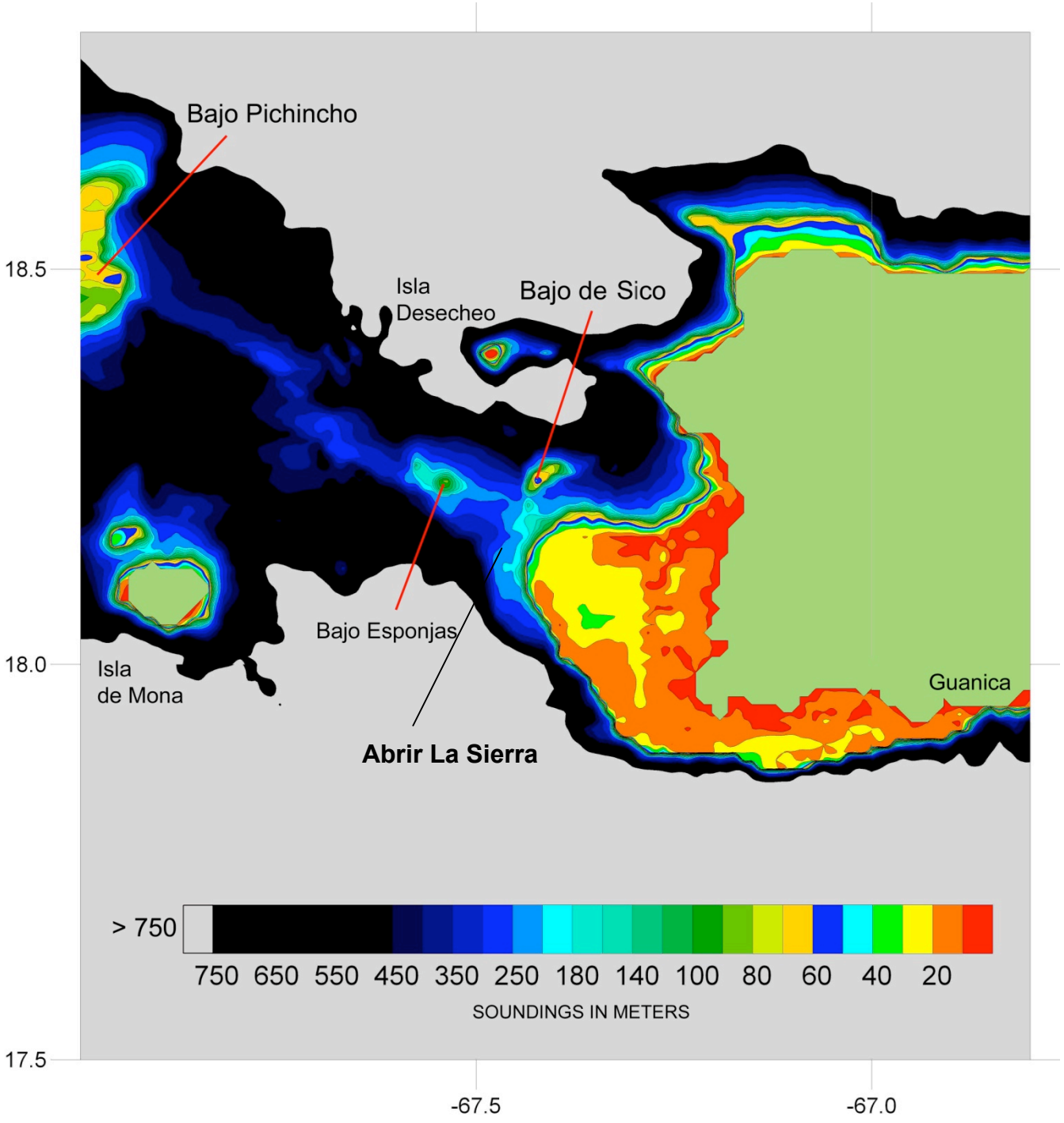
# Research Programs

- Puerto Rico National Coral Monitoring Program – DNER
  - Baseline characterization (1999 – 2001), comprised a total of 65 reefs within DNER desig. Natural Reserves
  - Annual surveys on sets of five 10-m long permanent transects/reef station. % cover sessile-benthos, density of fishes and motile megabenthic invert
  - Time series analyses of variations in % reef substrate cover
  - Presently monitoring a total of 15 reef stations/yr (Desecheo 30, 20,15m; Mona 30, 20,15m Mayaguez 30,20,10m; Rincon 20,10,5m; Derrumbadero 20m; Guanica 10m; CDM 15m

- Assessment of Mesophotic Reef Fish Habitats - CFMC
  - Exploration and discovery of mesophotic reef systems (>30 m depth)
  - Bathymetry and benthic habitat mapping
  - Quantitative/taxonomic characterization of predominant sessile-benthic fishes and megabenthic invertebrates associated with main reef habita
  - Baseline assessment of commercially important fish populations

# Location of Coral Reef Monitoring Sites in PR

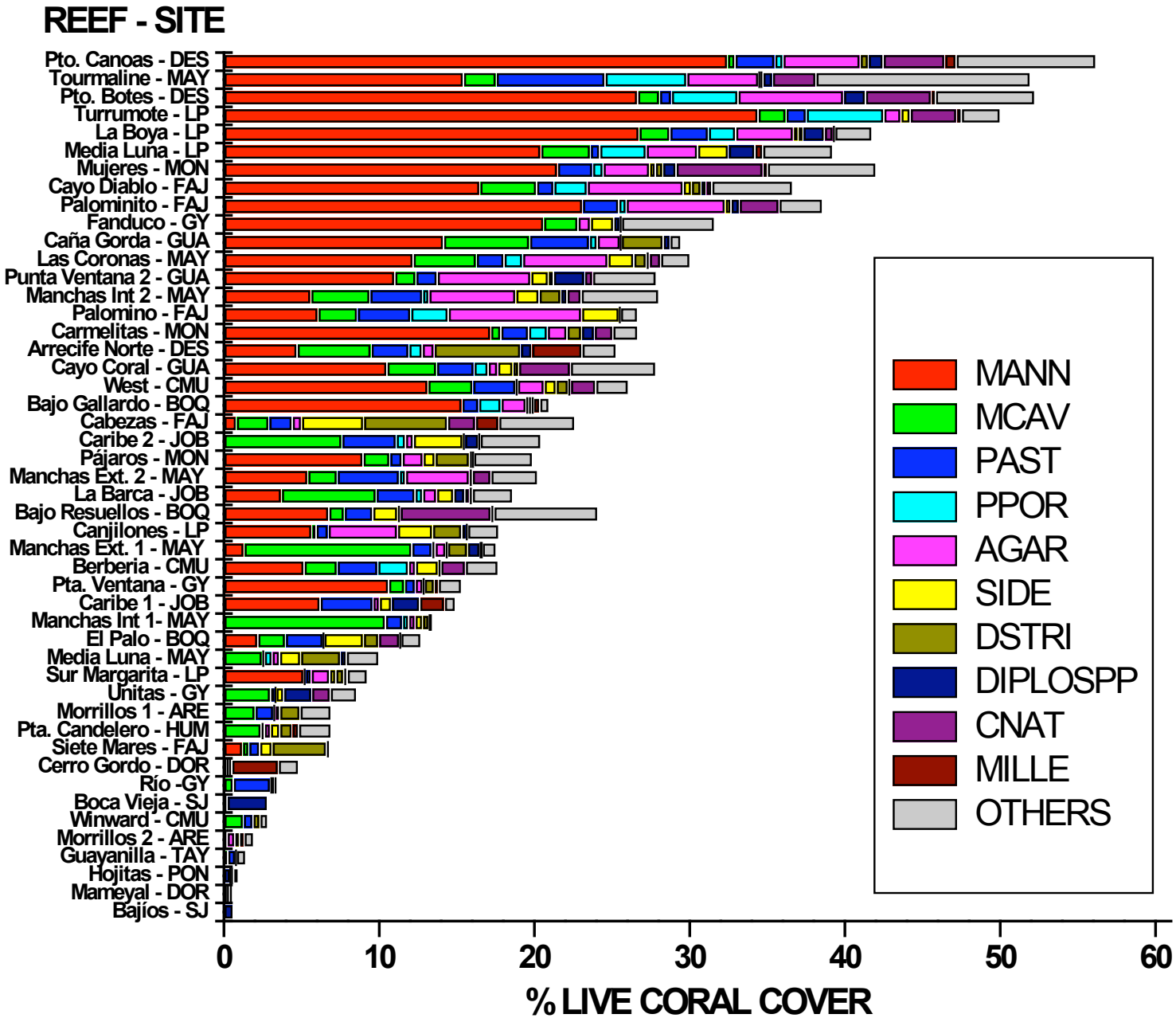



Bajo Pichincho
Isla
Desecheo
Bajo de Sico
Bajo Esponjas
Isla
de Mona
Abrir La Sierra
Guanica
18.5
18.0
17.5
-67.5
-67.0
> 750
750 650 550 450 350 250 180 140 100 80 60 40 20
SOUNDINGS IN METERS

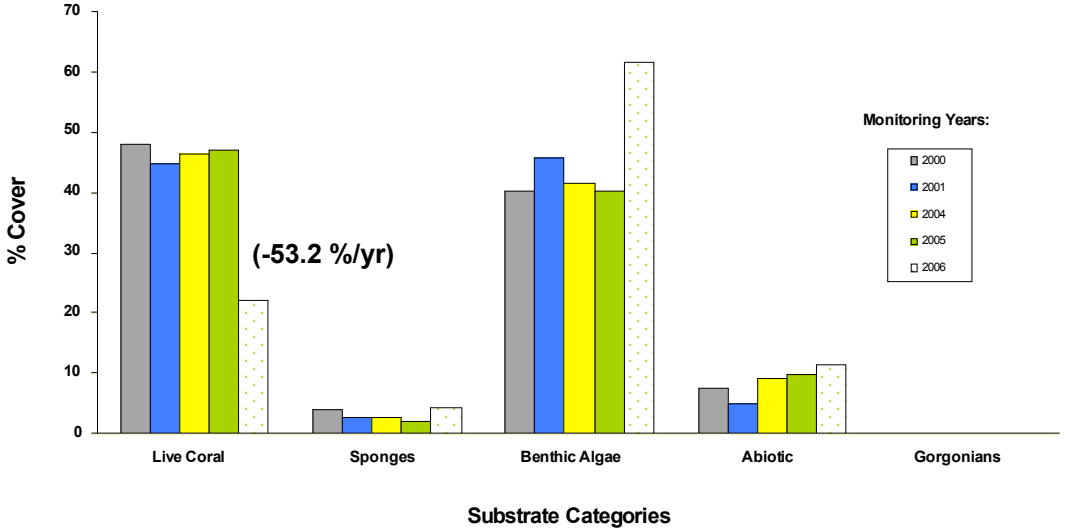
# Puerto Rico National Coral Reef Monitoring Program: Status and Trends (1999 – 2005)

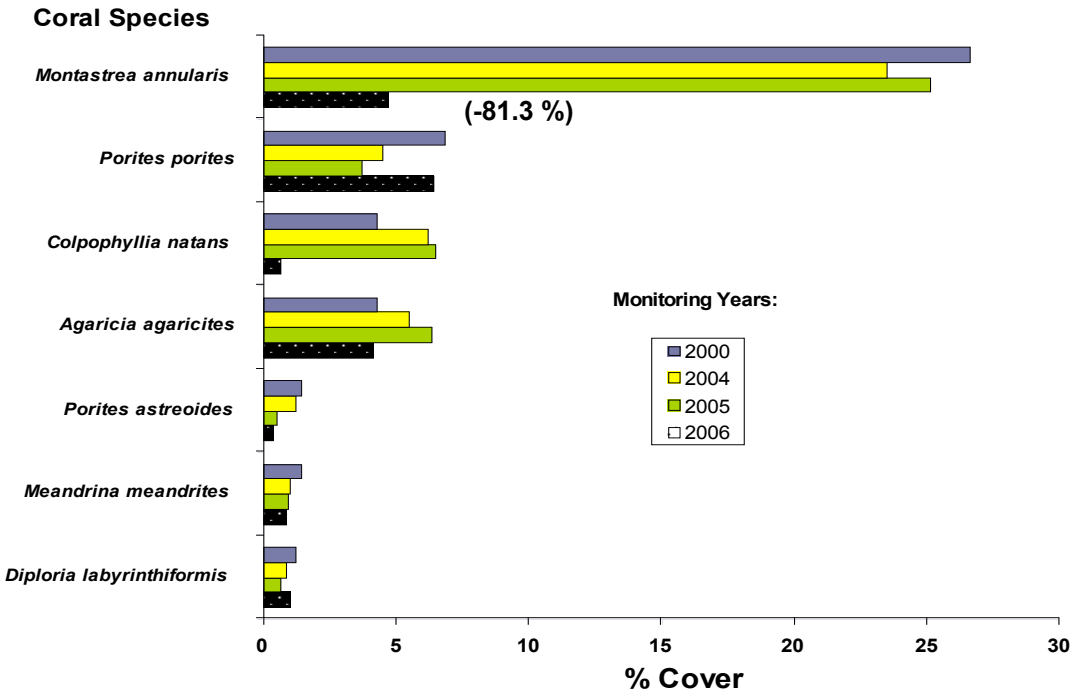
- Coral reefs located far from shore (shelf-edge), up-current from (or unaffected by) major rivers, and those associated with oceanic islands presented the highest live coral cover until 2005
- Boulder Star Coral, *Montastraea annularis* was the dominant coral species from reefs with highest live coral cover
- Live coral cover remained stable at reefs monitored in the west coast (Isla Desecheo, Mayaguez, Rincon) and Isla Vieques from 1999-2005
- Stat. sig. declines of live coral cover detected for south coast reefs (Caja de Muerto, Guanica) between baseline and 2005
- Declines of live coral cover largely associated with the dominant reef building species (*M. annularis)* but included other spp.
- Reef fish species richness and abundance positively correlated with live coral cover and rugosity

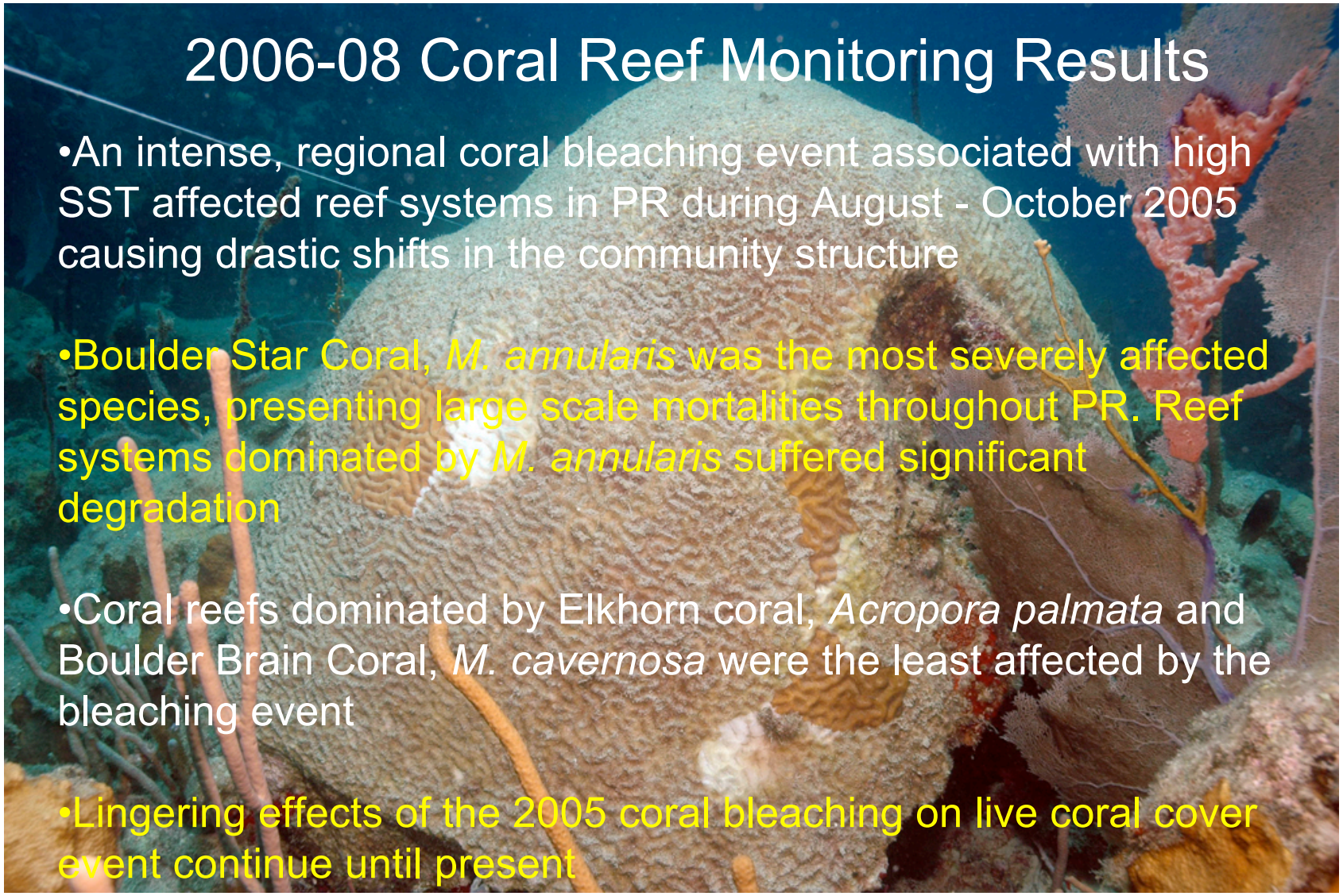
# Percent live coral cover at reef sites – baseline data set



# Puerto Canoas Reef 20 m - Desecheo







# 2006-08 Coral Reef Monitoring Results

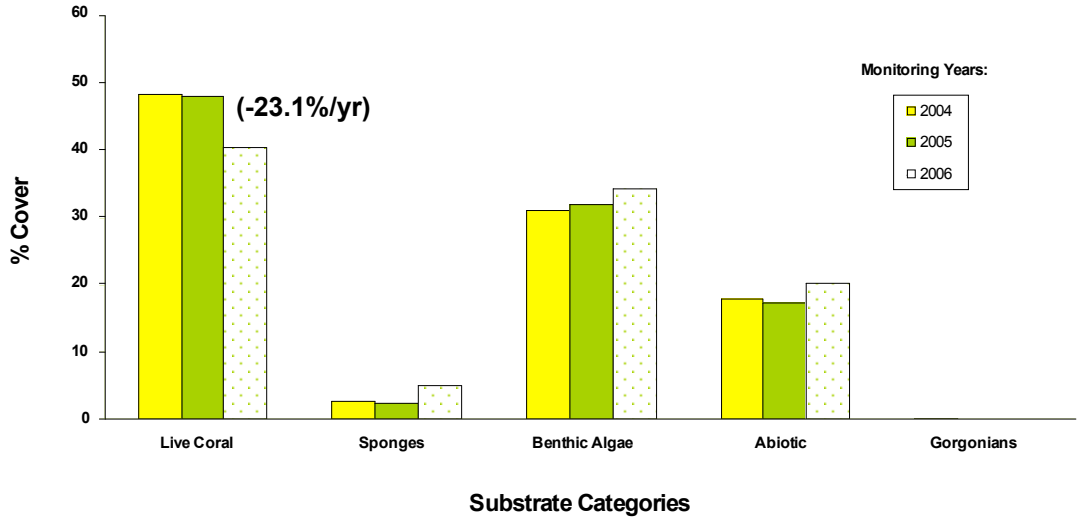
•An intense, regional coral bleaching event associated with high SST affected reef systems in PR during August - October 2005 causing drastic shifts in the community structure

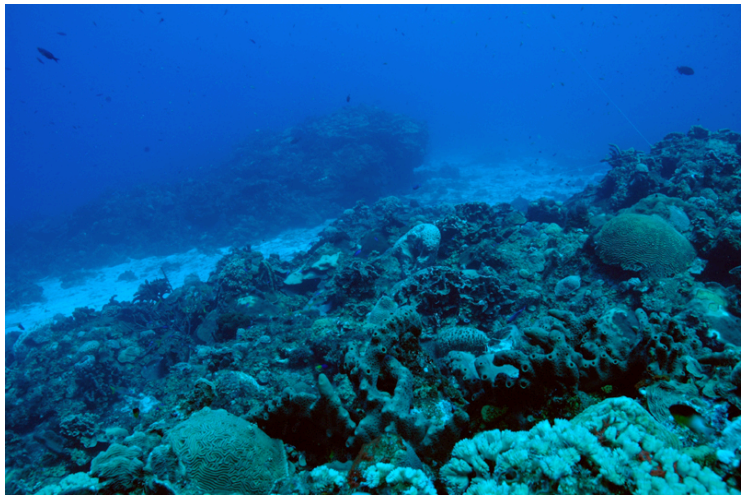
•Boulder Star Coral, *M. annularis* was the most severely affected species, presenting large scale mortalities throughout PR. Reef systems dominated by *M. annularis* suffered significant degradation

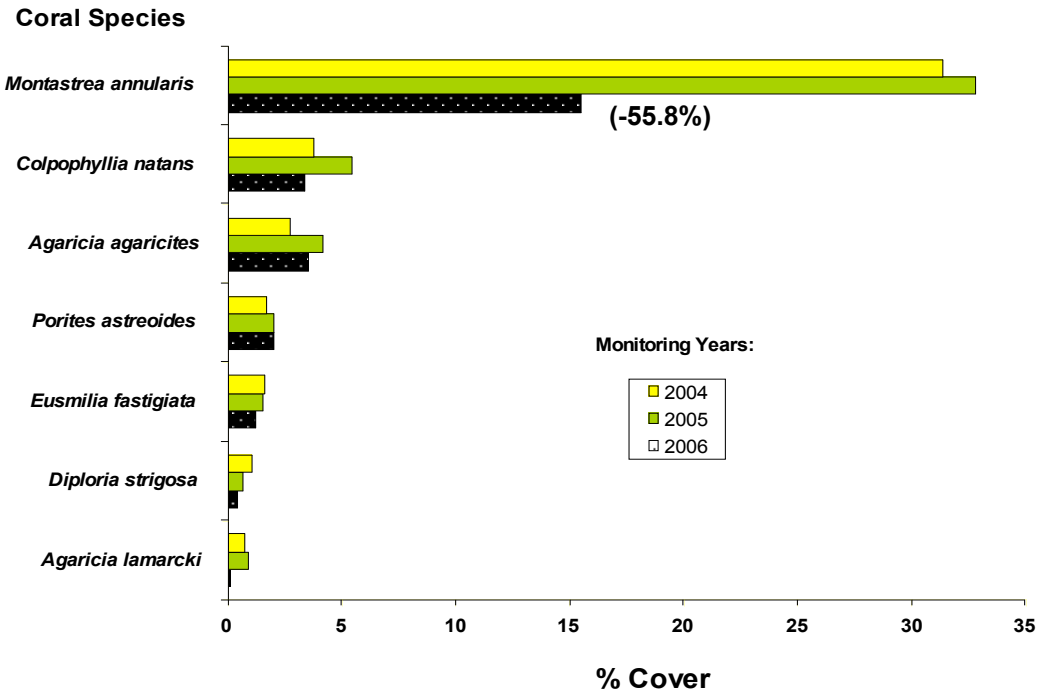
•Coral reefs dominated by Elkhorn coral, *Acropora palmata* and Boulder Brain Coral, *M. cavernosa* were the least affected by the bleaching event

•Lingering effects of the 2005 coral bleaching on live coral cover event continue until present

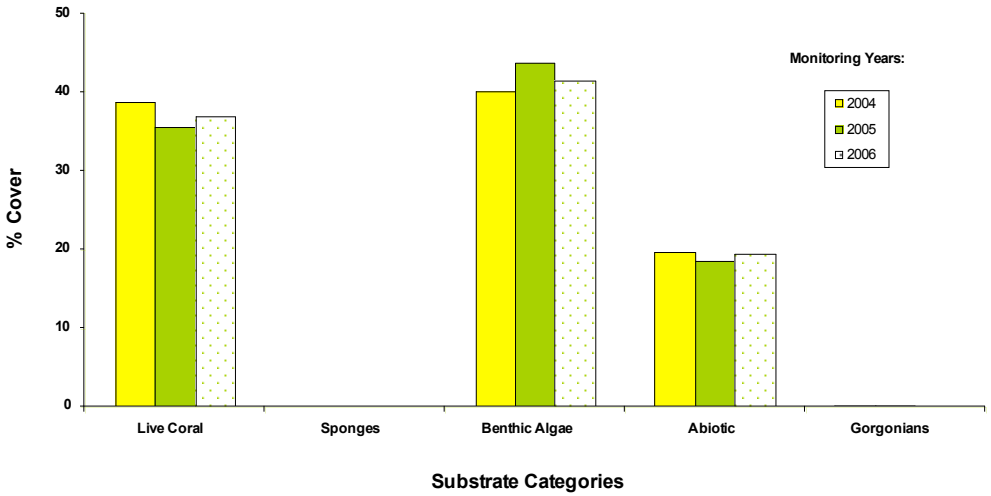
# Puerto Canoas Reef 30 m - Desecheo

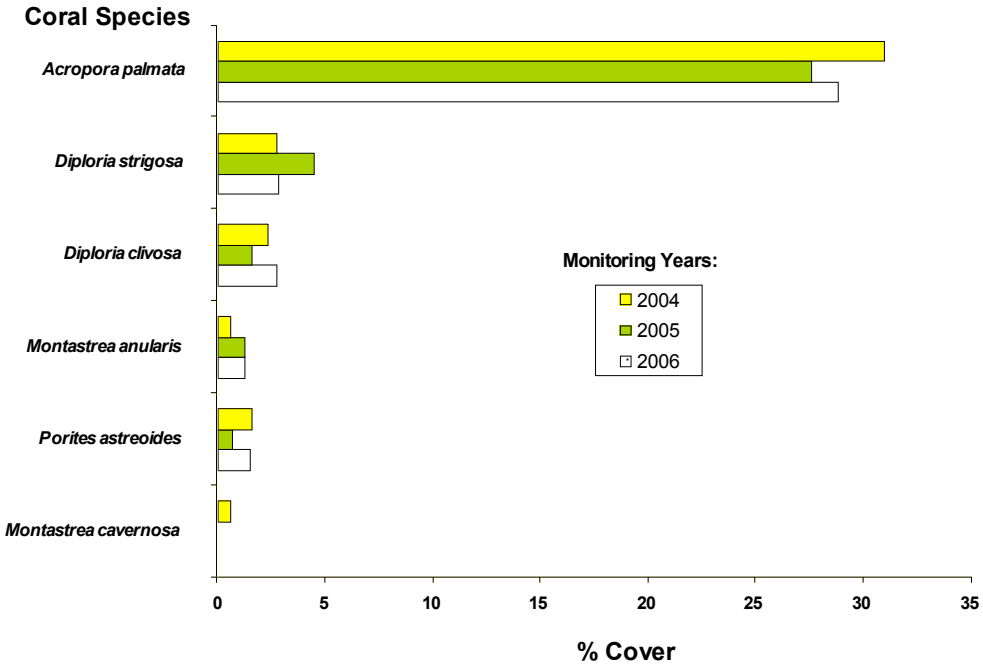


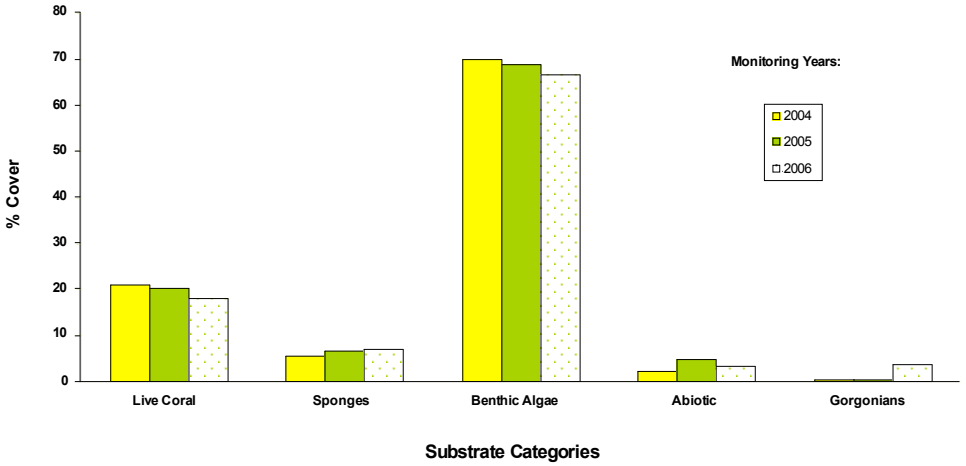


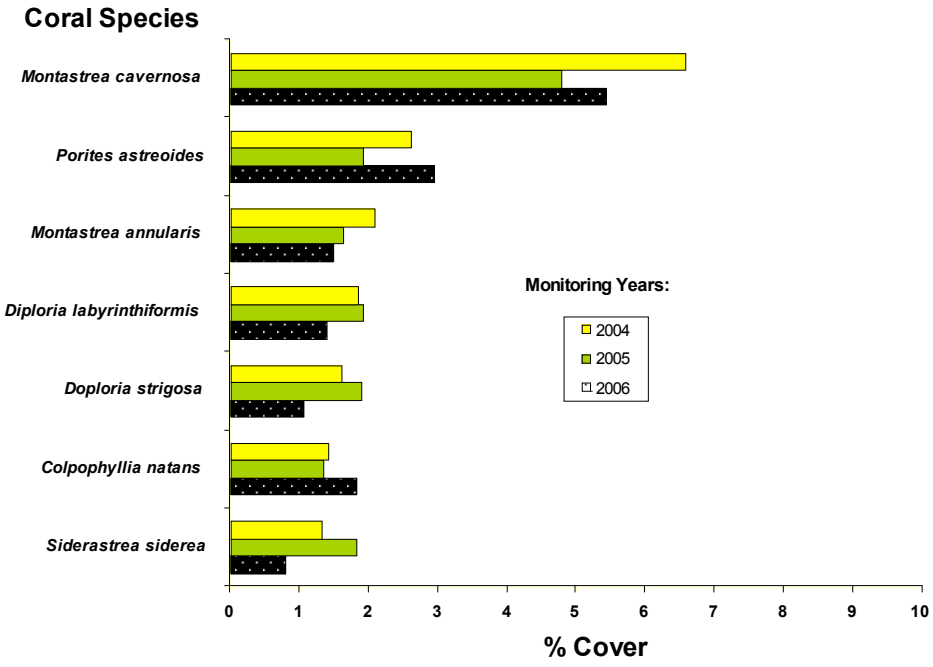
# Tres Palmas Reef 5 m - Rincon

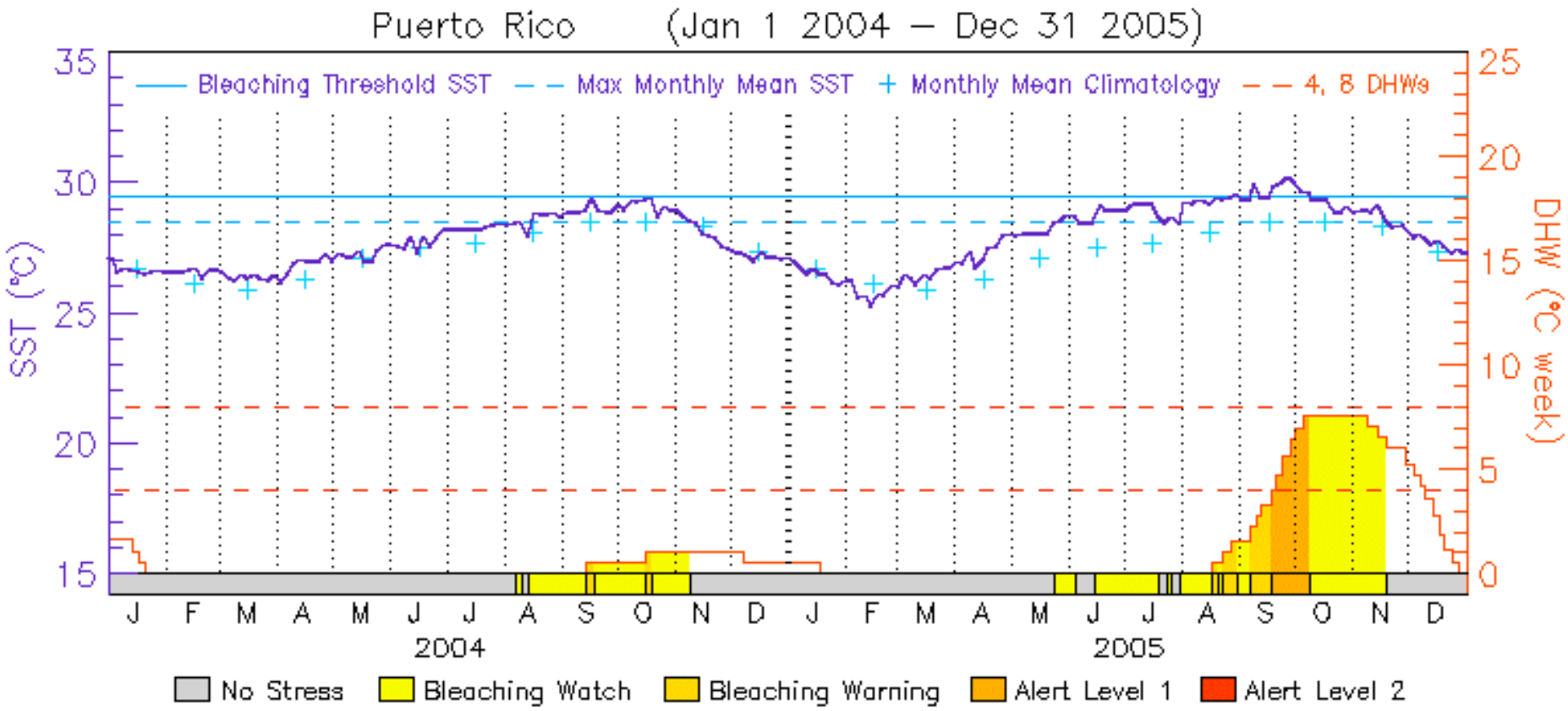




# Tres Palmas Reef 10 m - Rincon



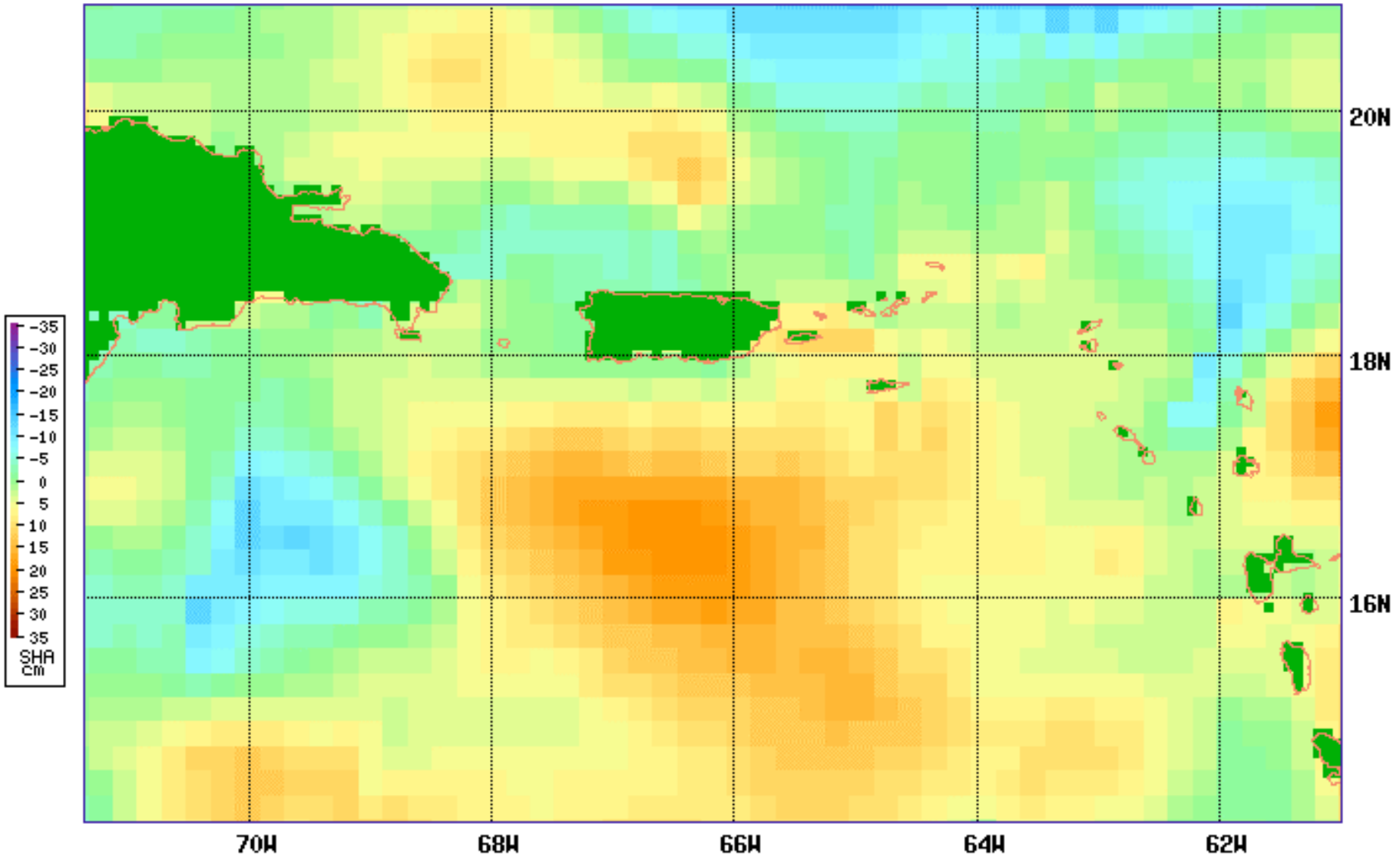



Puerto Rico (Jan 1 2004 – Dec 31 2005)
Bleaching Threshold SST
Max Monthly Mean SST
Monthly Mean Climatology
4, 8 DHWs
SST (°C)
DHW (°C week)
35
30
25
20
15
25
20
15
10
5
0
J F M A M J J A S O N D J F M A M J J A S O N D
2004
2005
No Stress
Bleaching Watch
Bleaching Warning
Alert Level 1
Alert Level 2

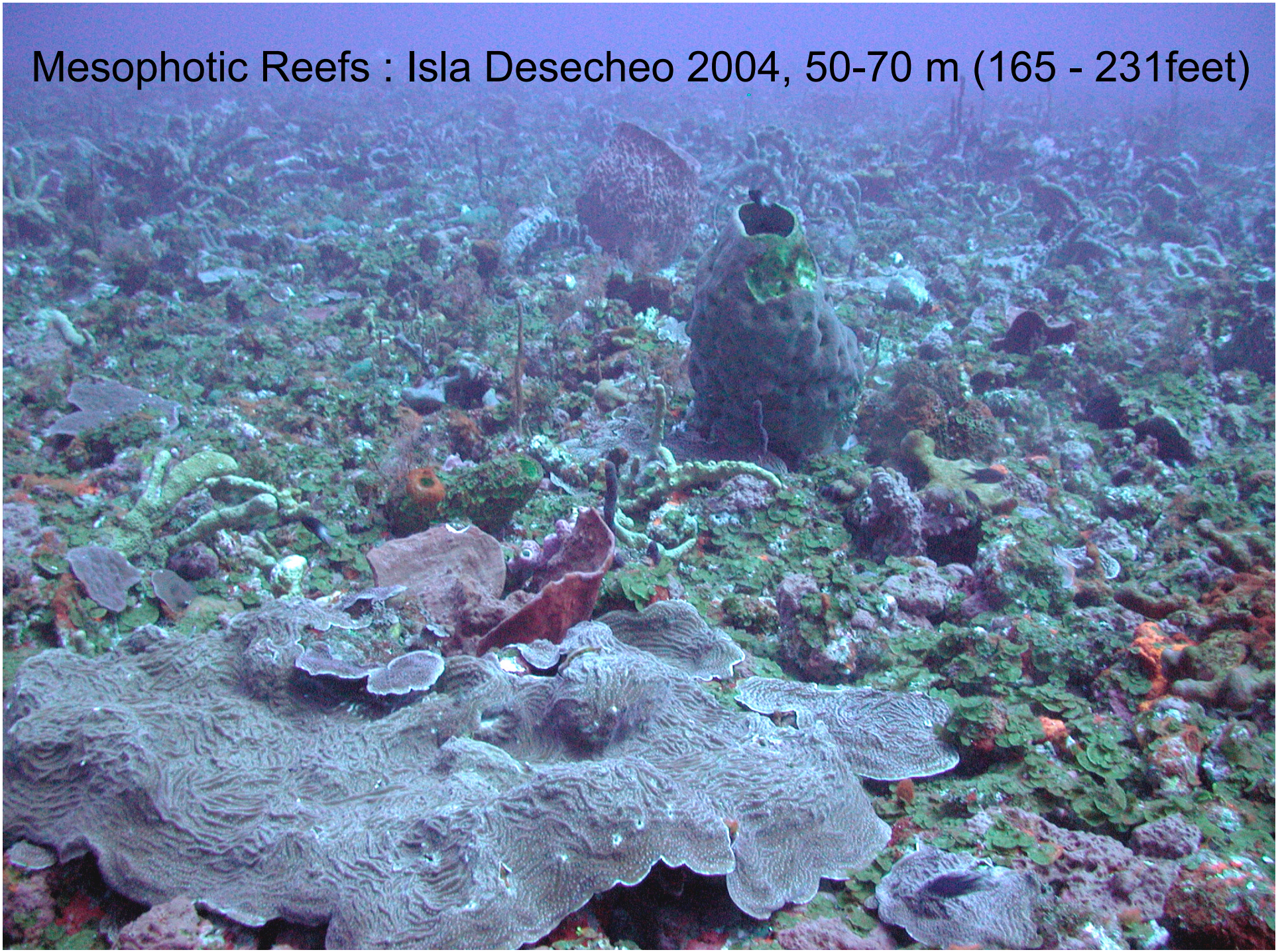
AUG-12-2005

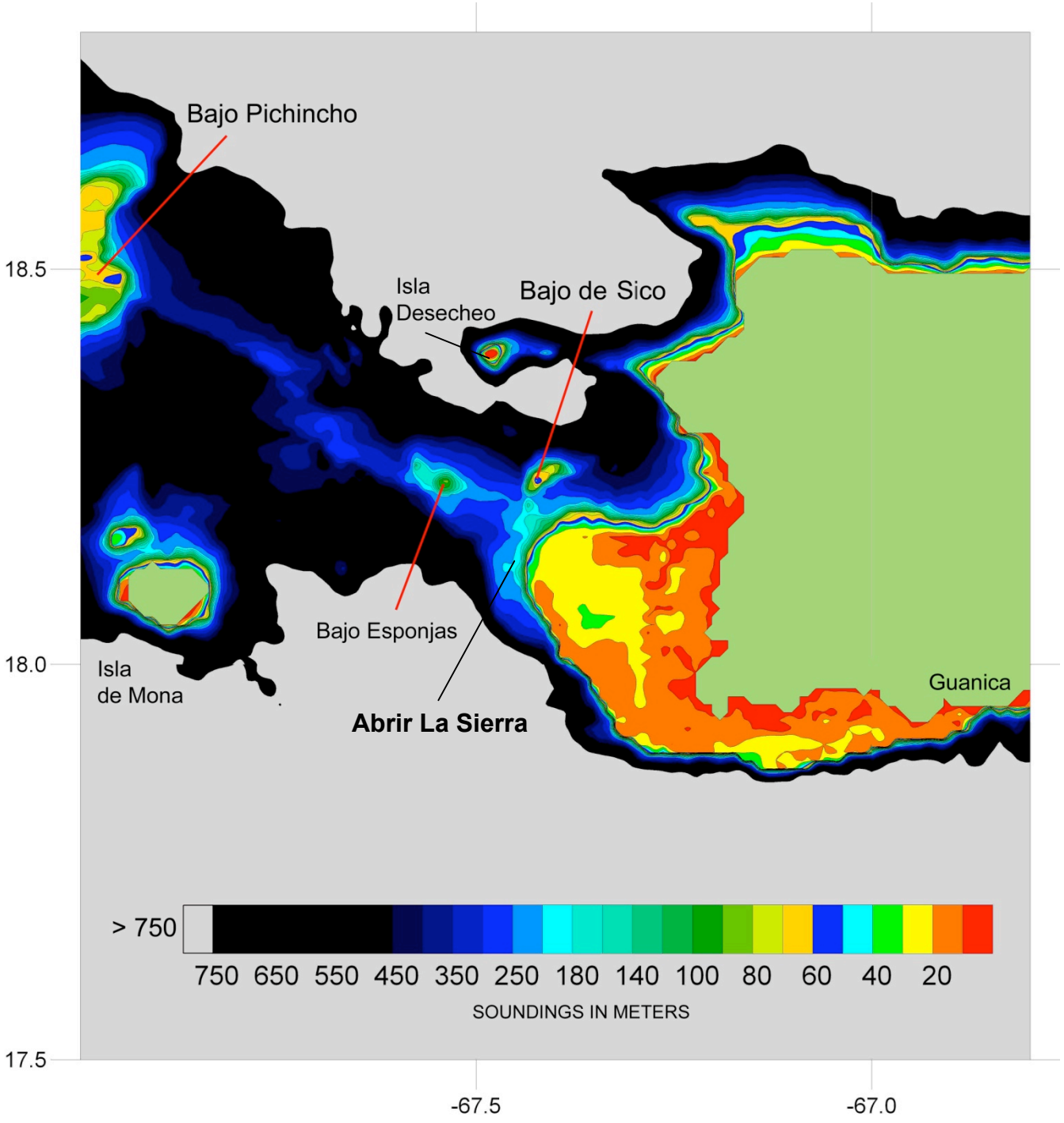
CoastWatch NOAA/AOML

Altimeter/GTS Interface



Mesophotic Reefs : Isla Desecheo 2004, 50-70 m (165 - 231feet)




Bajo Pichincho
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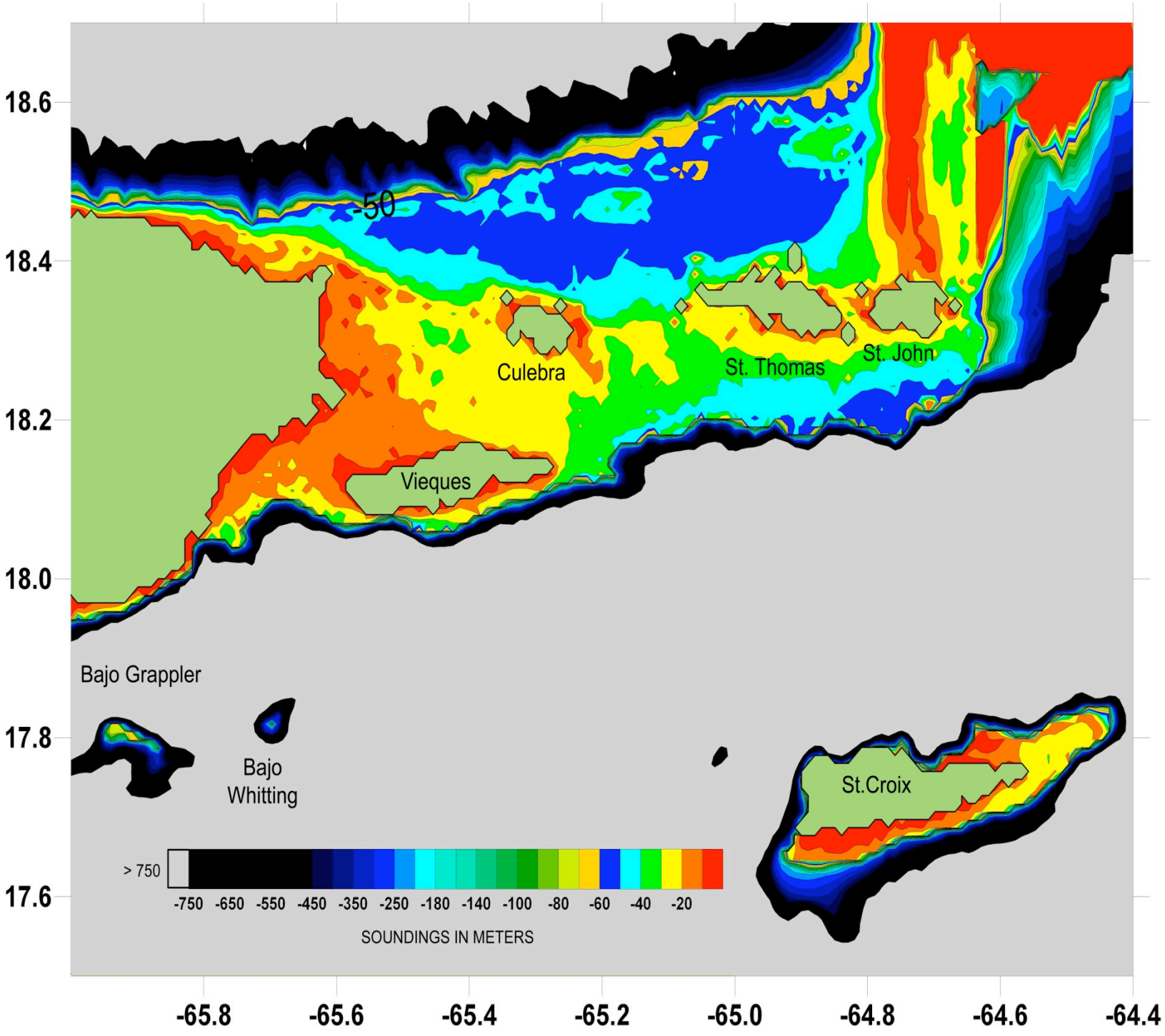
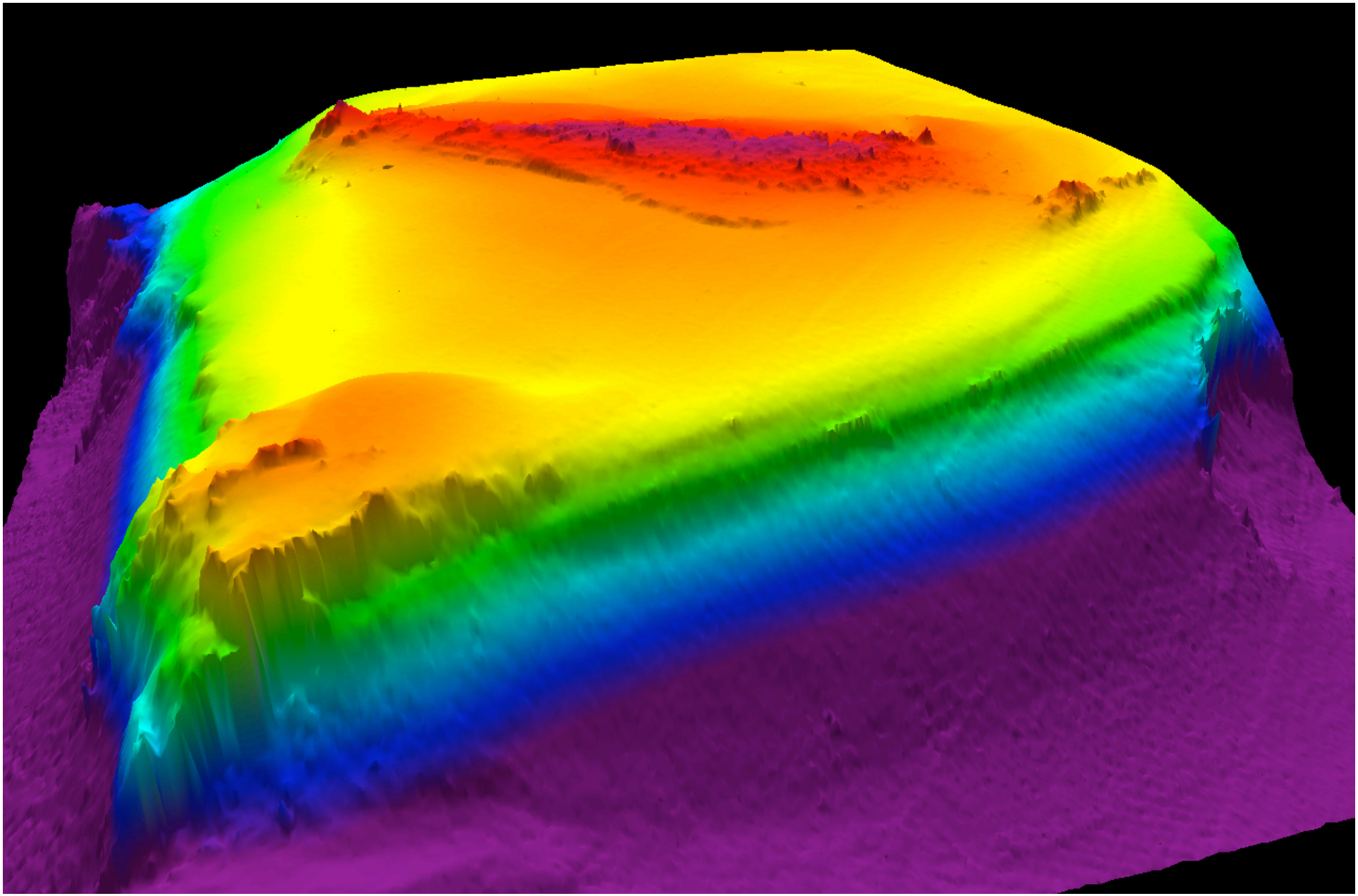
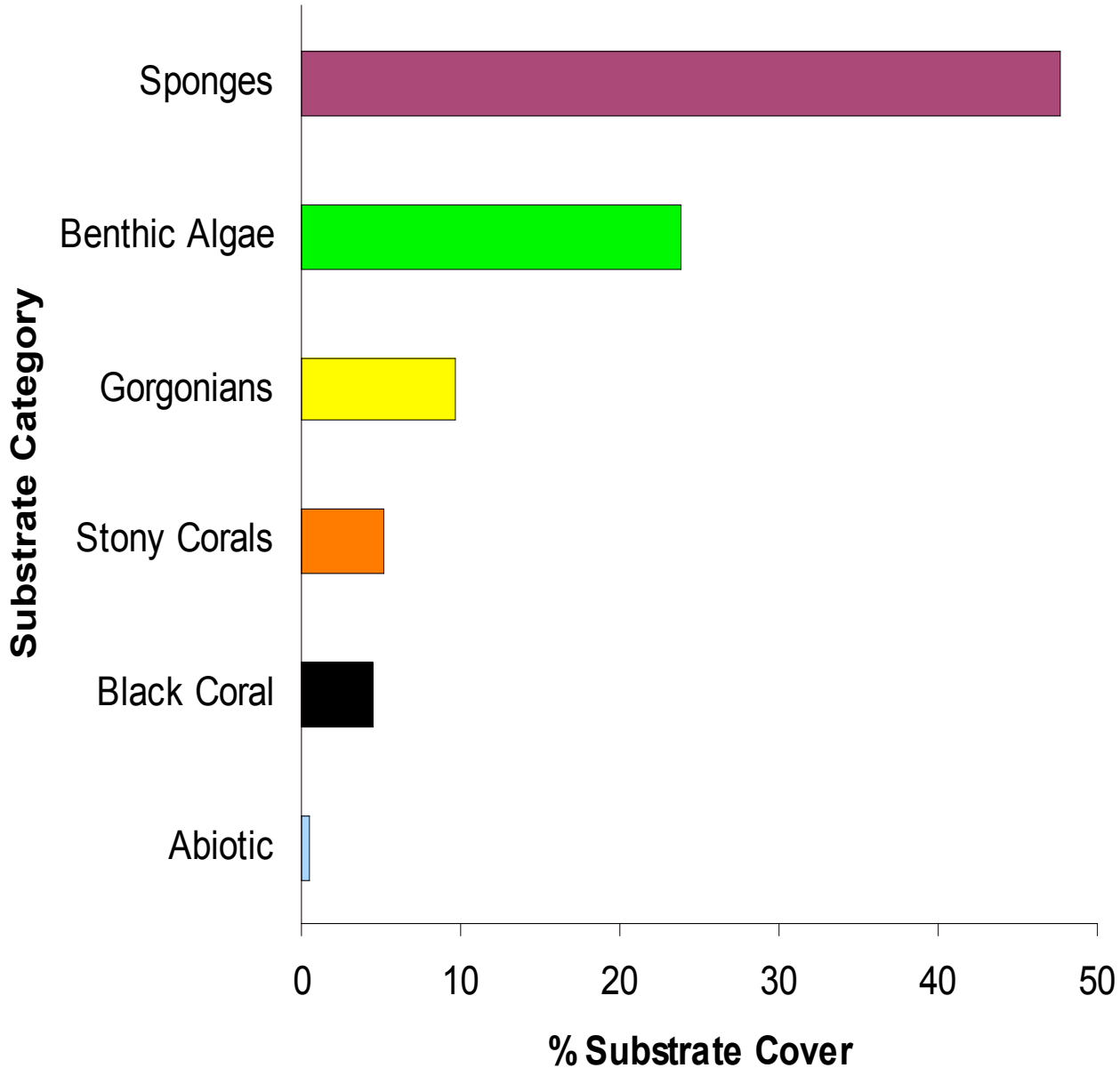
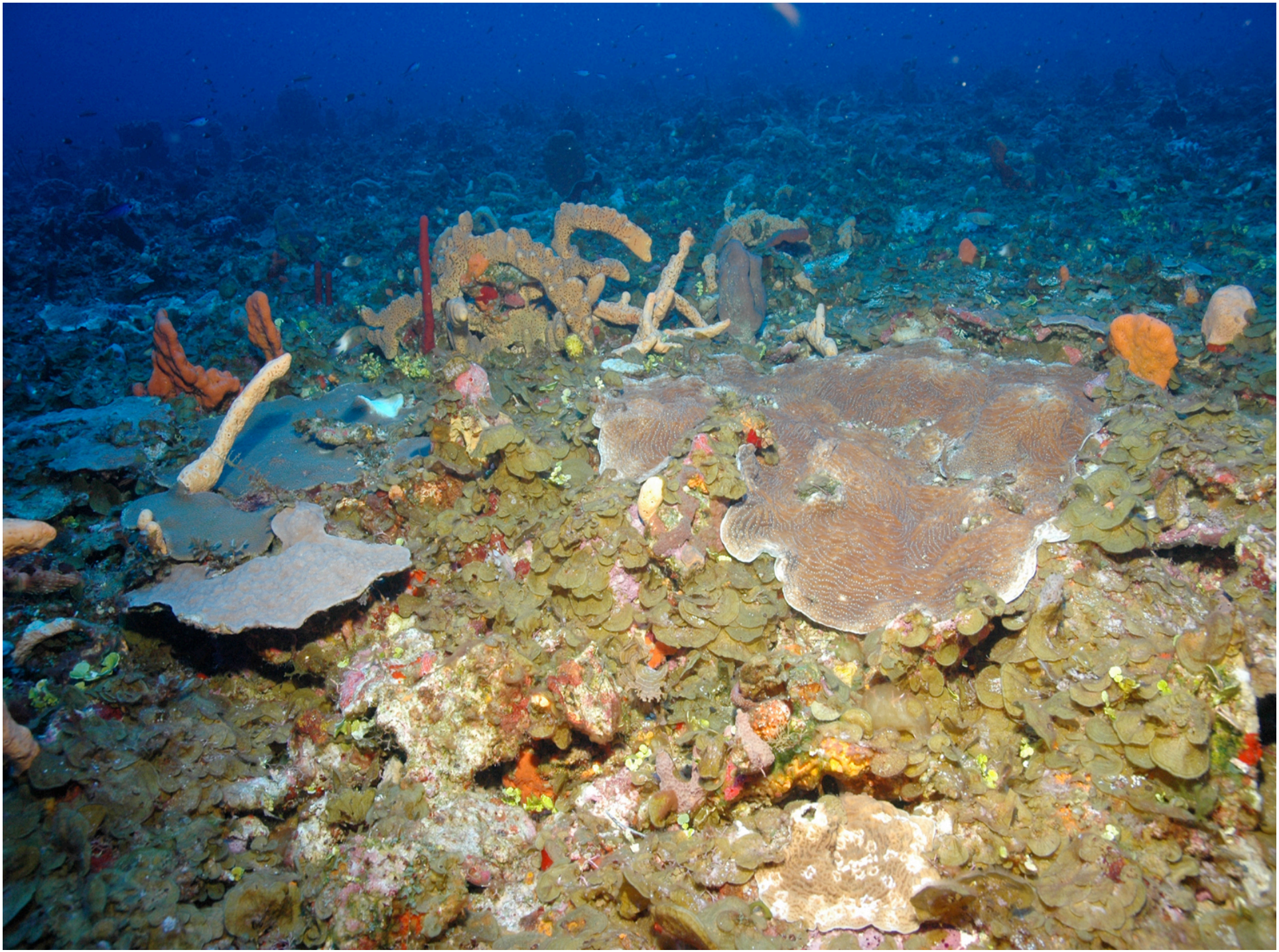
18.5
18.0
17.5
-67.5
-67.0
> 750
750 650 550 450 350 250 180 140 100 80 60 40 20
SOUNDINGS IN METERS


18.6
18.4
18.2
18.0
17.8
17.6
-50
Culebra
St. Thomas
St. John
Vieques
Bajo Grappler
Bajo
Whitting
St.Croix
> 750
-750 -650 -550 -450 -350 -250 -180 -140 -100 -80 -60 -40 -20
SOUNDINGS IN METERS
-65.8
-65.6
-65.4
-65.2
-65.0
-64.8
-64.6
-64.4



# Reef Wall : Bajo de Sico, 120 – 140 ‘





# Mesophotic Reefs (30 – 100 m)

- Cover extensive areas of the insular slope and seamounts
- Live scleractinian corals observed down to 90 m (~300')
- Seamount walls colonized by benthic algae, sponges, corals, gorgonians, antipatharians and hydrozoans
- Rhodolith reefs (depth > 150') residential habitats for red hind, and a wide variety of deep-water reef fishes, many of them important in the aquarium trade
- Important residential habitats and refuge of large groupers, snappers, sharks, sea-turtles
- Spawning aggregation sites for several species of groupers
- Feeding grounds for migratory pelagic fishes, marlin, wahoo, dorado, tunas, mackerel
- Reservoir of shallow reef scleractinian corals
- Prime habitat for black corals (Antipatharians) and other deep-water symbiotic and apo-symbiotic corals