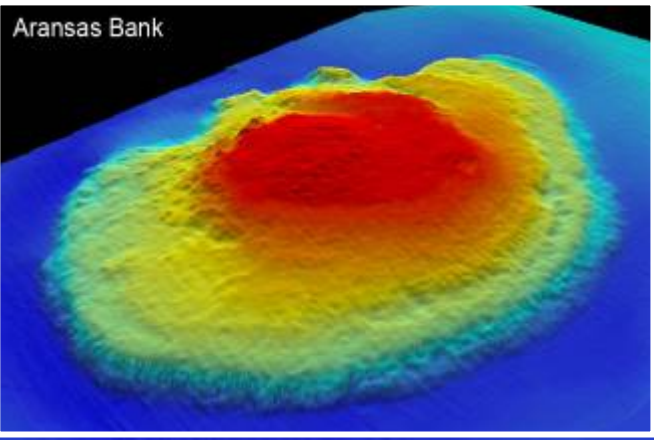
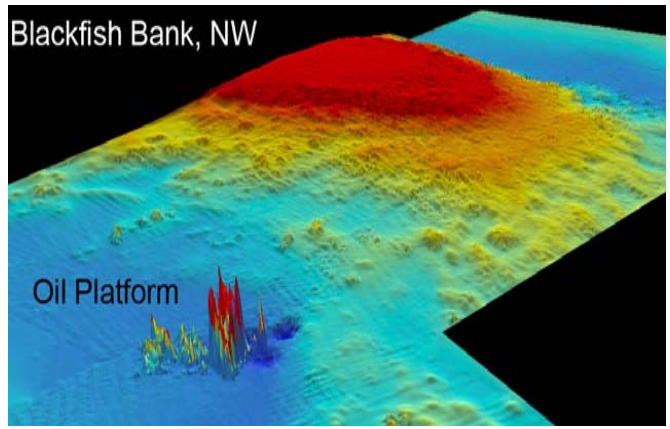
Recent Studies on the South Texas Banks: Mapping and Habitat

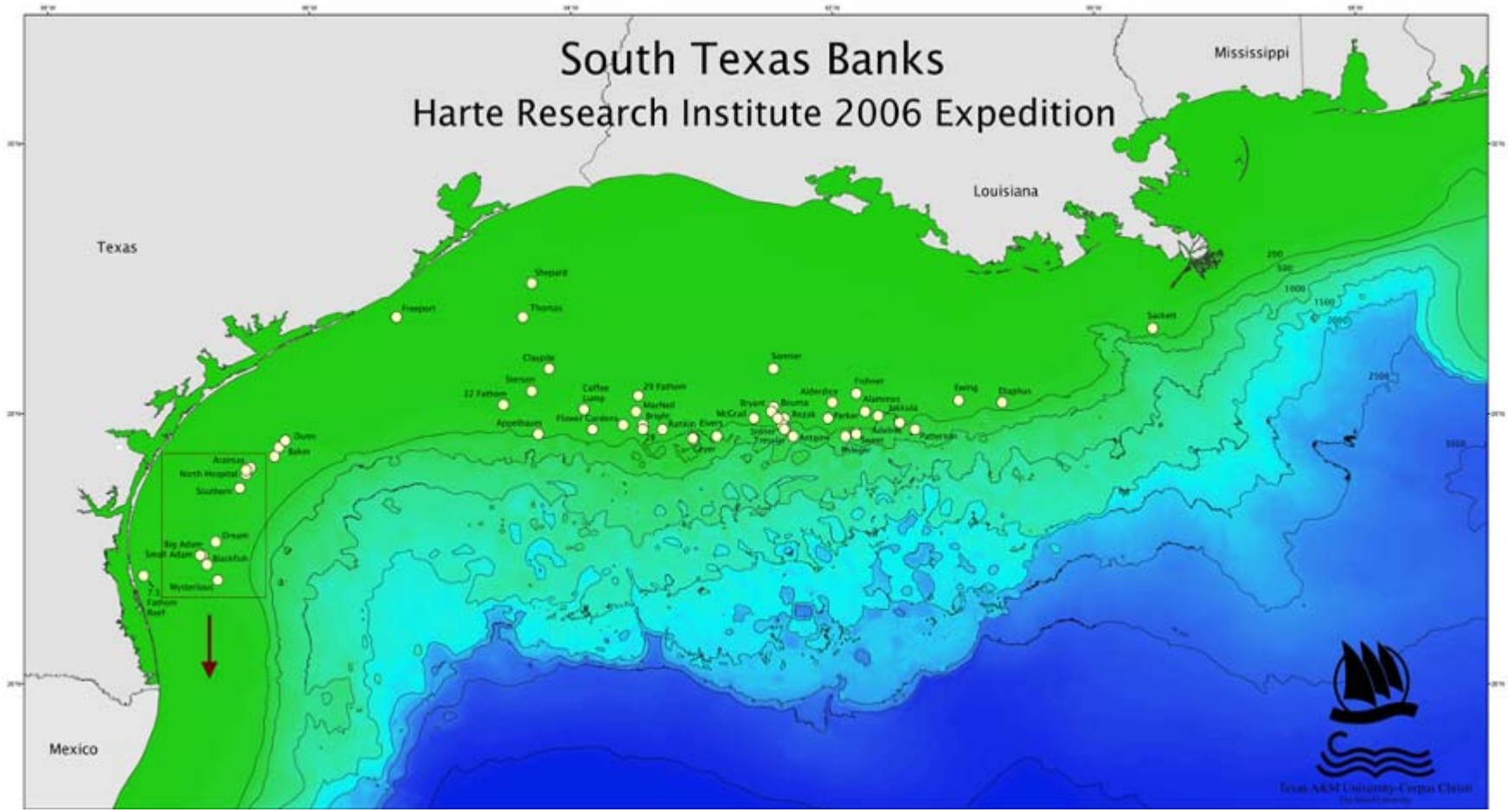




Douglas C. Weaver
John W. Tunnell, Jr.
Thomas C. Shirley

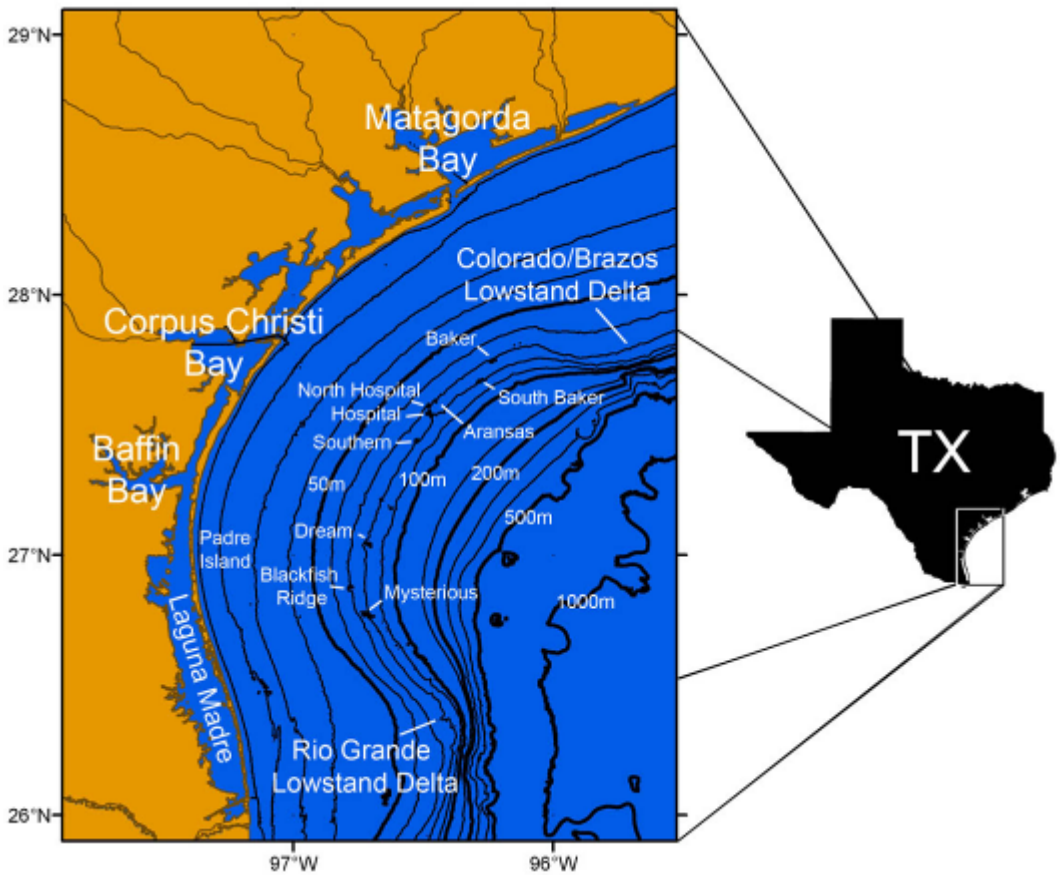
Harte Research Institute for Gulf of Mexico Studies
Texas A&M University, Corpus Christi

Geographic Setting – Northwestern Gulf of Mexico

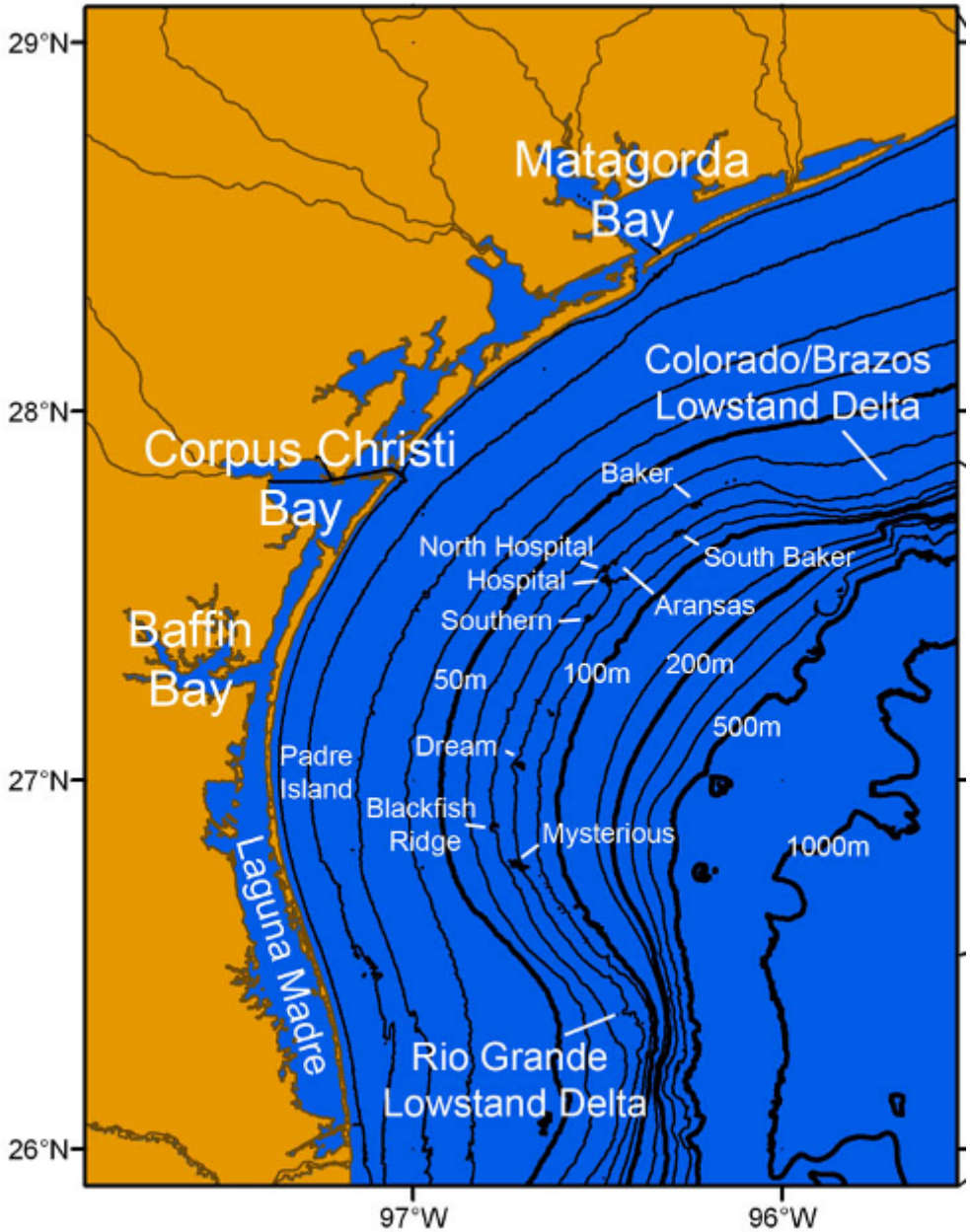


- Over 200 Mid to Outer Continental Shelf Banks in NW Gulf.
- At least 120 primary coral reef fishes known from a species pool ~160.

-20 Banks of the South Texas Banks. Habitat and Fauna Poorly known.
-70 species of fishes (52 reef fishes) reported in Rezak & Bright.



South Texas Banks
S. TX Fishing Banks
Snapper Banks



Bright and Rezak 1976;
Rezak et al. 1985.
Formed ~18k yrs ago

Relict Platform Reefs?
-similar in size and shape to Tuxpan and Veracruz Reefs.

Drowned by rising sea levels Between 10-12k yrs ago.

Lacks living coral reefs or thriving coralline algal communities.

Last study 33 years ago.


30°N
20°N
Flower Garden Banks
National Marine Sanctuary
Florida
The Bahamas
Gulf of Mexico
Arenas
Alacran
Cuba
Tuxpan
Triangulos
Arcos
Veracruz
Cayman Islands
Navassa
Haiti
Jamaica
Mexico
Belize
Guatemala
Honduras
Caribbean Sea

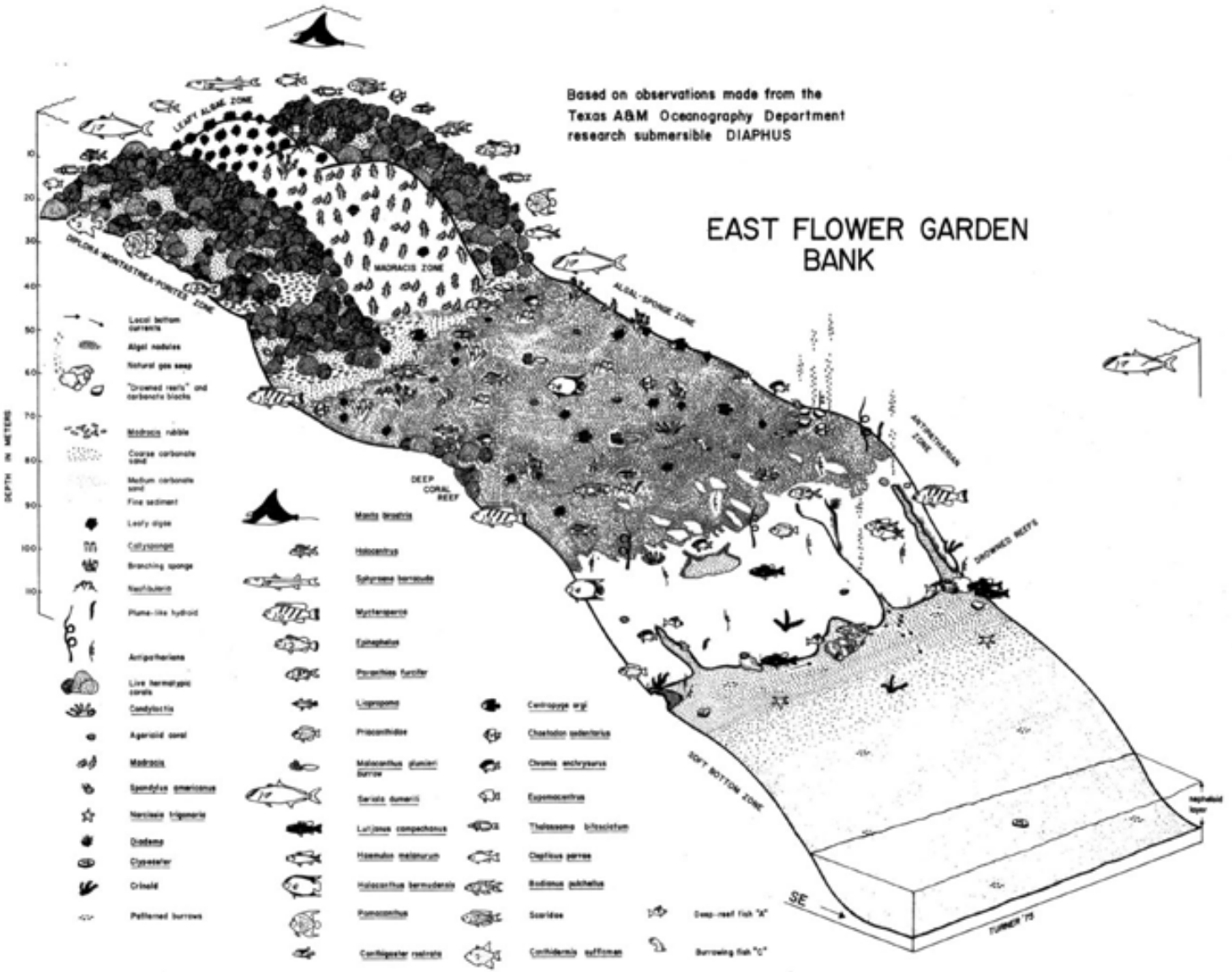


Figure 47. East Flower Garden block diagram.

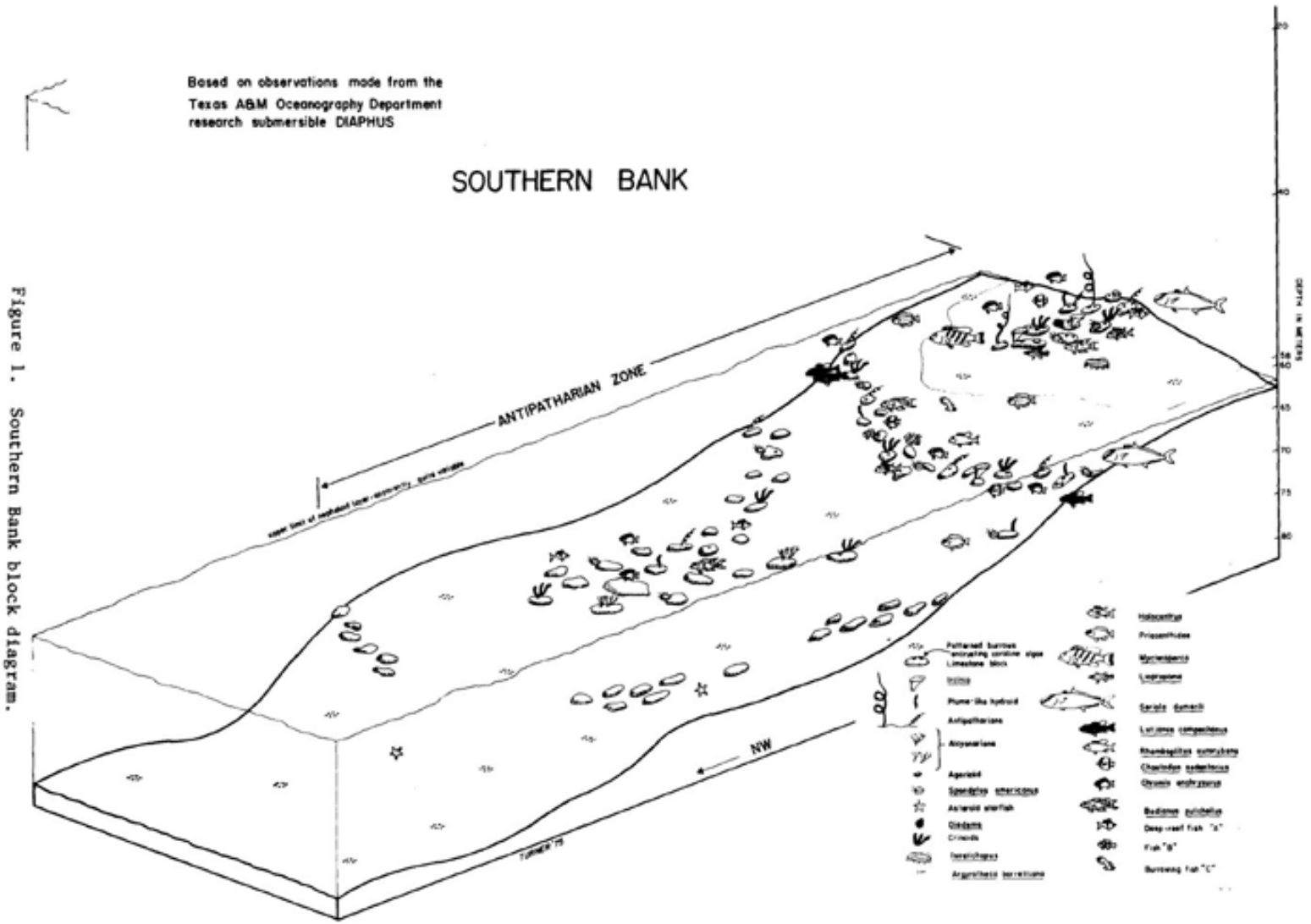


Figure 1. Southern Bank block diagram.

Multibeam Mapping

Seven and One Half Fathom Reef
Aransas, N. Hospital, Southern, Dream, Blackfish Ridge

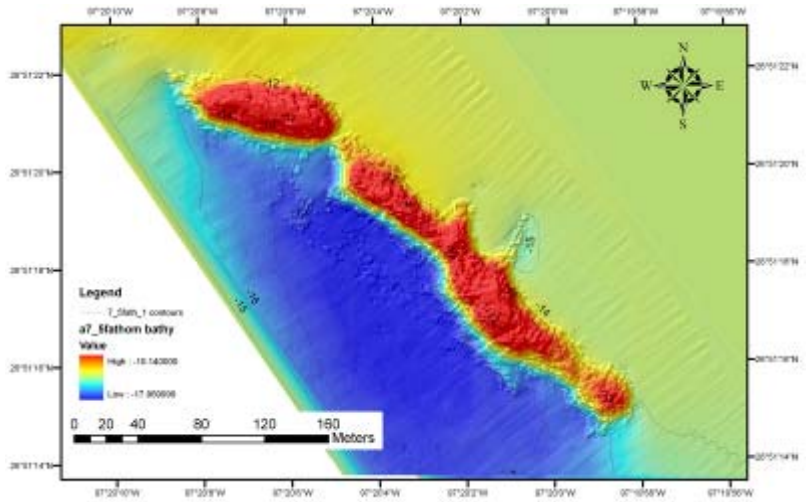
Reson 8125 Multibeam Echosounder
240 focused beams, 455 kHz

Applanix Pos MV motion sensor
YSI CTD water column –velocity profiles

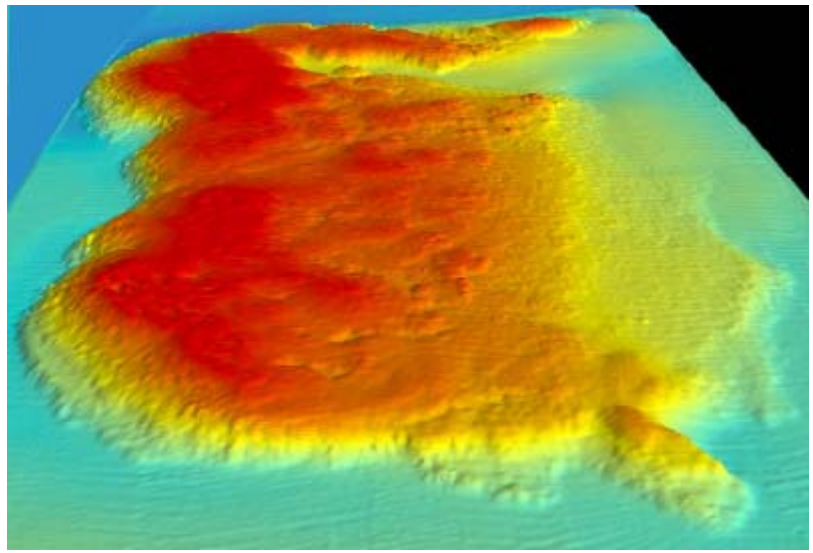
Raw and 1m binned data

Multibeam soundings imported
to ArcGIS 9.1 software

Gridded at 0.5 to 3m resolution
Corresponding hillshades produced in Spatial Analyst



Seven and One Half Fathom



North Hospital

25 October 2008 – Southern

17 November 2008 – North Hospital

Tow Camera Surveys
Color and Low Light B&W Seaviewer Cams

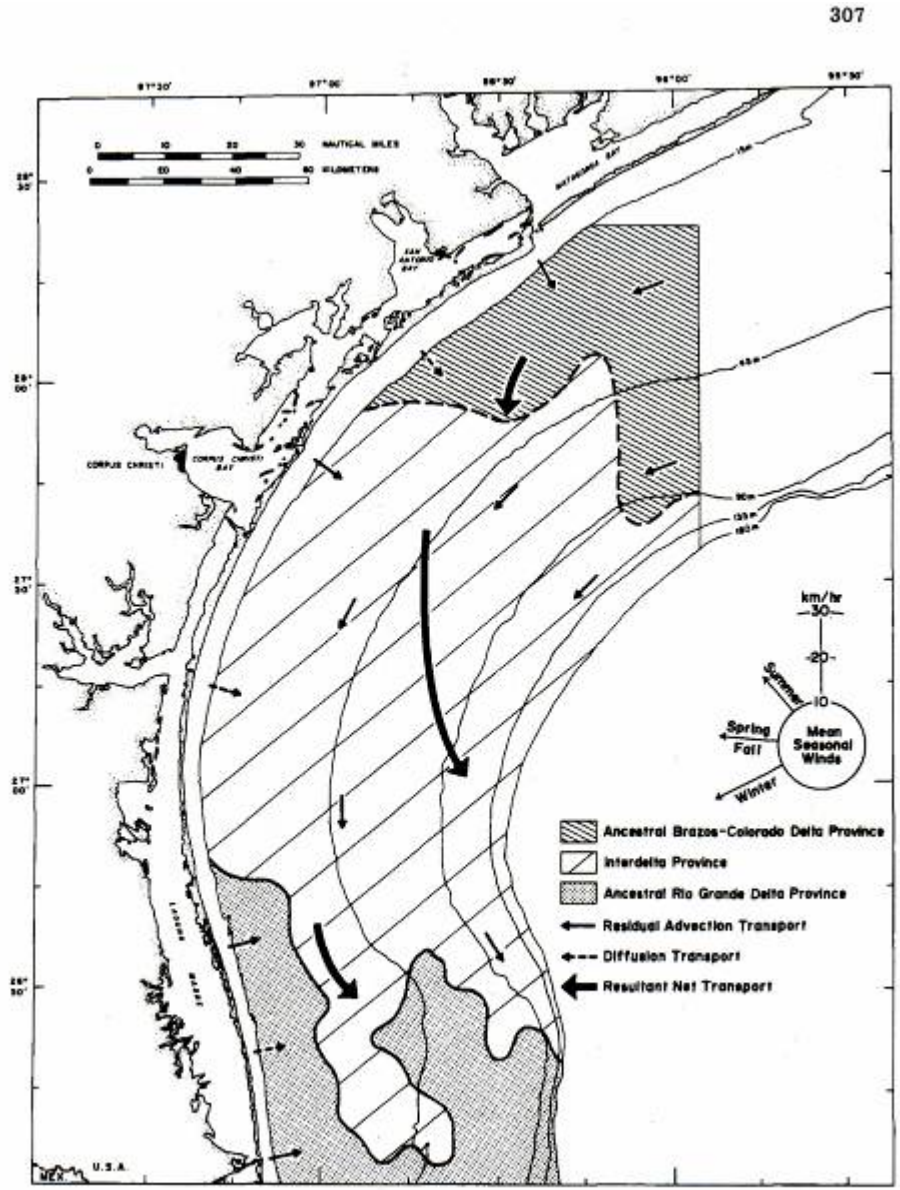


Fig.8. Conceptual-model diagram of the proposed general sediment-dispersal system on the South Texas continental shelf.

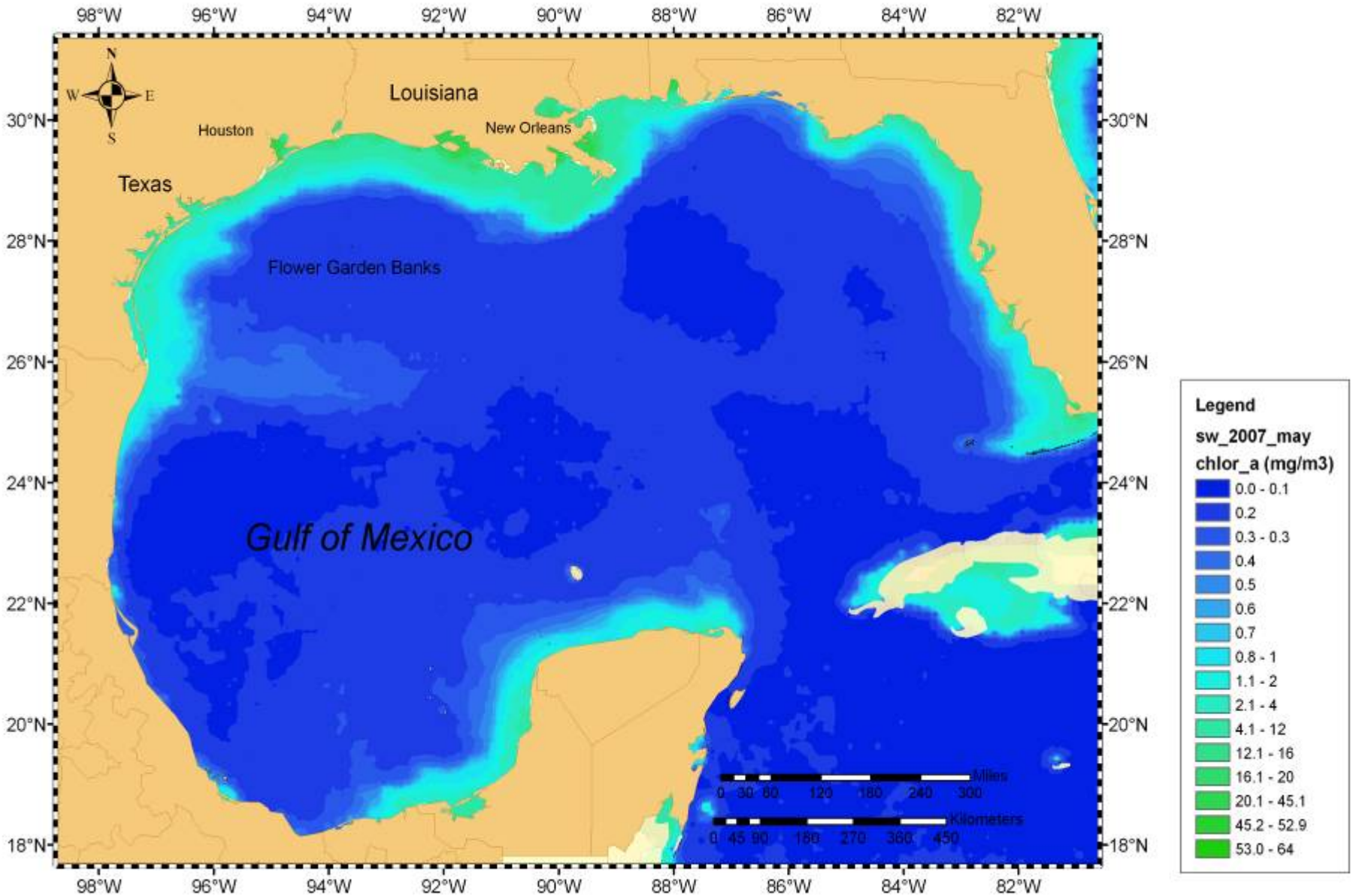
Wind-Driven Circulation (Shideler 1978)

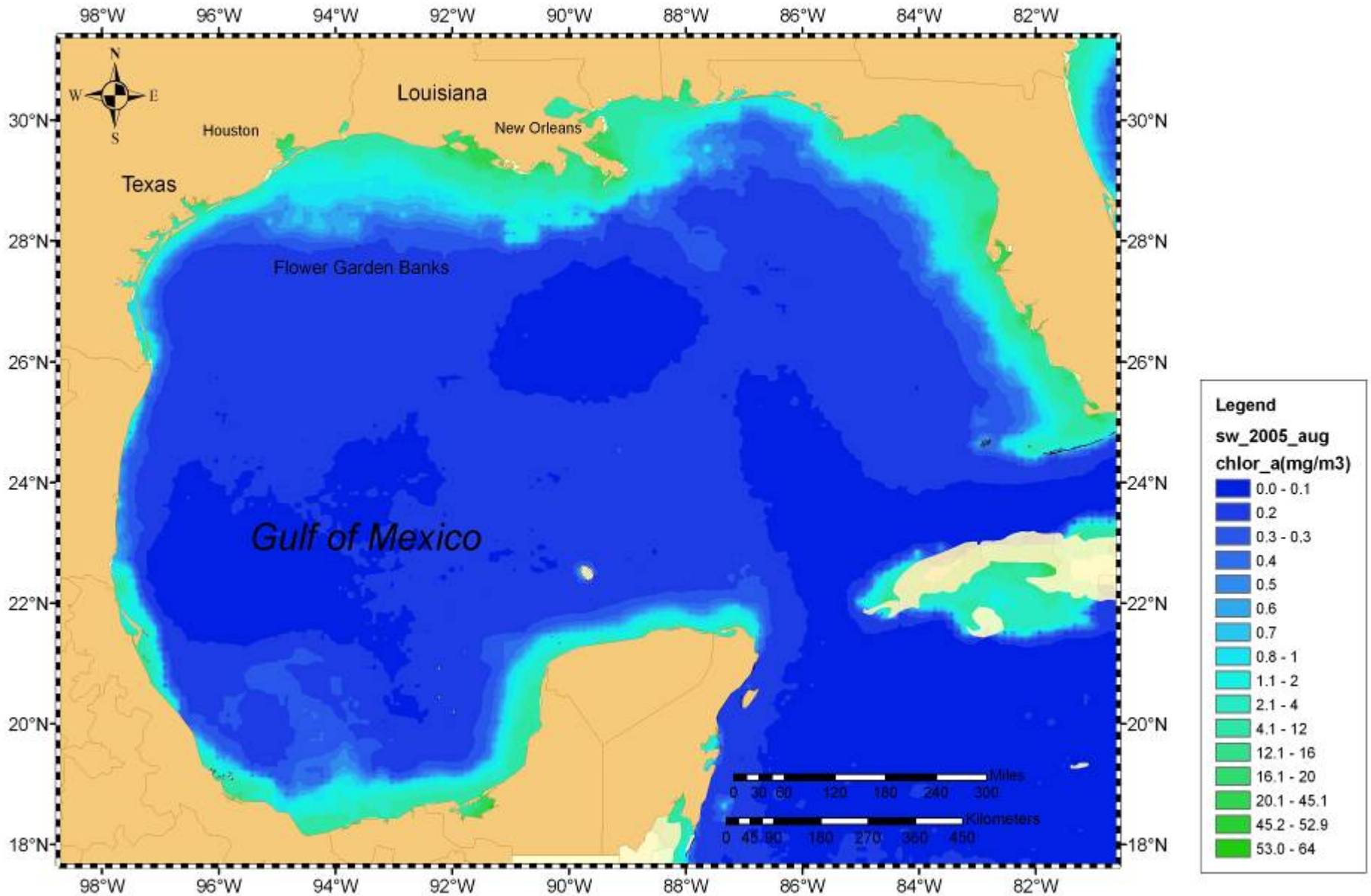
Winter/Spring-Northers
15-20X >25knots

Summer- Southerly
Average 1 cyclone/season

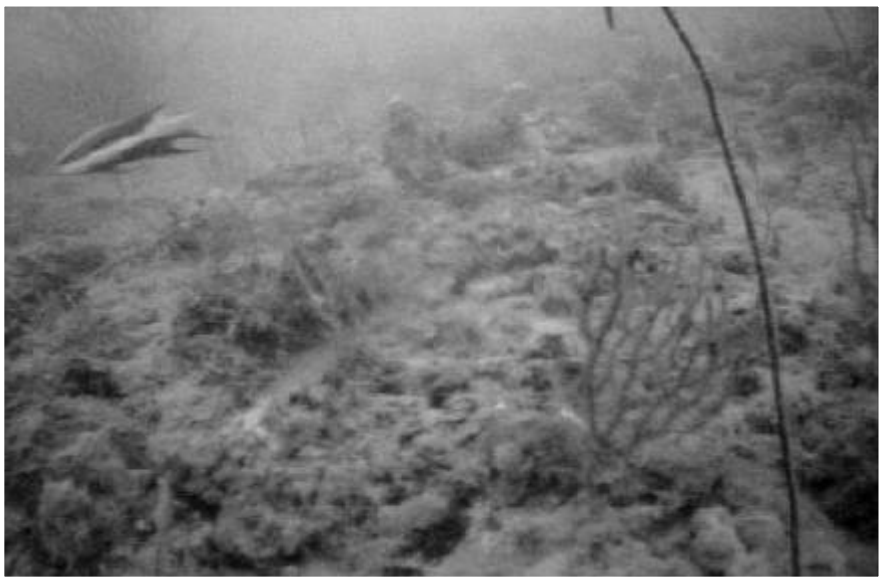
Southern transport of sediment in winter and spring-
Texas Mud Blanket

Oceanic conditions in summer and Fall.

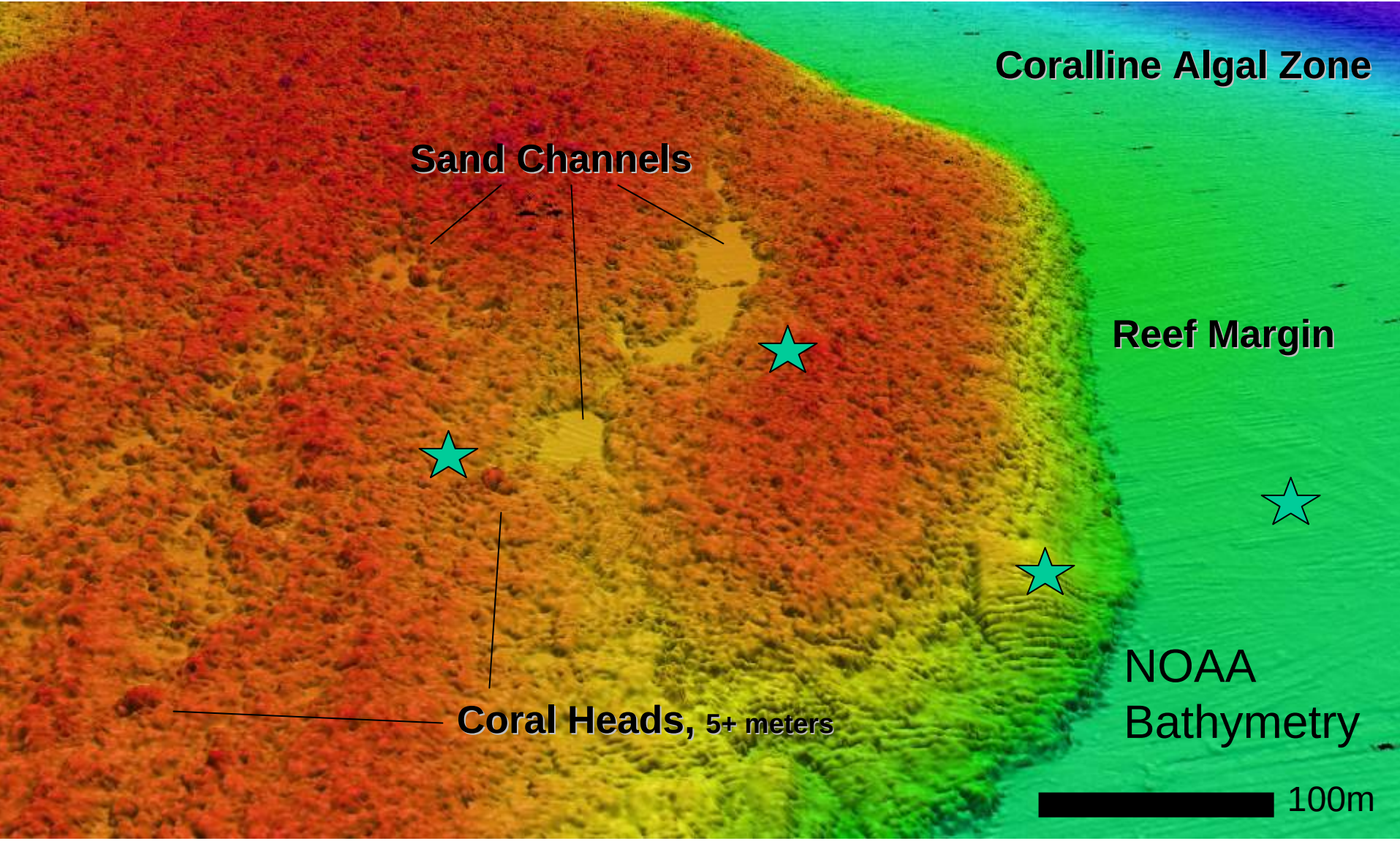

98°W
96°W
94°W
92°W
90°W
88°W
86°W
84°W
82°W
30°N
28°N
26°N
24°N
22°N
20°N
18°N
N
W
E
S
Louisiana
Houston
New Orleans
Texas
Flower Garden Banks
Gulf of Mexico
Miles
0 30 60 120 180 240 300
Kilometers
0 45 90 180 270 360 450
Legend
sw_2007_may
chlor_a (mg/m3)
0.0 - 0.1
0.2
0.3 - 0.3
0.4
0.5
0.6
0.7
0.8 - 1
1.1 - 2
2.1 - 4
4.1 - 12
12.1 - 16
16.1 - 20
20.1 - 45.1
45.2 - 52.9
53.0 - 64


98°W
96°W
94°W
92°W
90°W
88°W
86°W
84°W
82°W
30°N
28°N
26°N
24°N
22°N
20°N
18°N
N
W
E
S
Louisiana
Houston
New Orleans
Texas
Flower Garden Banks
Gulf of Mexico
Miles
0 30 60 120 180 240 300
Kilometers
0 45 90 180 270 360 450
Legend
sw_2005_aug
chlor_a(mg/m3)
0.0 - 0.1
0.2
0.3 - 0.3
0.4
0.5
0.6
0.7
0.8 - 1
1.1 - 2
2.1 - 4
4.1 - 12
12.1 - 16
16.1 - 20
20.1 - 45.1
45.2 - 52.9
53.0 - 64

South Texas Bank Habitat



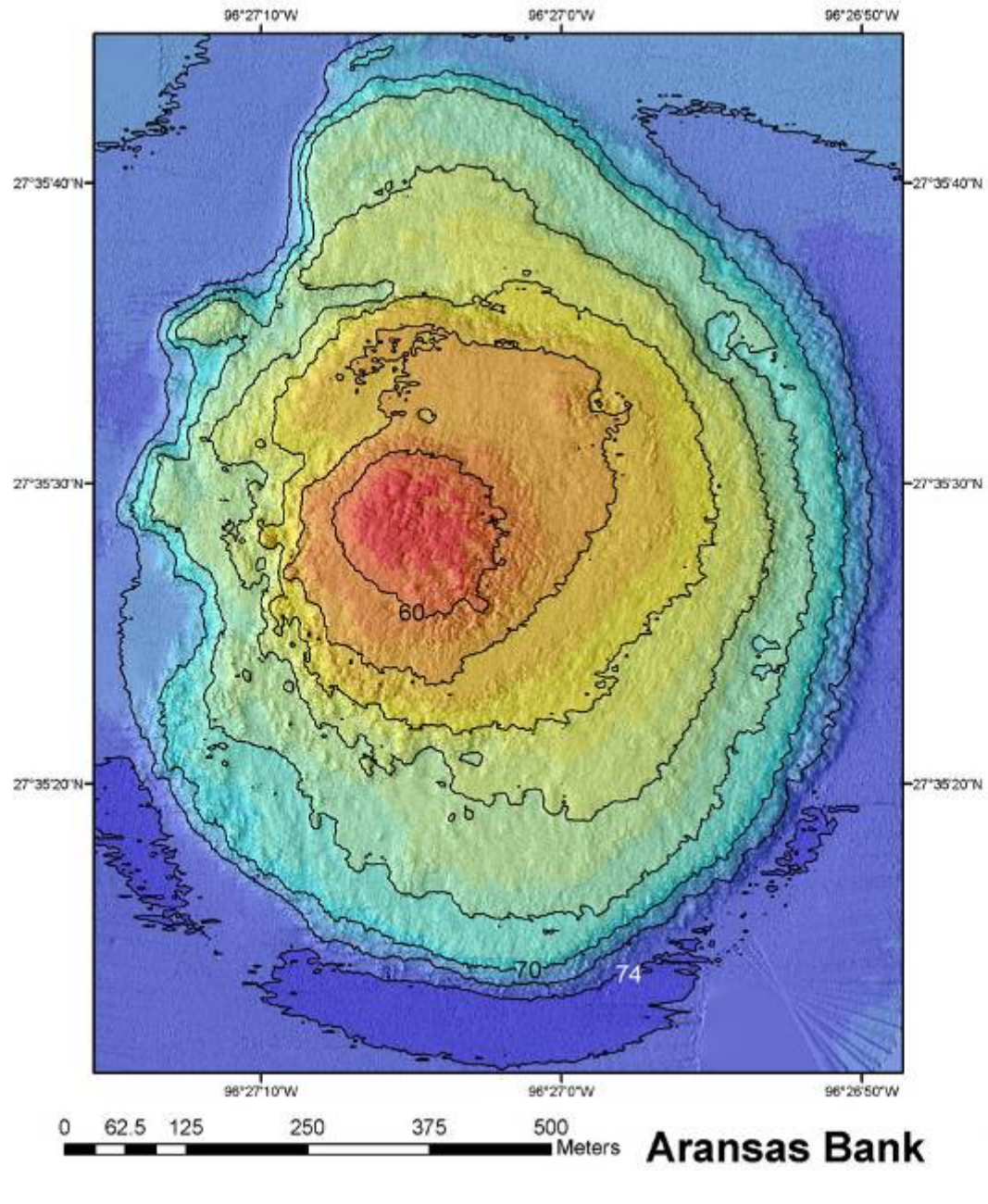
Fishes of the South Texas Banks

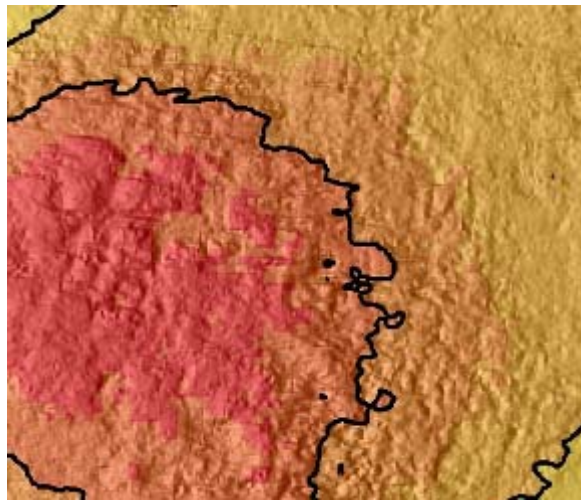


Multibeam Bathymetry –Coral Reef Cap

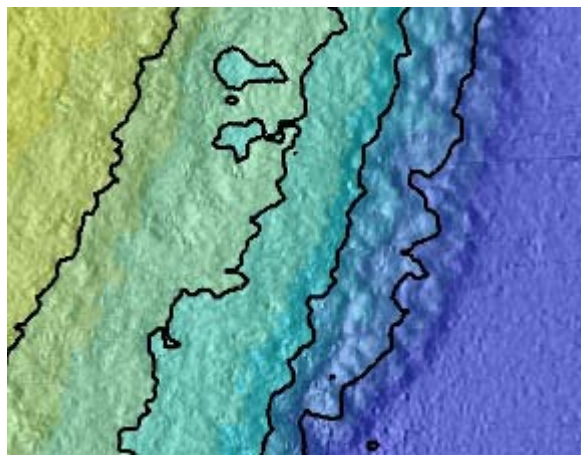
Specific Locations used for Data Analysis

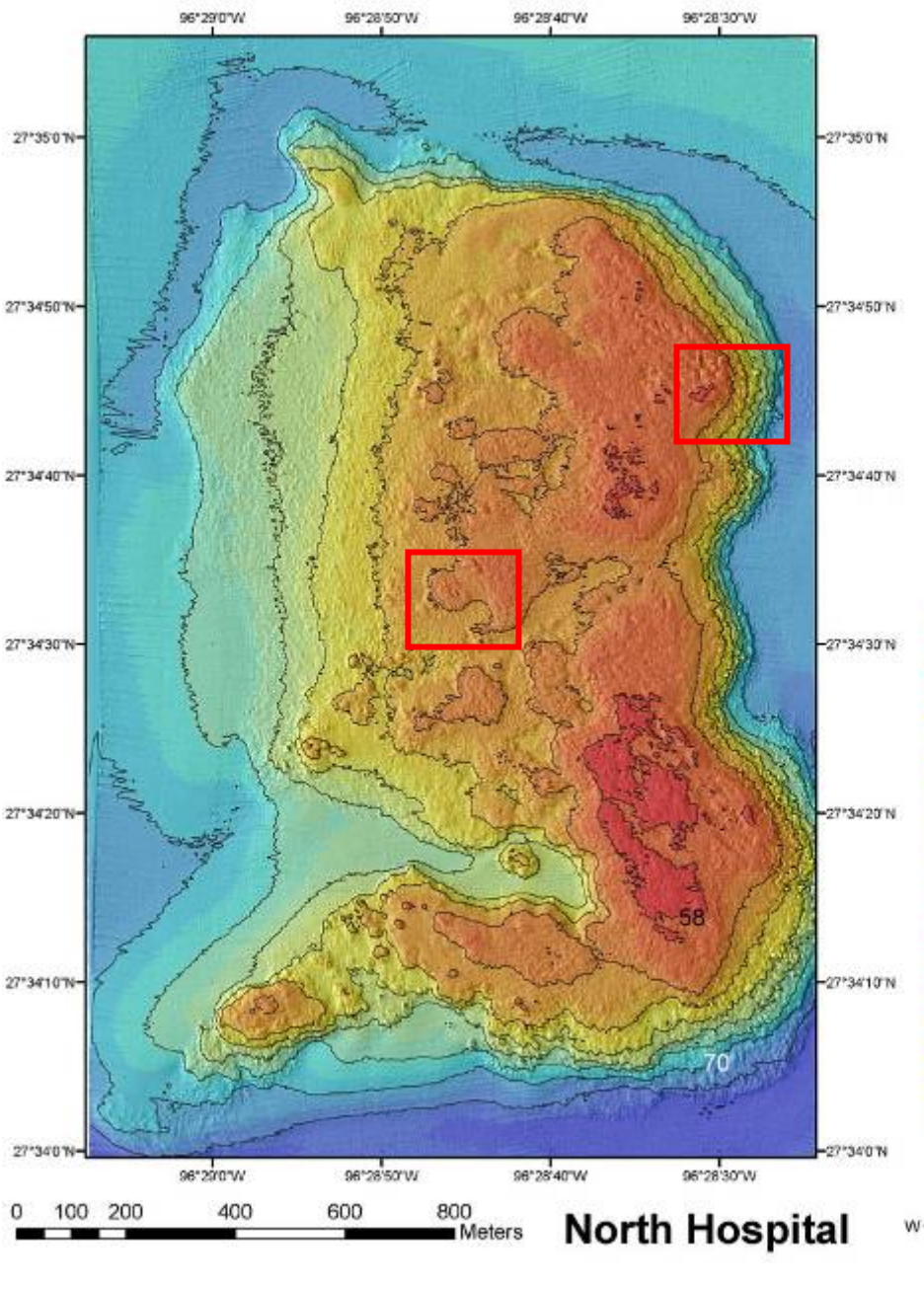
TEXAS A&M UNIVERSITY CORPUS CHRISTI

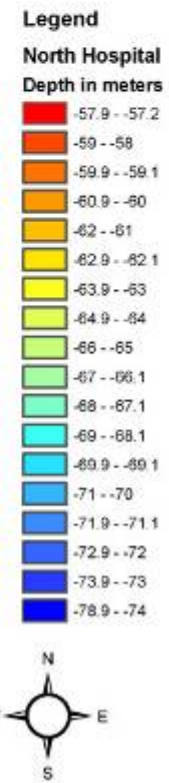

96°27'10"W
96°27'0"W
96°26'50"W
27°35'40"N
27°35'30"N
27°35'20"N
60
70
74
Legend
aransas bathymetry
Depth in meters
-58.9 - -58.1
-59.9 - -59
-60.9 - -60
-61.9 - -61
-62.9 - -62
-63.9 - -63
-64.9 - -64
-65.9 - -65
-66.9 - -66
-67.9 - -67
-68.9 - -68
-69.9 - -69
-70.9 - -70
-71.9 - -71
-72.9 - -72
-73.9 - -73
-74.5 - -74
N
W
E
S
0 62.5 125 250 375 500
Meters
Aransas Bank

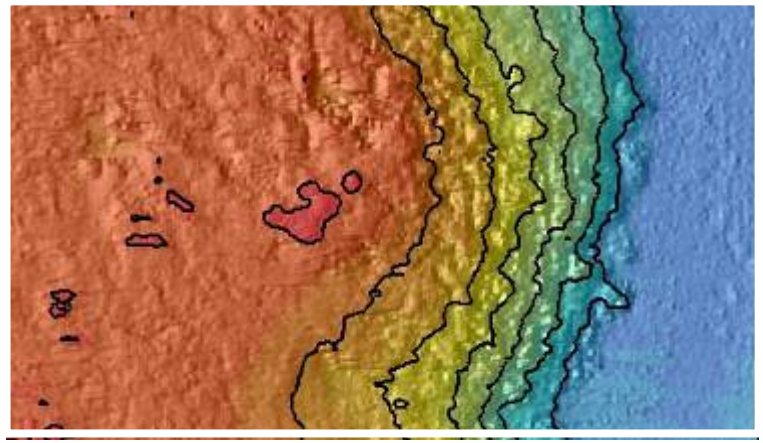


Patch Reefs

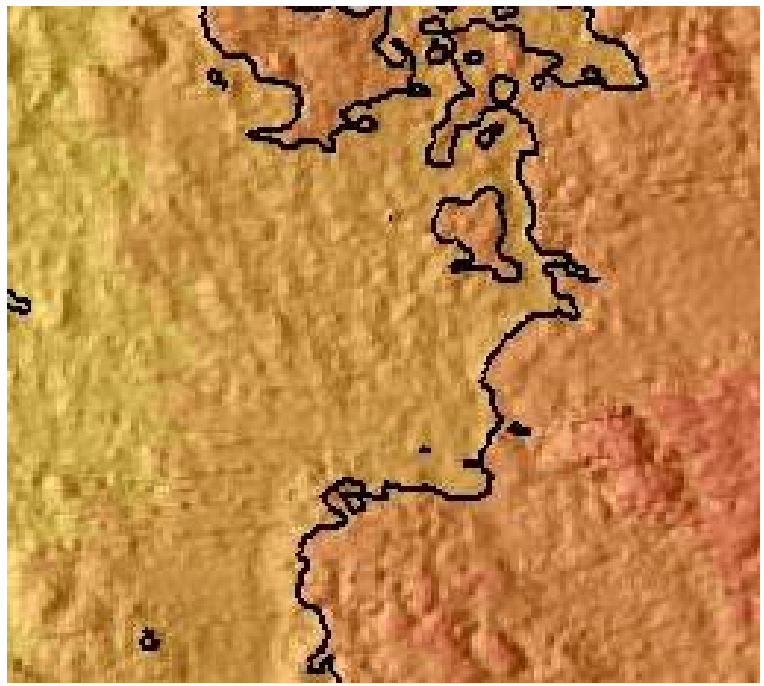


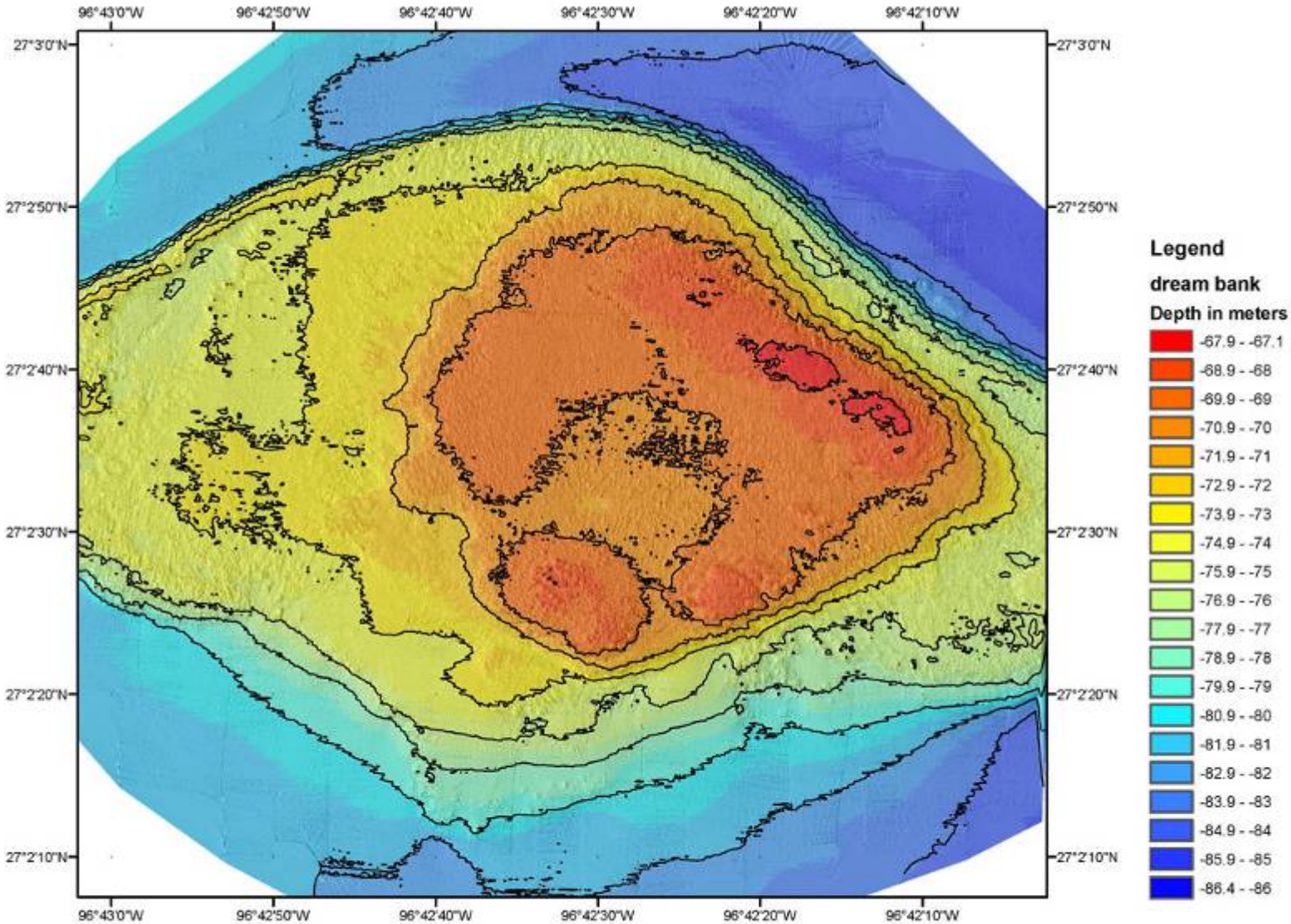

96°29'0"W
96°28'50"W
96°28'40"W
96°28'30"W
27°35'0"N
27°34'50"N
27°34'40"N
27°34'30"N
27°34'20"N
27°34'10"N
27°34'0"N
58
70
0 100 200 400 600 800
Meters
North Hospital


Legend
North Hospital
Depth in meters
-57.9 - -57.2
-59 - -58
-59.9 - -59.1
-60.9 - -60
-62 - -61
-62.9 - -62.1
-63.9 - -63
-64.9 - -64
-66 - -65
-67 - -66.1
-68 - -67.1
-69 - -68.1
-69.9 - -69.1
-71 - -70
-71.9 - -71.1
-72.9 - -72
-73.9 - -73
-78.9 - -74
N
W
E
S

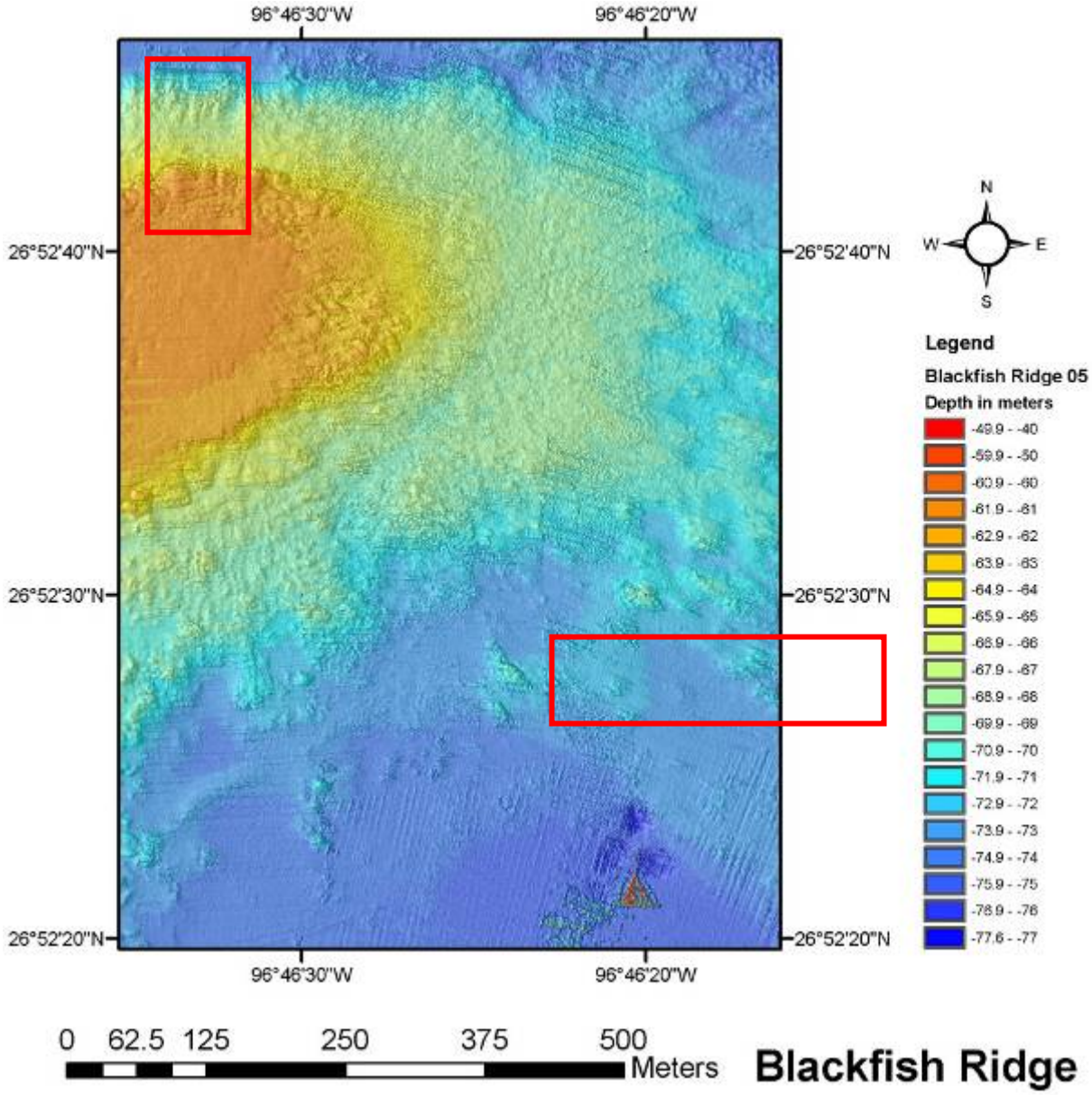


Patch Reefs



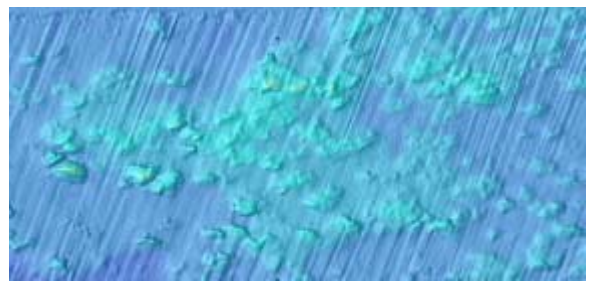

96°43'0"W
96°42'50"W
96°42'40"W
96°42'30"W
96°42'20"W
96°42'10"W
27°3'0"N
27°2'50"N
27°2'40"N
27°2'30"N
27°2'20"N
27°2'10"N
Legend
dream bank
Depth in meters
-67.9 - -67.1
-68.9 - -68
-69.9 - -69
-70.9 - -70
-71.9 - -71
-72.9 - -72
-73.9 - -73
-74.9 - -74
-75.9 - -75
-76.9 - -76
-77.9 - -77
-78.9 - -78
-79.9 - -79
-80.9 - -80
-81.9 - -81
-82.9 - -82
-83.9 - -83
-84.9 - -84
-85.9 - -85
-86.4 - -86
0 125 250 500 750 1,000
Meters
N
W
E
S

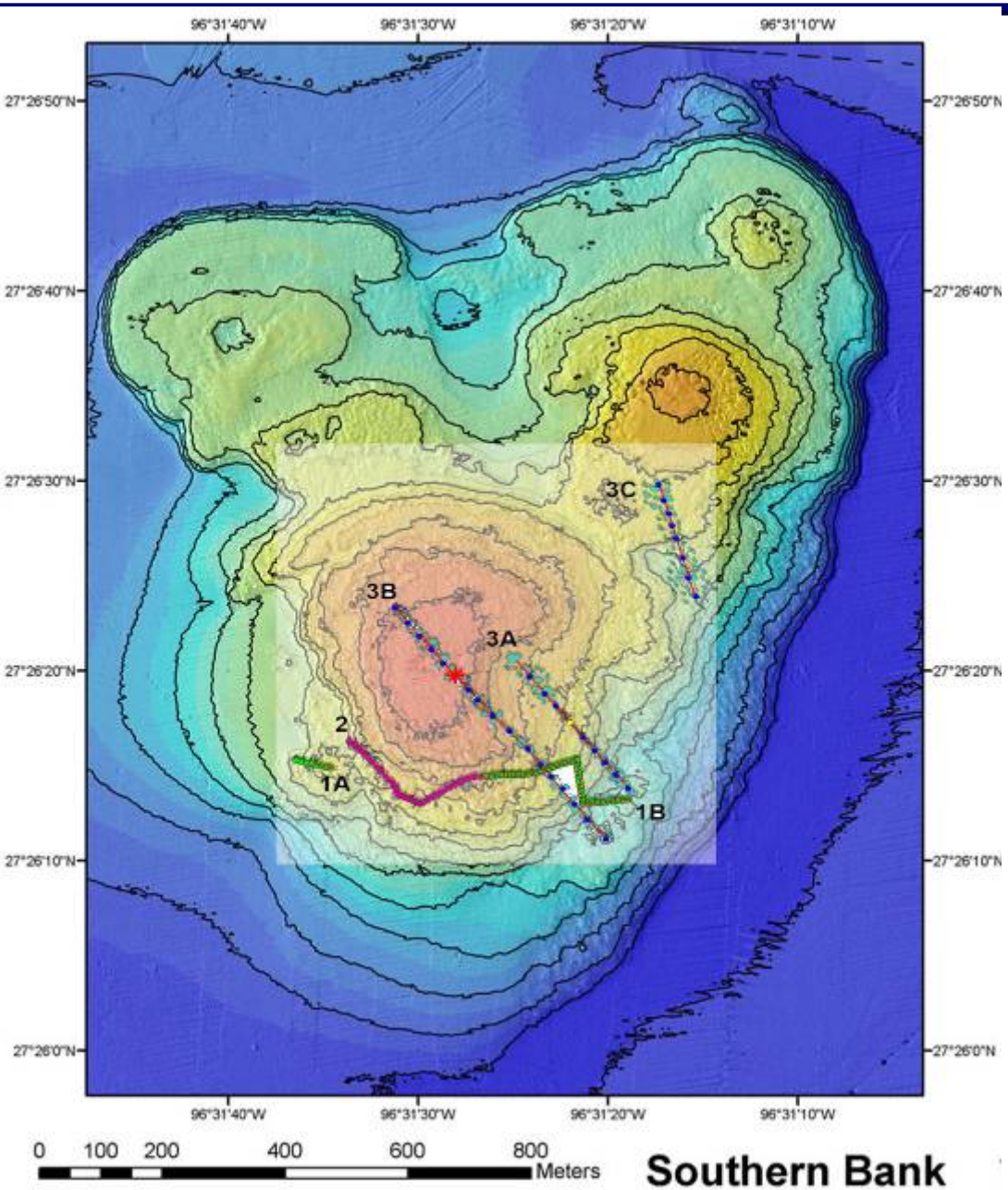
Dream Bank



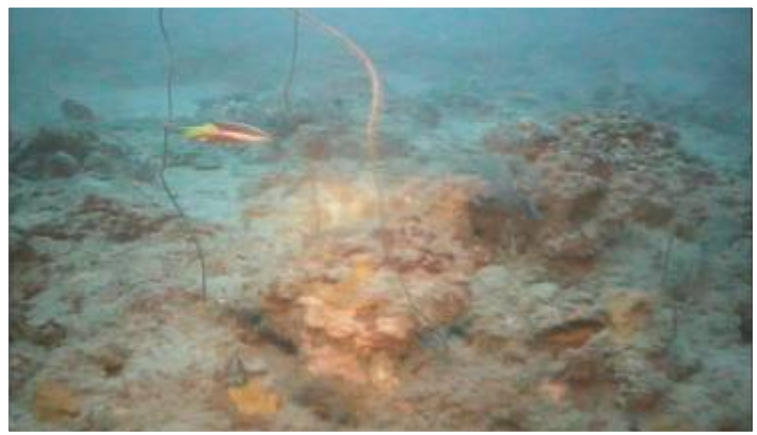
Spur & Groove?
Reef Cuts?

Deep Patch Reefs

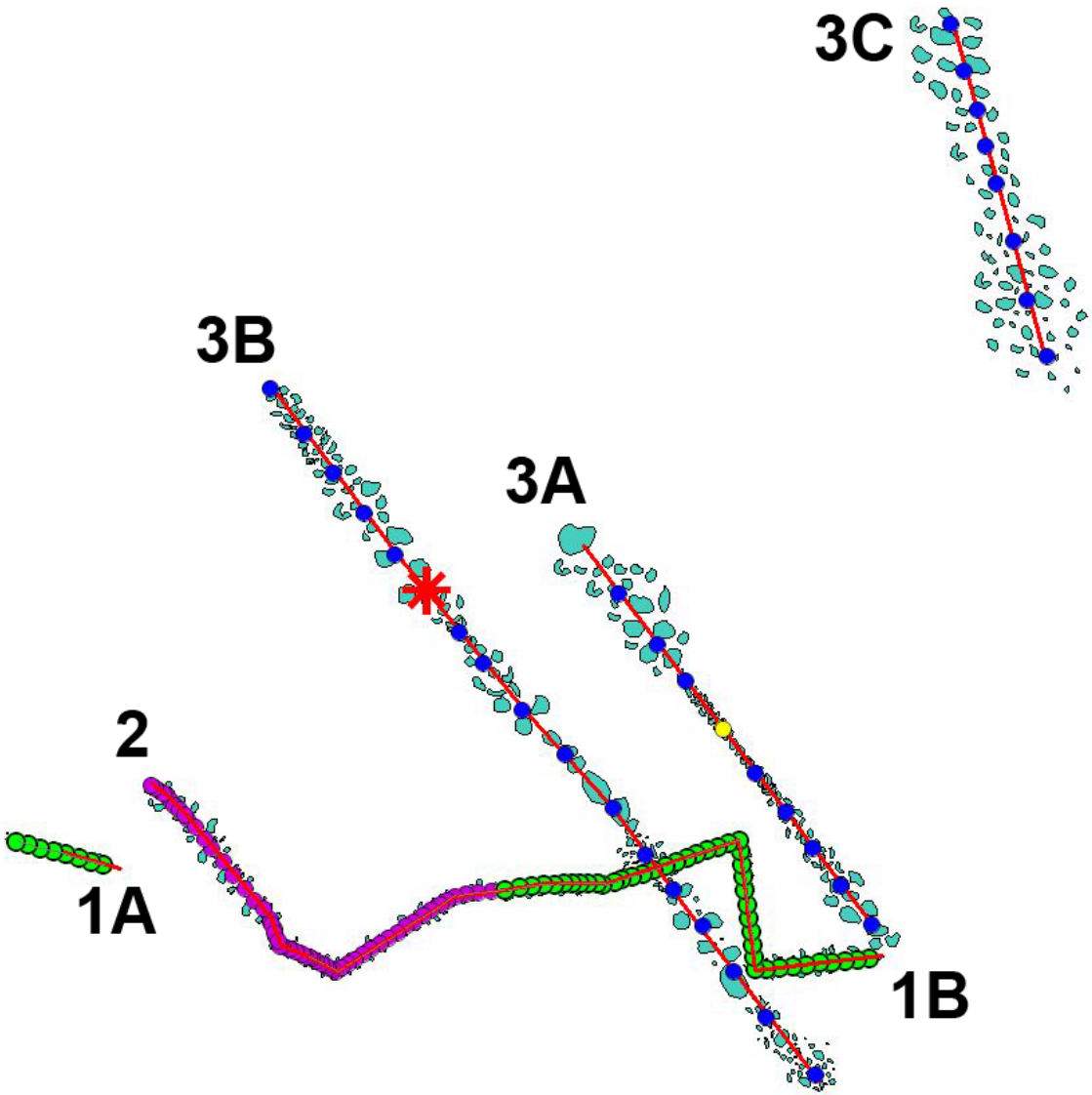




Habitat Map
5 Video Transects
Reef Size, Shape, % Cover



Coralgal Patch Reefs

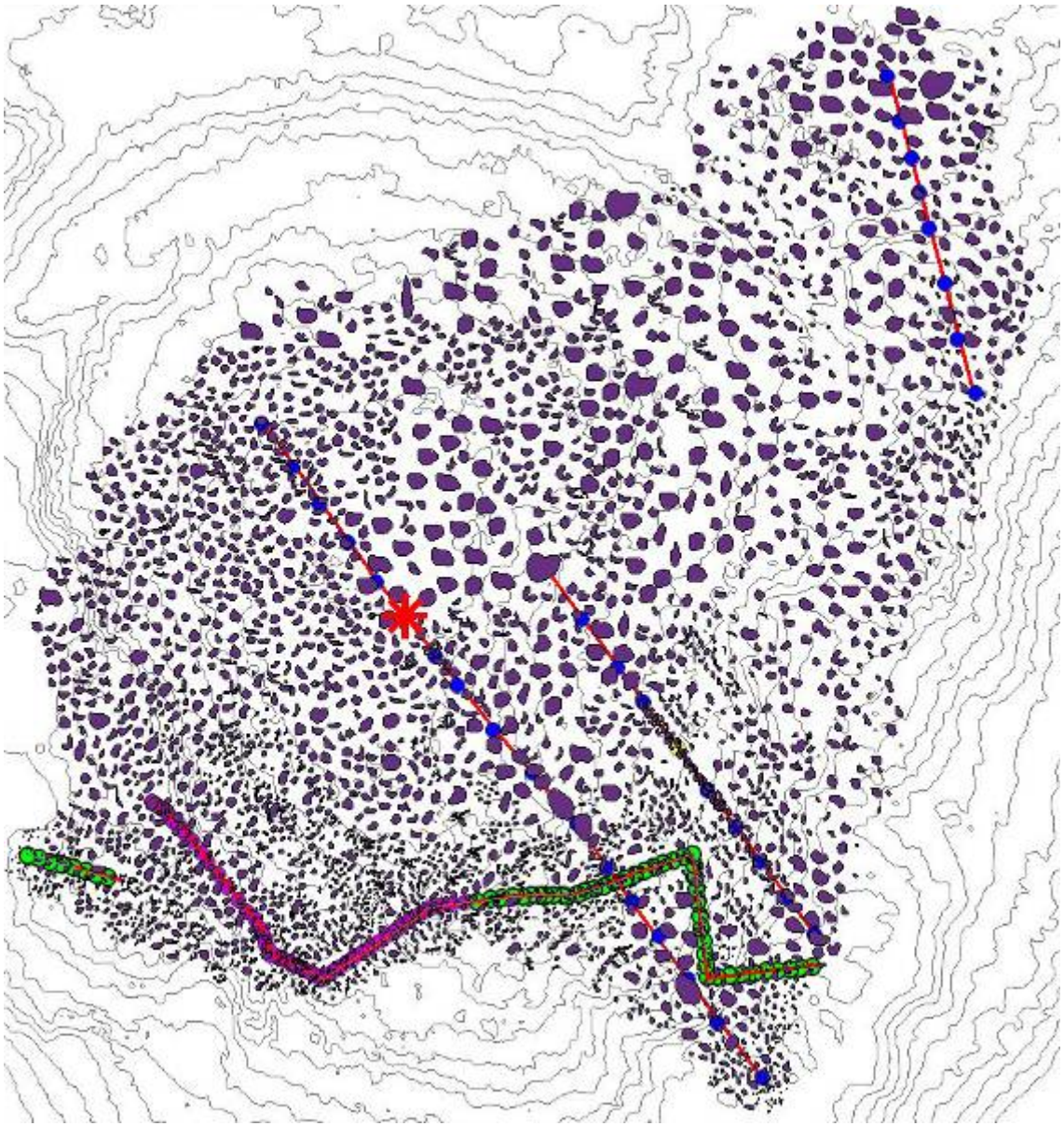


5-10m diam near crest

1-5 meter diameter on terrace

3-10m diameter on edge of terrace

Central Gas Seep



Coralgal Patch Reefs

Hardbottom Habitat

~ 4,800 in number

50,000 m^2 in area

20% coverage

Estimated
184,000+ m2
For entire bank <70m

Conclusions

Three of five banks mapped follow model reef system proposed by Lindquist (1978) and Rezak et al. (1985): Circular, eastern depression, steep western margins, and terraces from 68 to 62m. Dream Bank with distinct terrace, reef crest at 68 meters.

Analogous to platform reefs of the Tuxpan/Veracruz Reef Systems? Reef crest, buttress zones, windward and leeward structures.

Blackfish Ridge with no distinct terrace, well developed deep patch reef system. Related to proximity to Rio Grande Lowstand Delta? Resembles nearshore reefs of the Veracruz system.

Data indicate extensive hardbottom on all features

Future Goals

Complete multibeam mapping of remaining South Texas banks, Including acoustic backscatter or high resolution sonar to identify distribution and morphology of hard bottom features.

Develop detailed habitat maps of major features, including patch reef distribution, reef crest and spur and groove formations

Sample large carbonate features to identify relict coral community.

Identify community composition of reef fishes and invertebrates, and determine similarity to communities on neighboring artificial reef platforms and faunal similarity to Flower Garden Bank Deep Reef Fish assemblage.

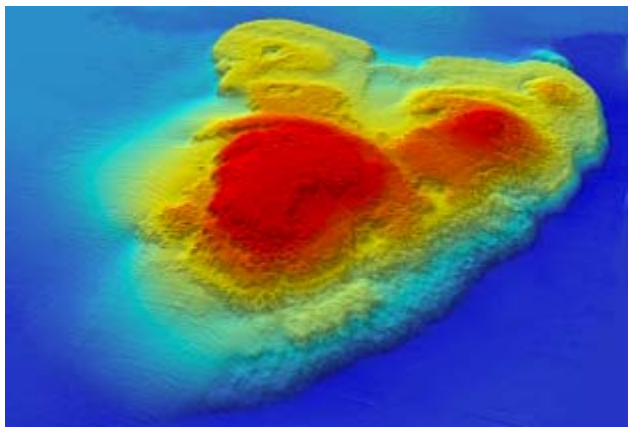
Acknowledgments

Captain Frank Wasson and Crew, M/V SPREE for multibeam support.

Captain Charles Doolin and Crew, M/V POINT GLASS and the Texas Sea Scouts for ship time and field support.

Gail Sutton, Al Oswalt, Lucas Turnabe and Dr. Andre Droxler for logistical and field support.

James Sinclair and MMS for invitation and travel support.



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