

Characterization of a Network of Marine Protected Areas in the Northwestern Gulf of Mexico

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April 25, 2006





Mississippi River Basin





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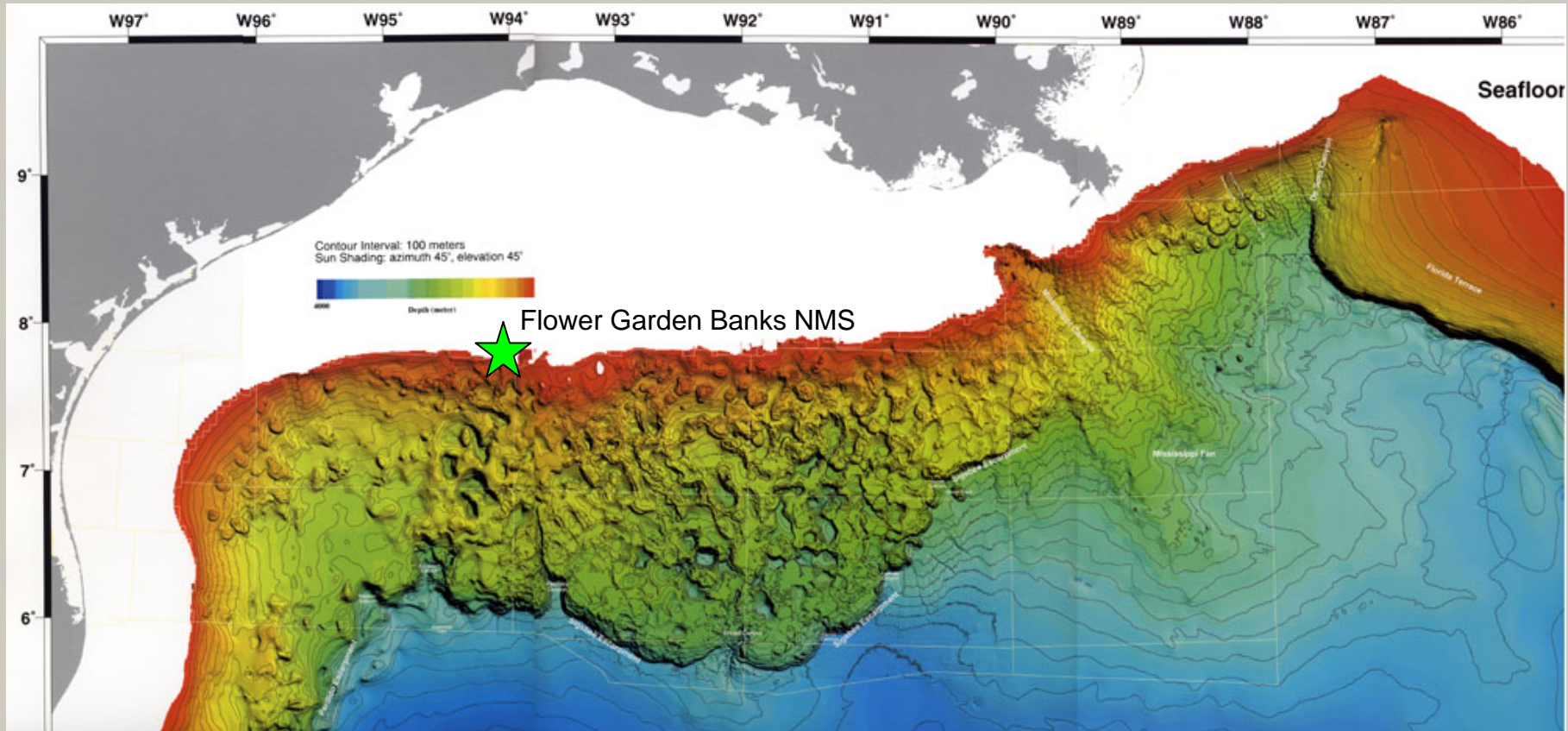


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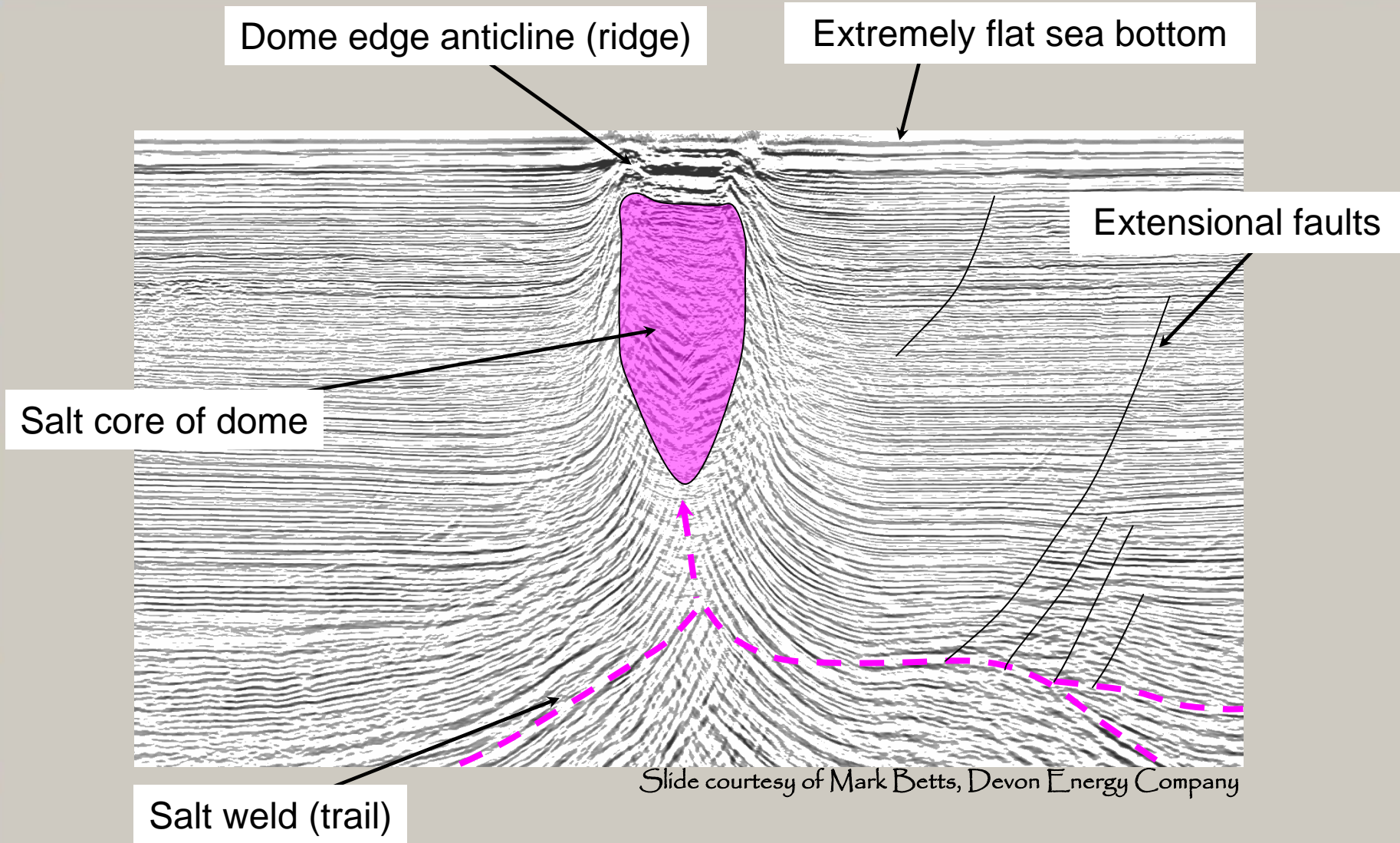
Shelf/Slope Bathymetry - NW Gulf of Mexico



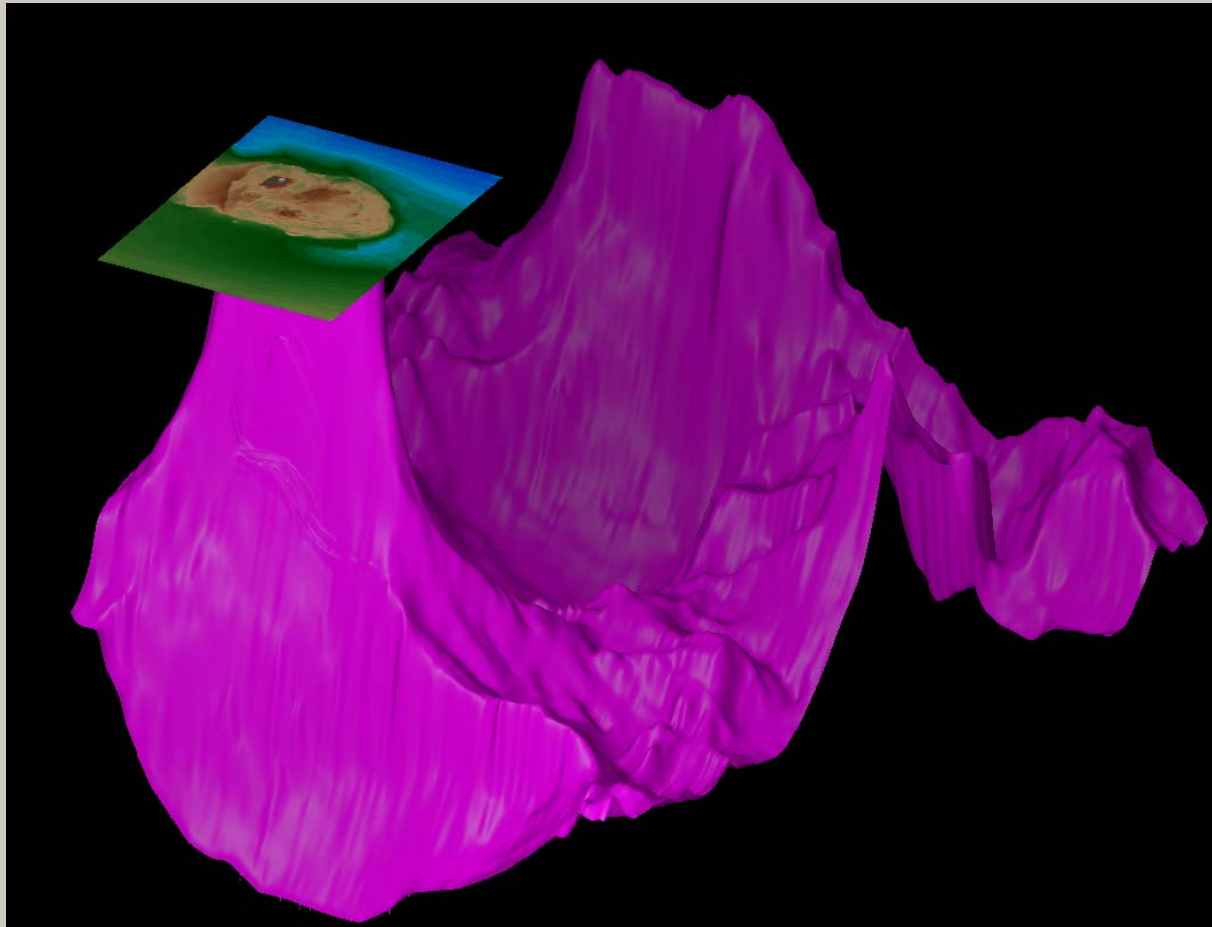
Salt Dome Region



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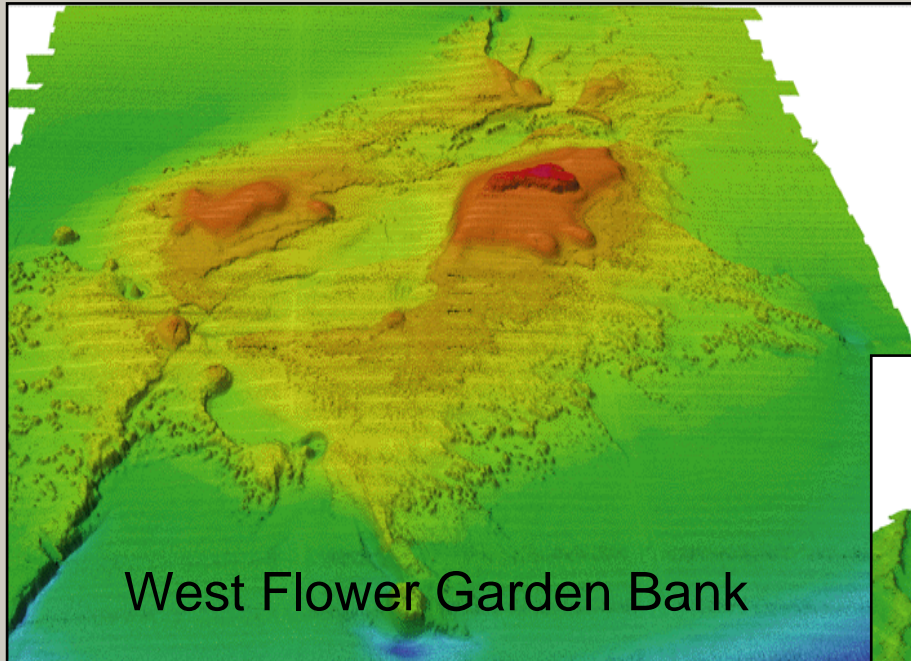


Typical seismic line through a Galveston Area salt dome



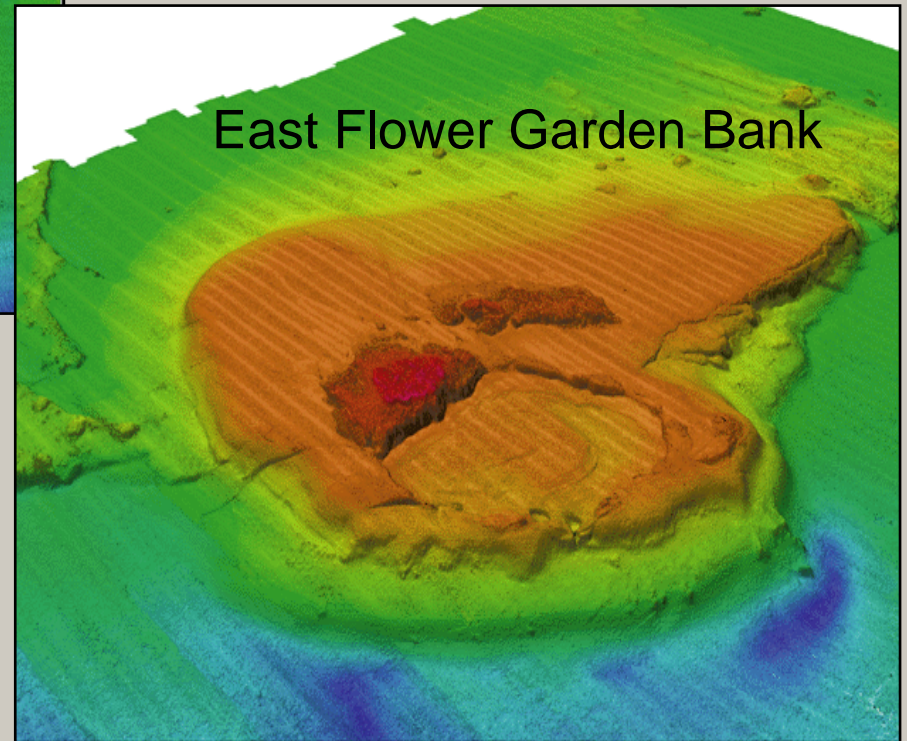
3D Salt Dome Visualization - Alderdice Bank

Image Courtesy of Mark Betts, Devon Energy Company



West Flower Garden Bank

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East Flower Garden Bank

Multibeam Bathymetry
USGS, 1997

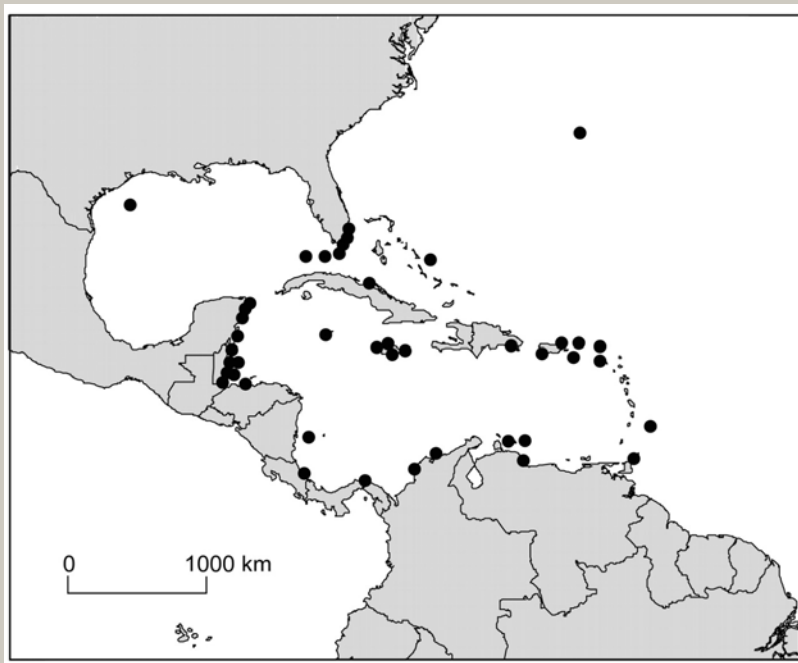


- ◆ Perched atop salt domes
- ◆ Northernmost coral reefs in the continental United States
- ◆ Reef foundation formed by large, stony corals (e.g. brain and star corals)
- ◆ About 23 coral species
- ◆ Over 850 other reef invertebrate species
- ◆ ~250 fish species
- ◆ 125+ algae species

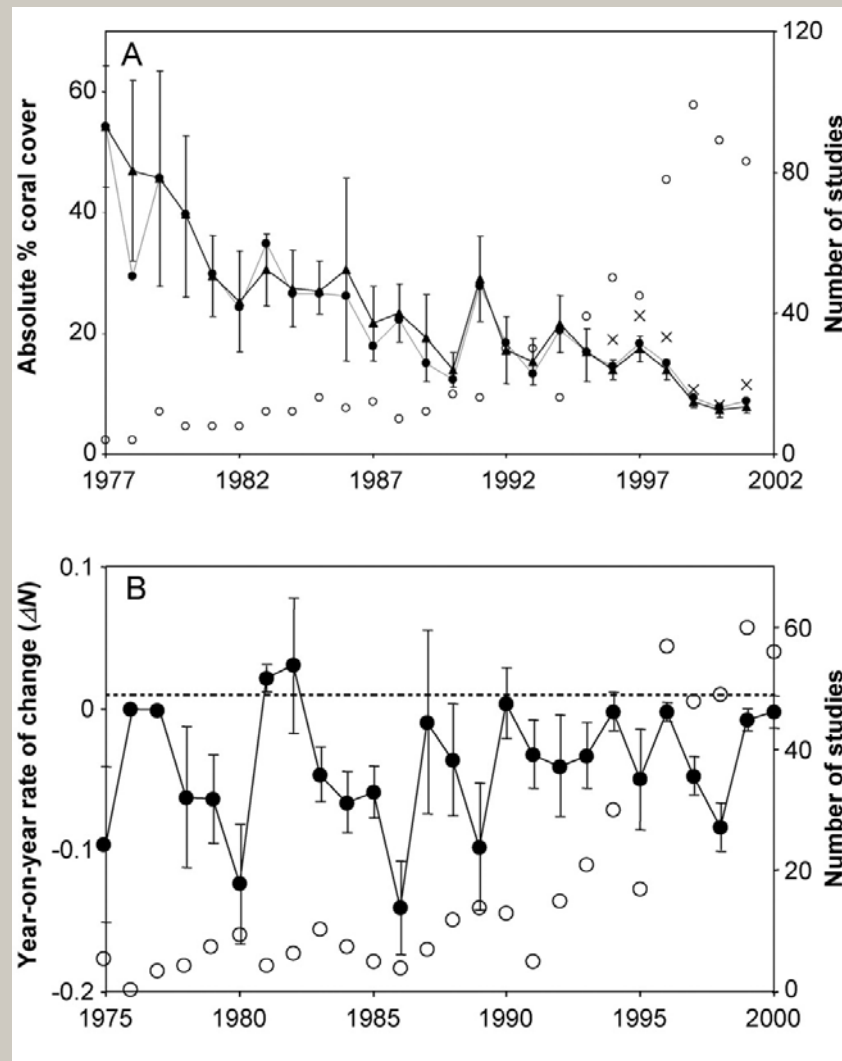


Long-term region-wide declines in Caribbean Corals

Gardner, T.A. et al., 2003. Science 301:958

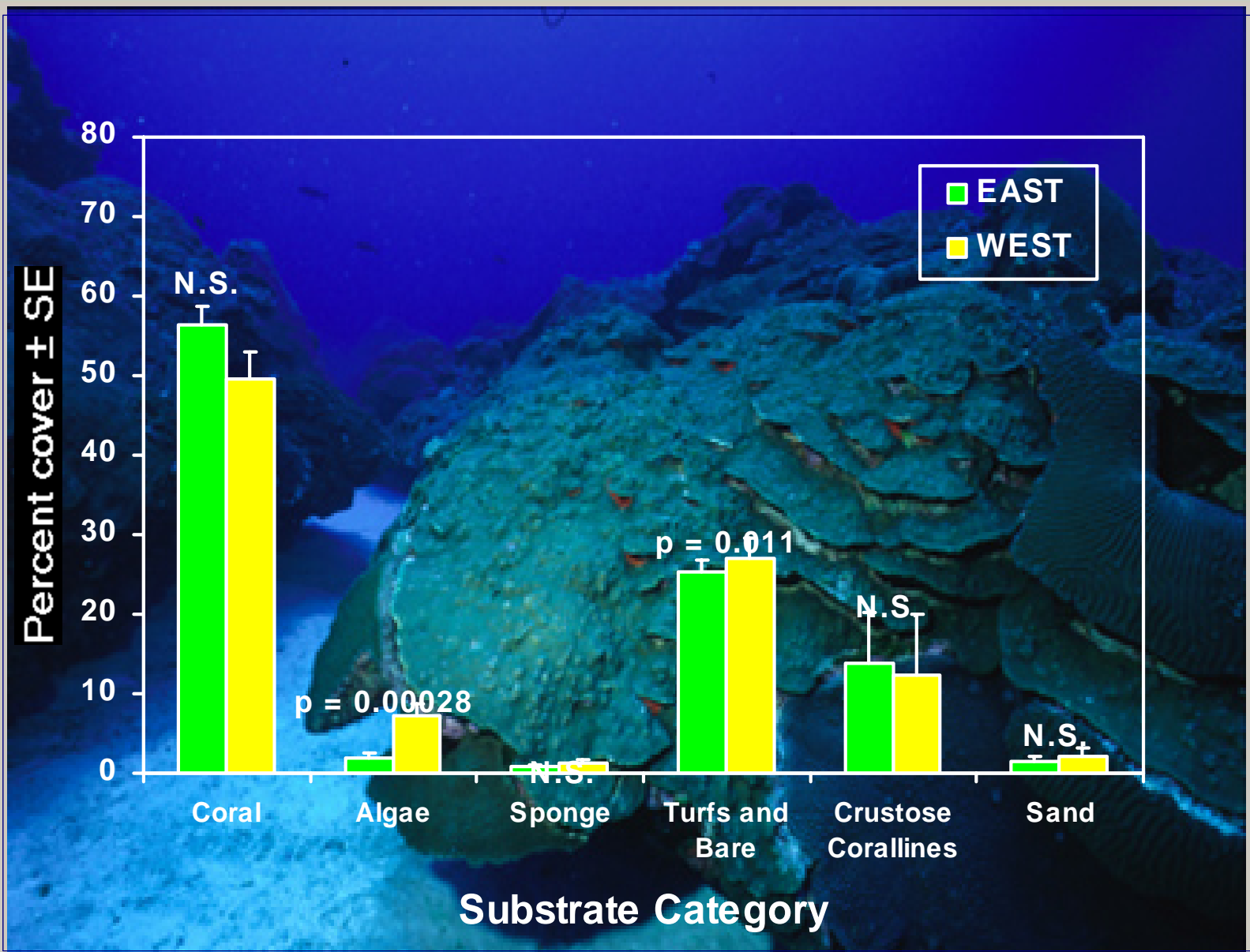


Average hard coral cover reduced by 80% (from 50% to 10%) in 30 years





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Percent Living Coral Cover - Major Reefs

Flower Garden Banks	50.5%
Cayman Islands	21.0%
Cuba	15 - 23%
Bonaire	48%
Akumal, Mexico	16.8%
Netherlands Antilles	10 - 47%
St. Vincent Grenadines	29 - 44%
Turks and Caicos	up to 30%
Florida Keys	3 - 22%

As determined by the Atlantic and Gulf Rapid Reef Assessment (AGRAA)

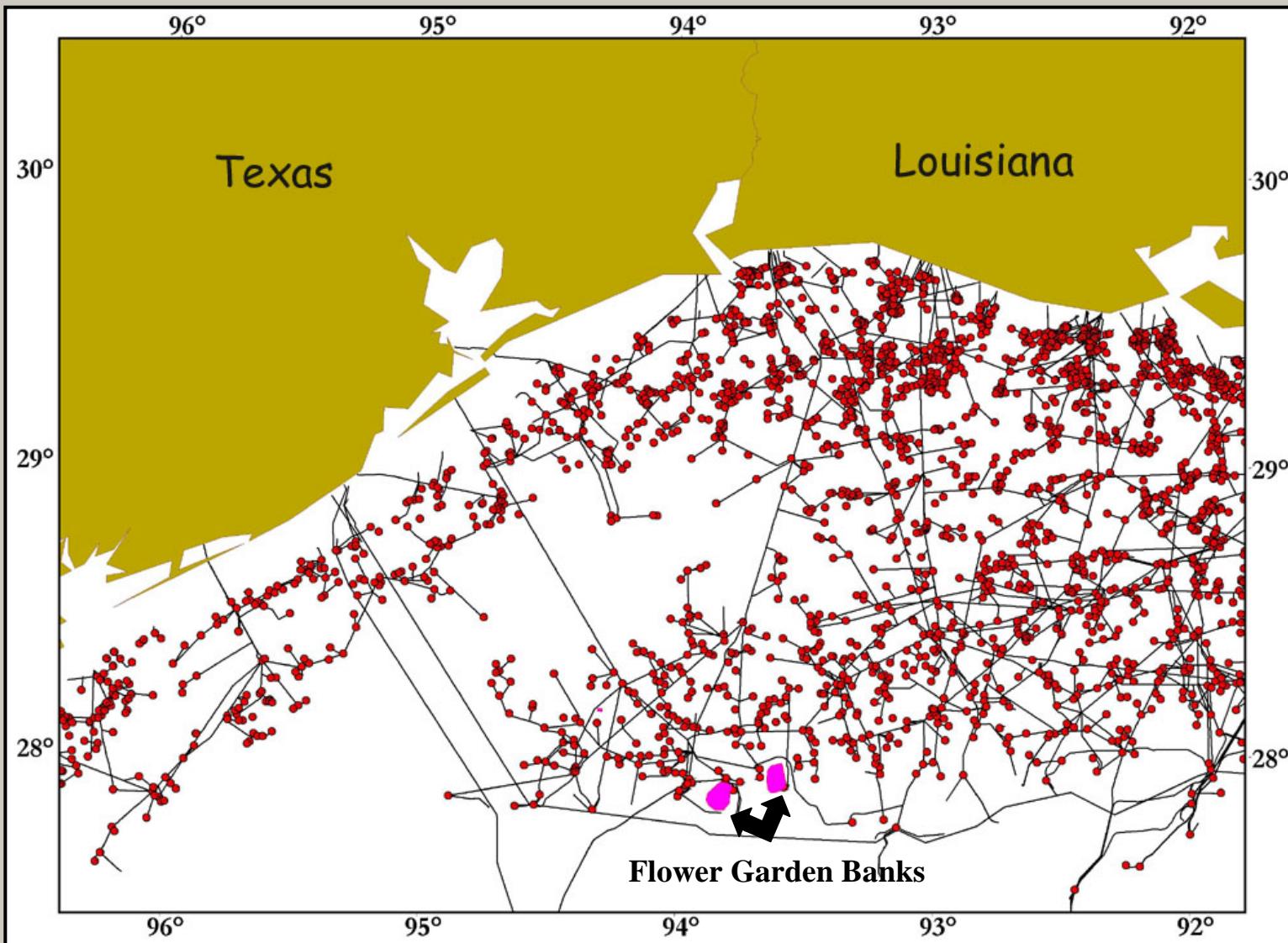


Essential Fish Habitat



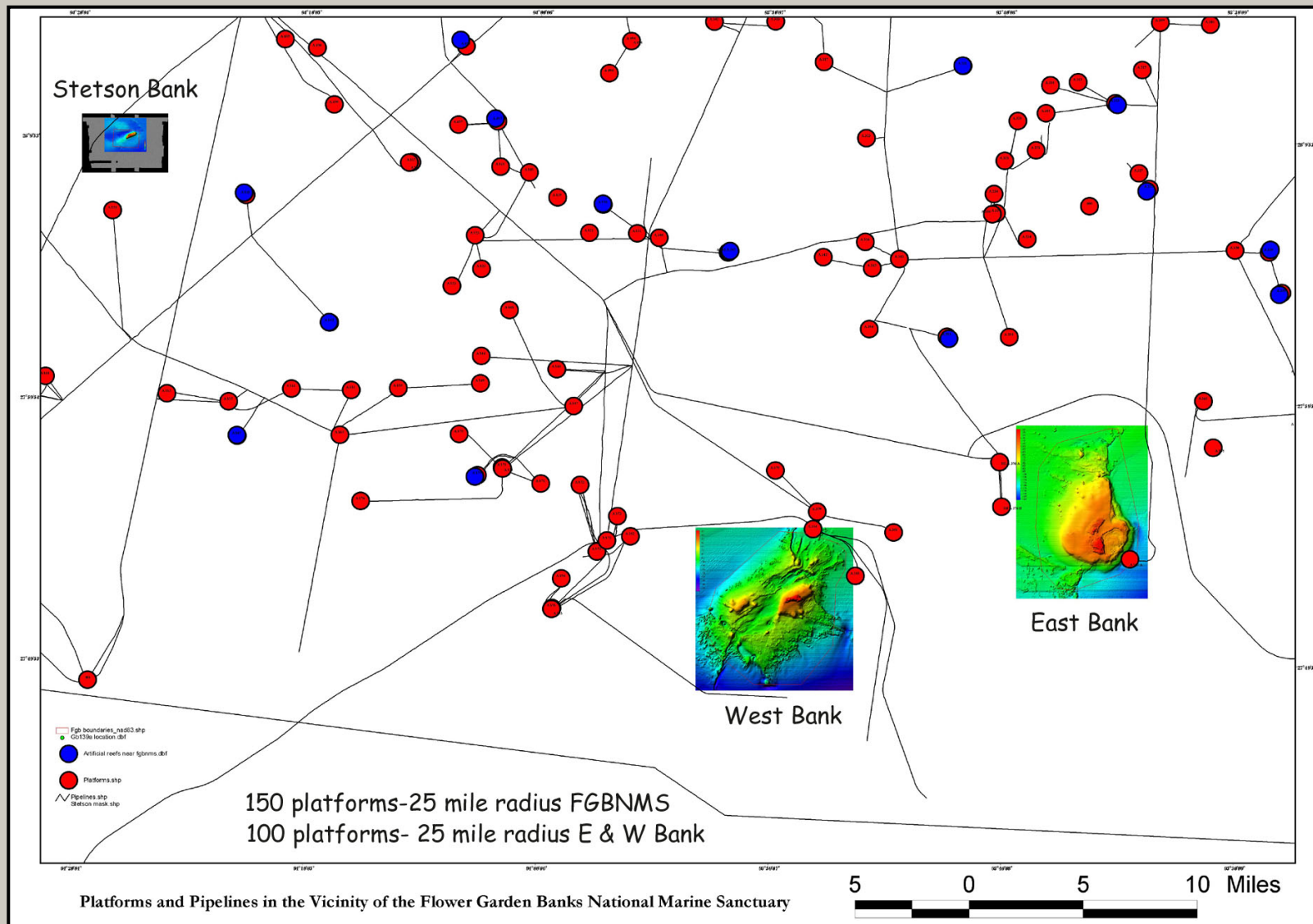


Oil and Gas Infrastructure





Oil and Gas Infrastructure



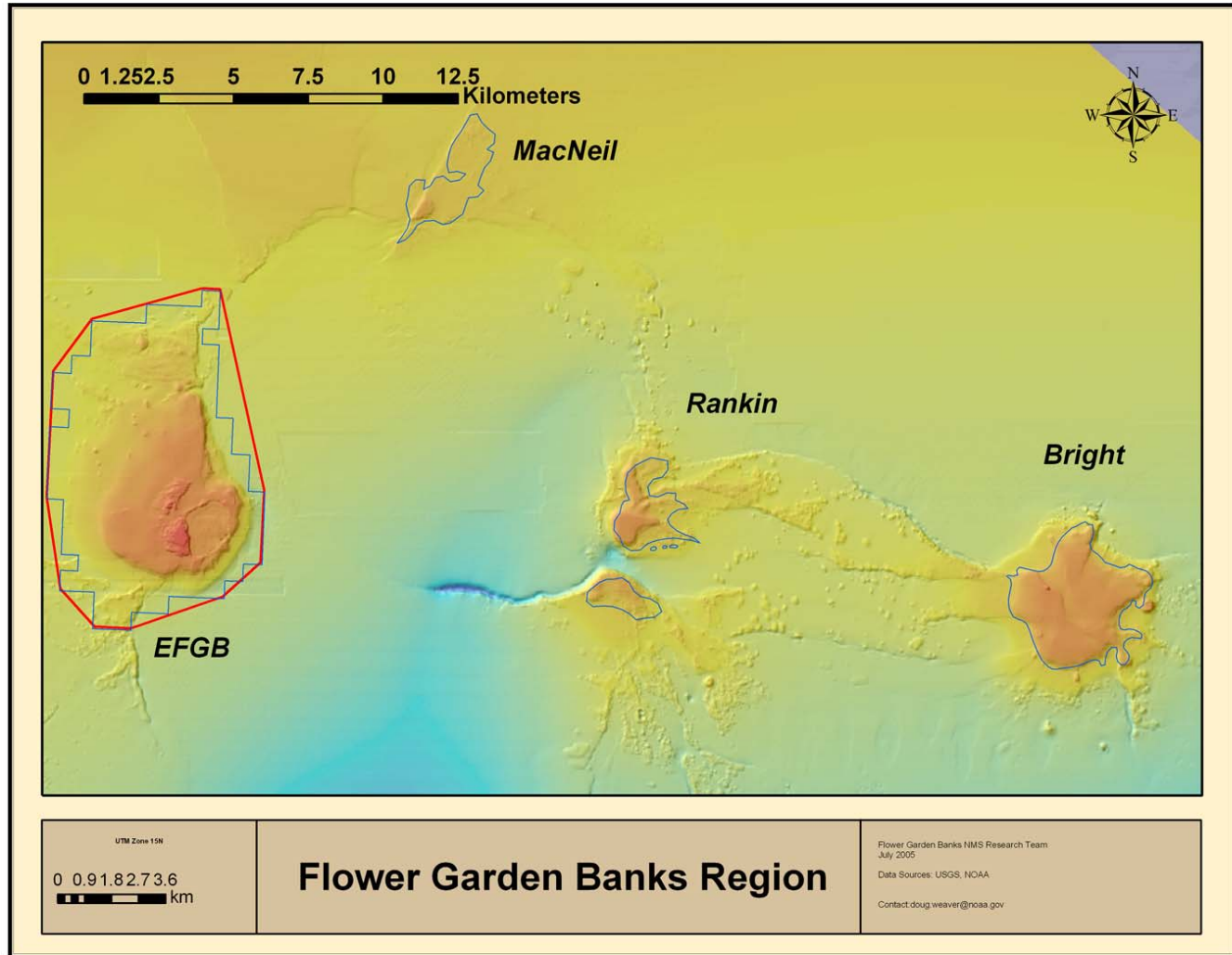


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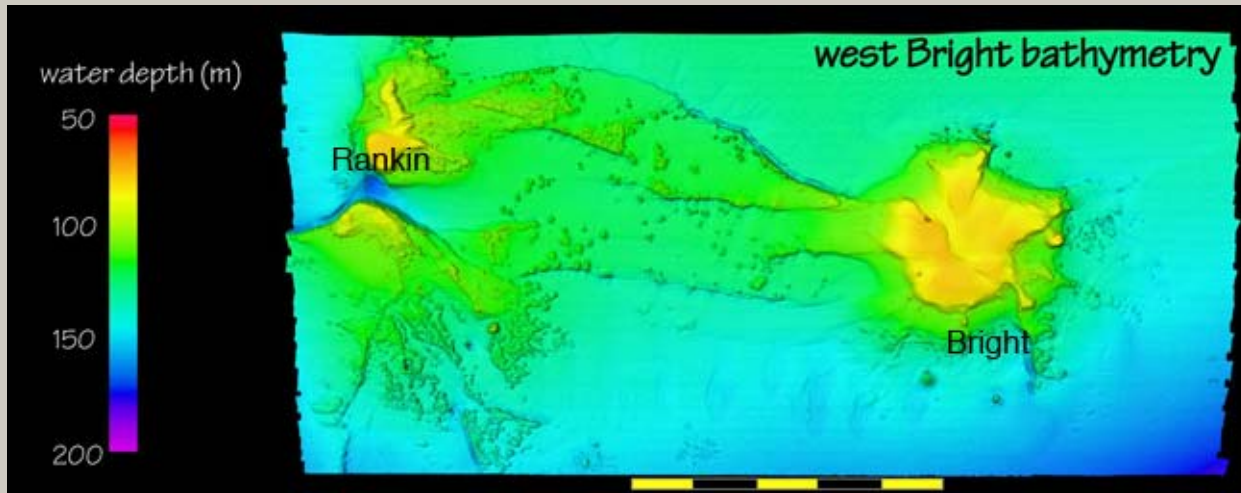


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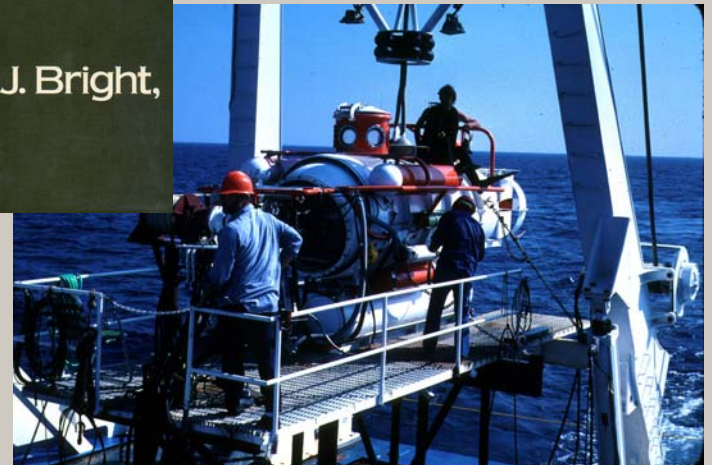
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Reefs and Banks of the Northwestern Gulf of Mexico

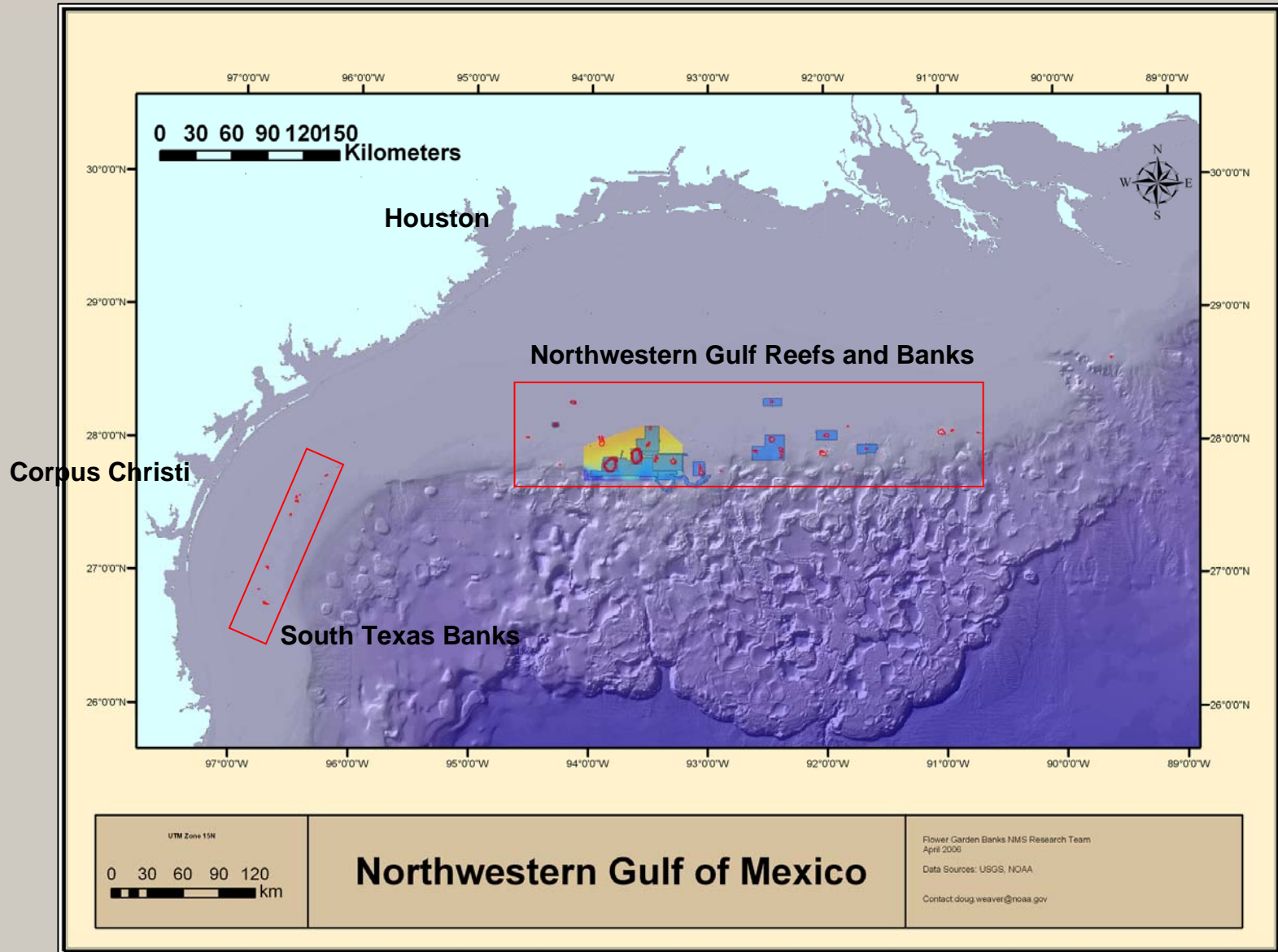
Their Geological, Biological, and Physical Dynamics

Richard Rezak, Thomas J. Bright, and David W. McGrail



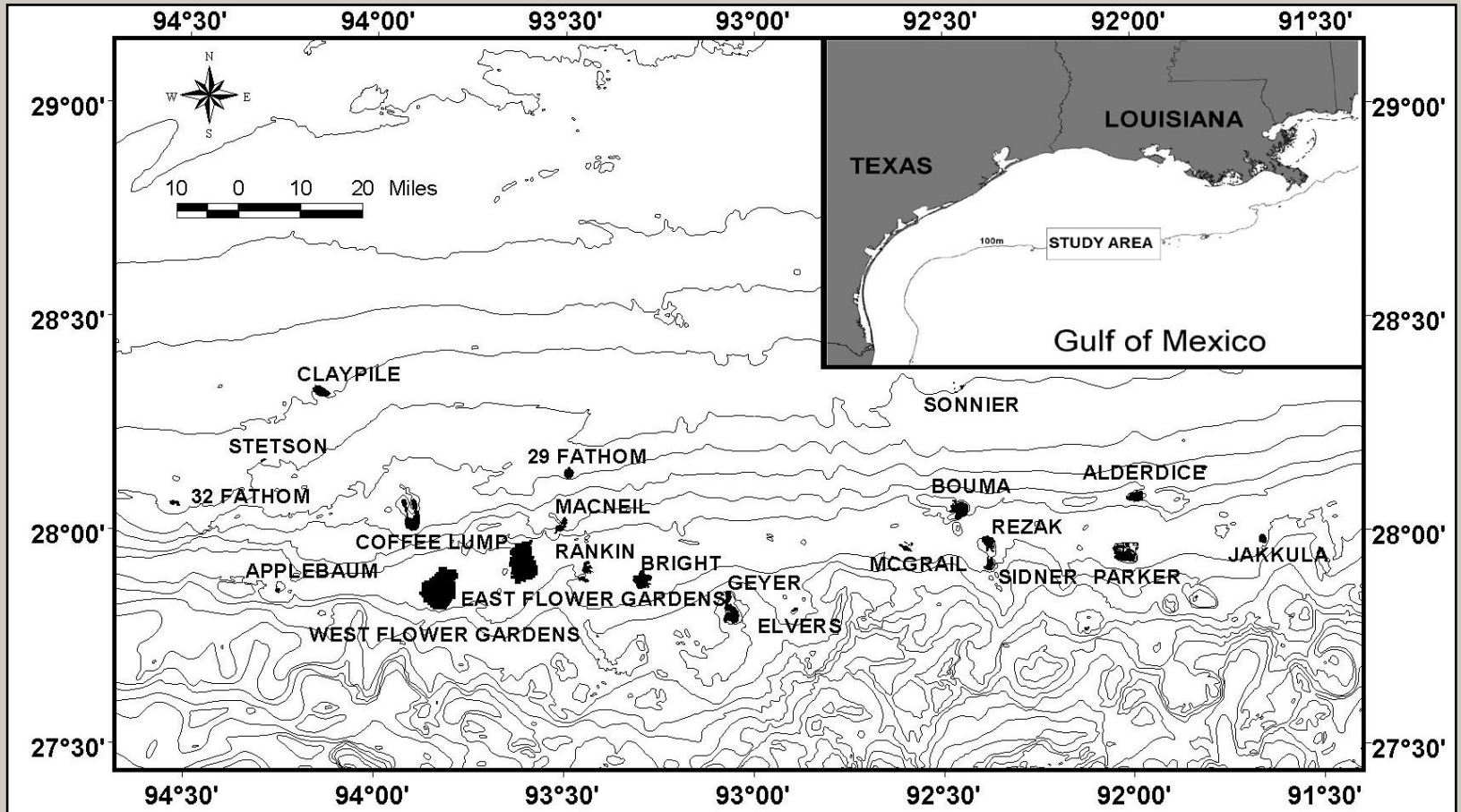


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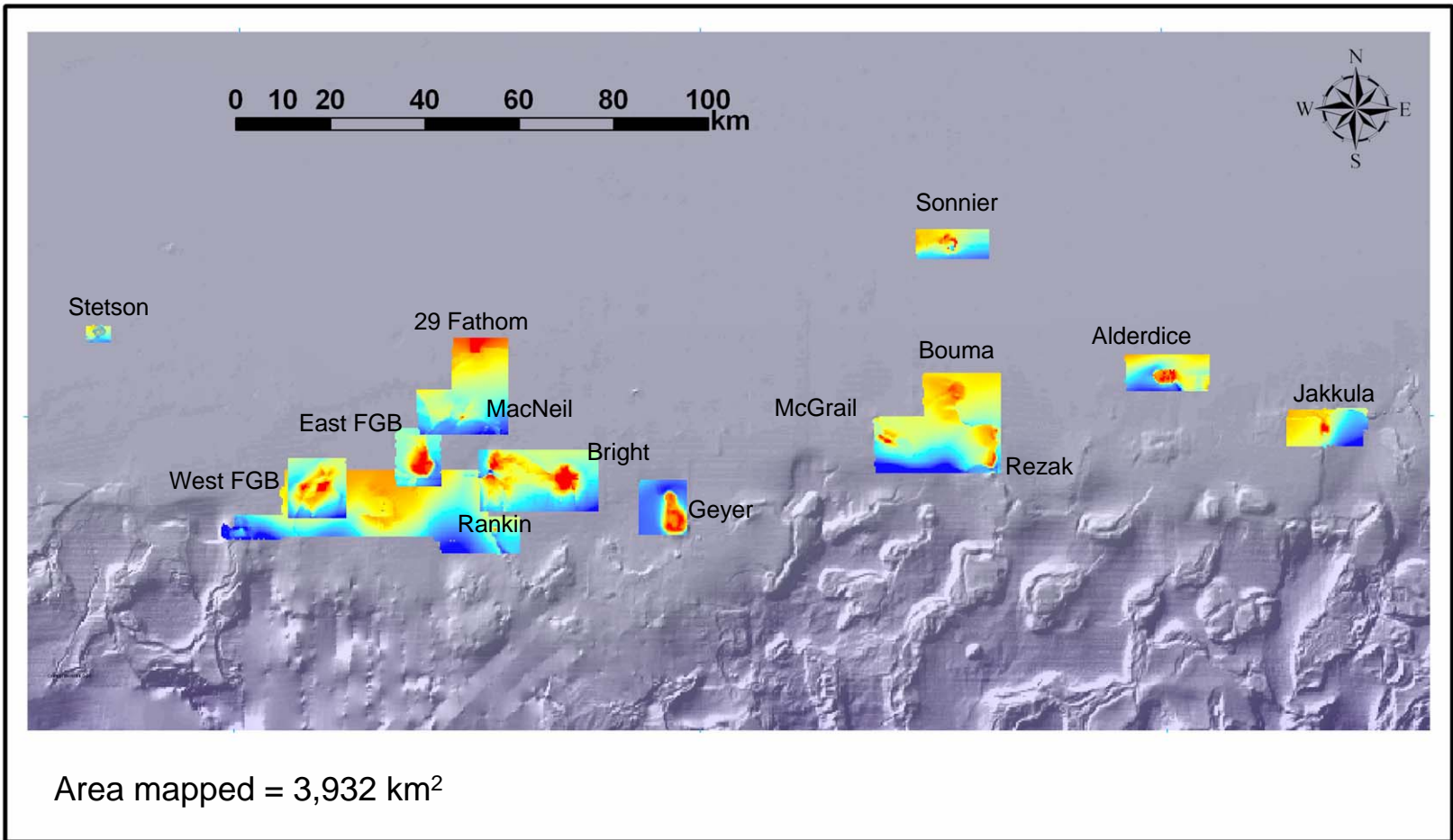
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Reefs and Banks of the Northwestern Gulf of Mexico



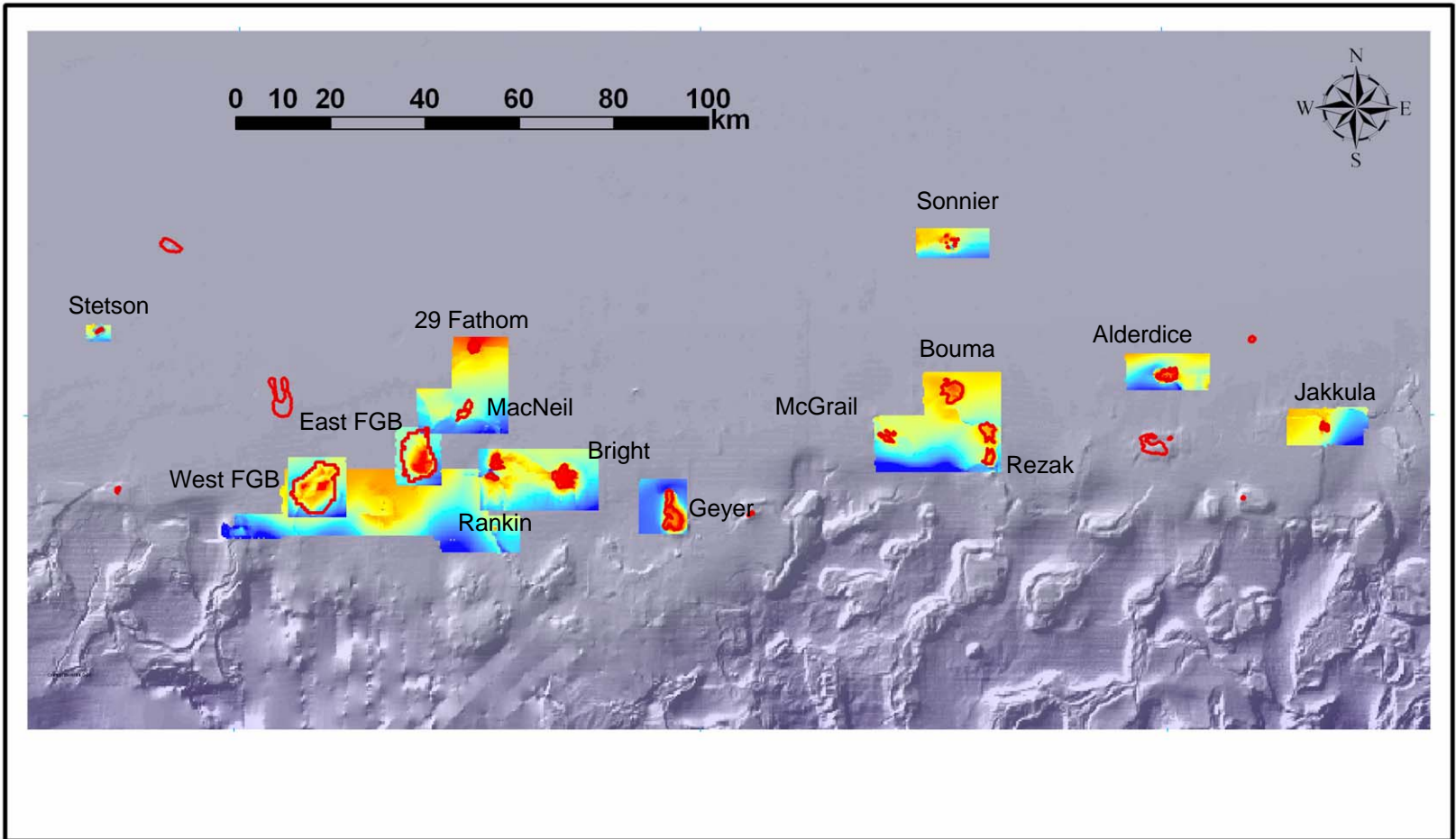
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NW Gulf of Mexico - High resolution multibeam surveys (1997 - 2005)



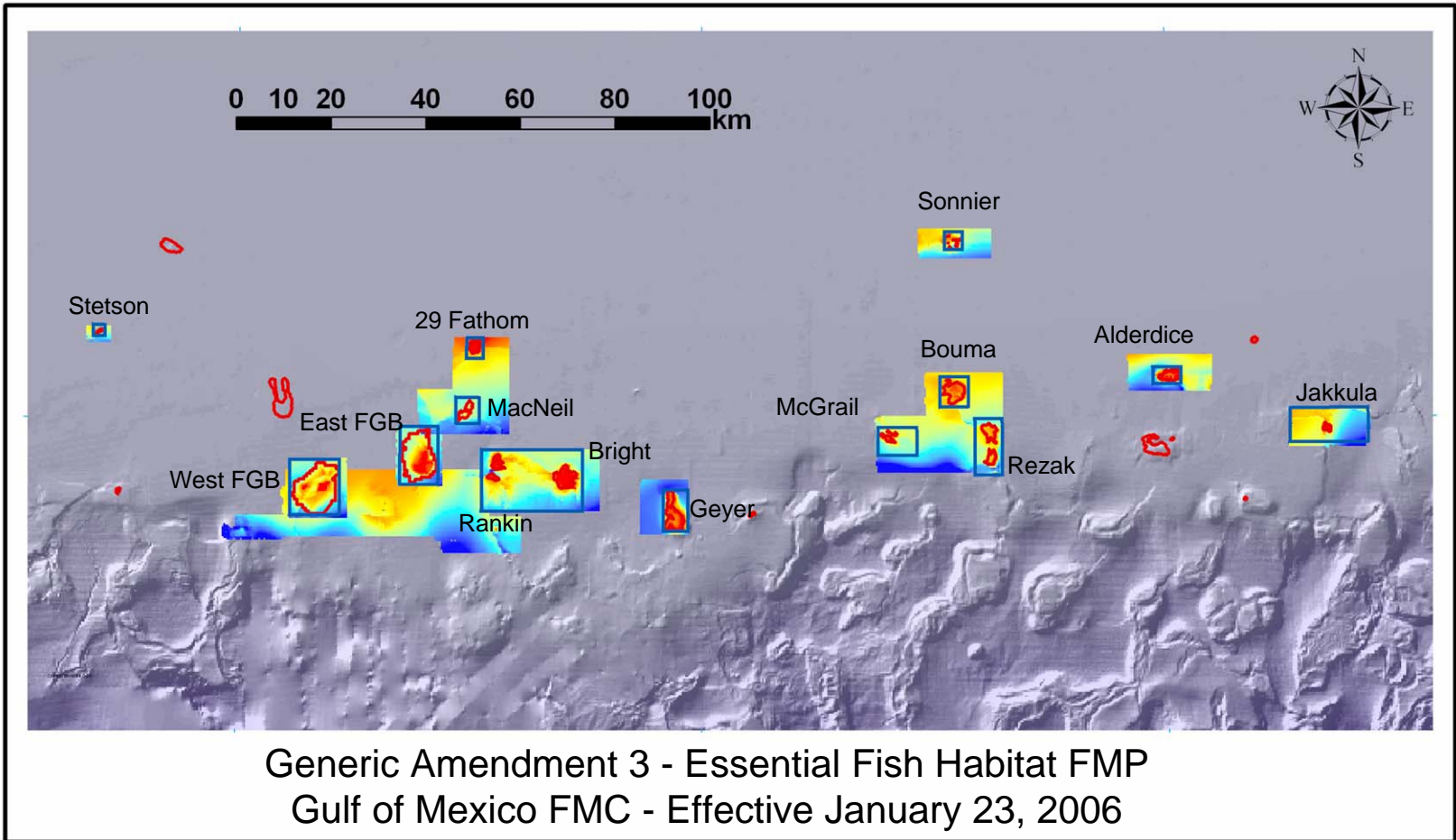
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NW Gulf of Mexico - MMS No-Activity Zones (1974)



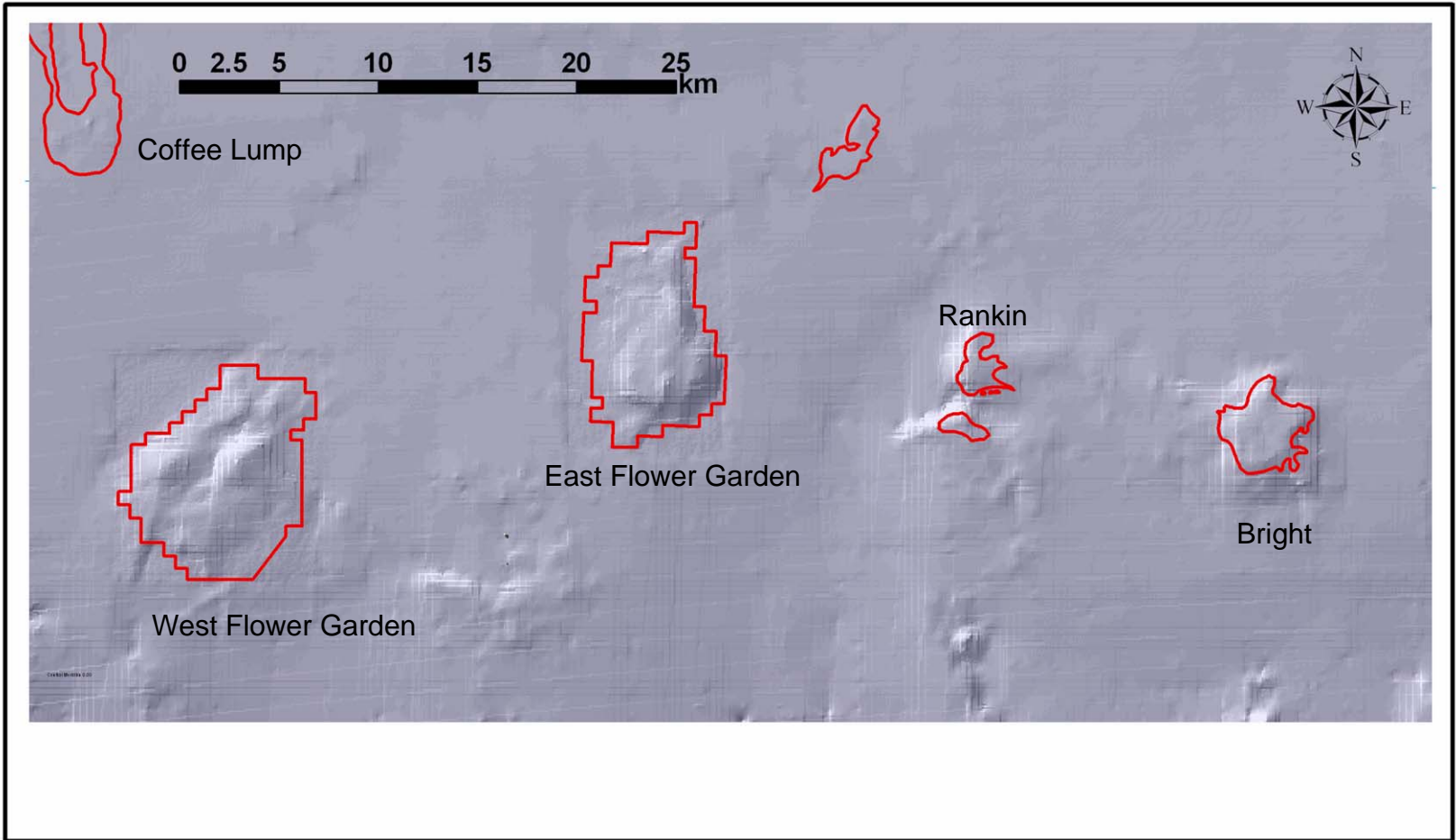
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NW Gulf of Mexico - HAPC boundary recommendations (2005)



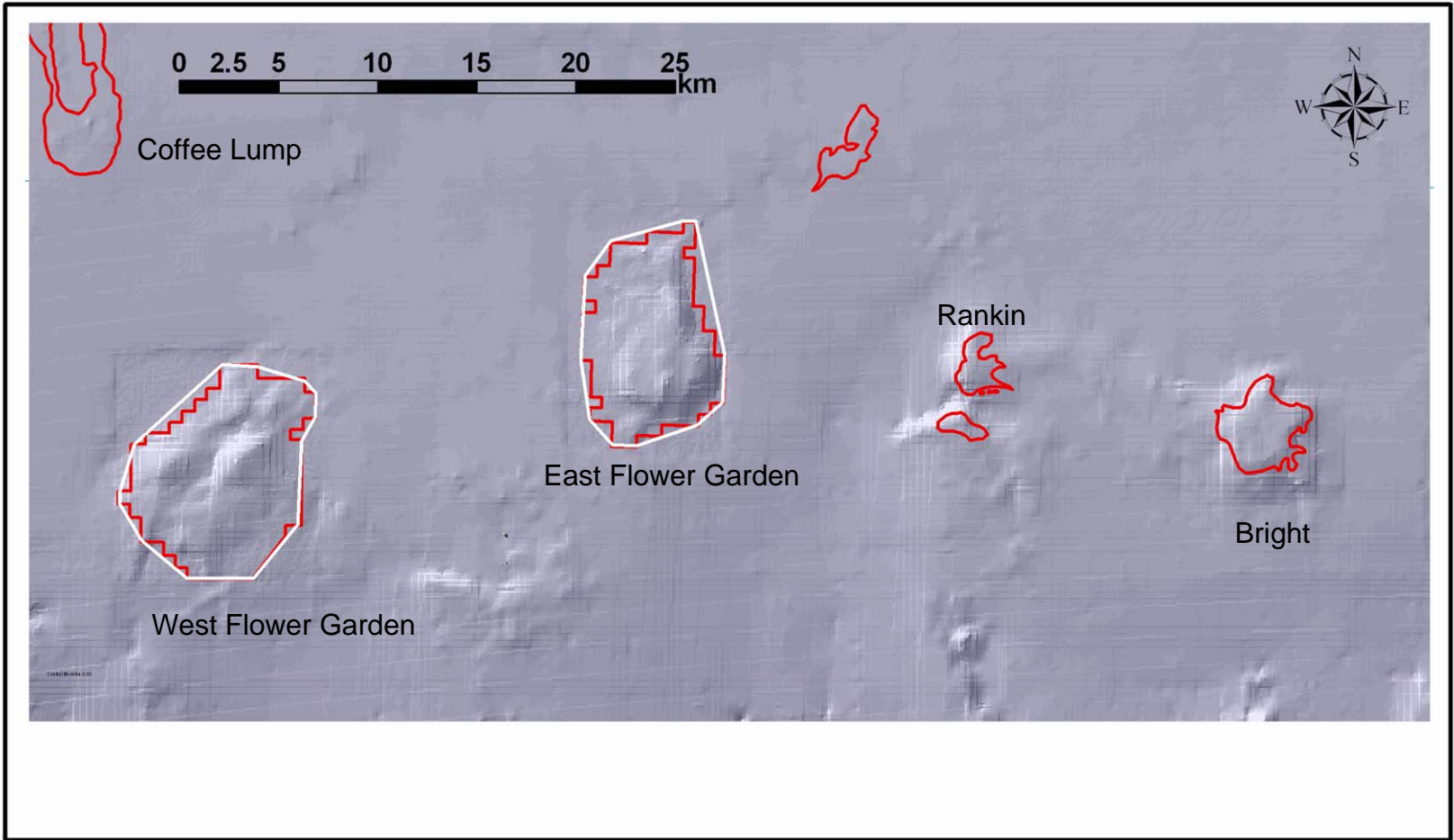
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Flower Garden Banks Region - MMS No-Activity Zones (1974)



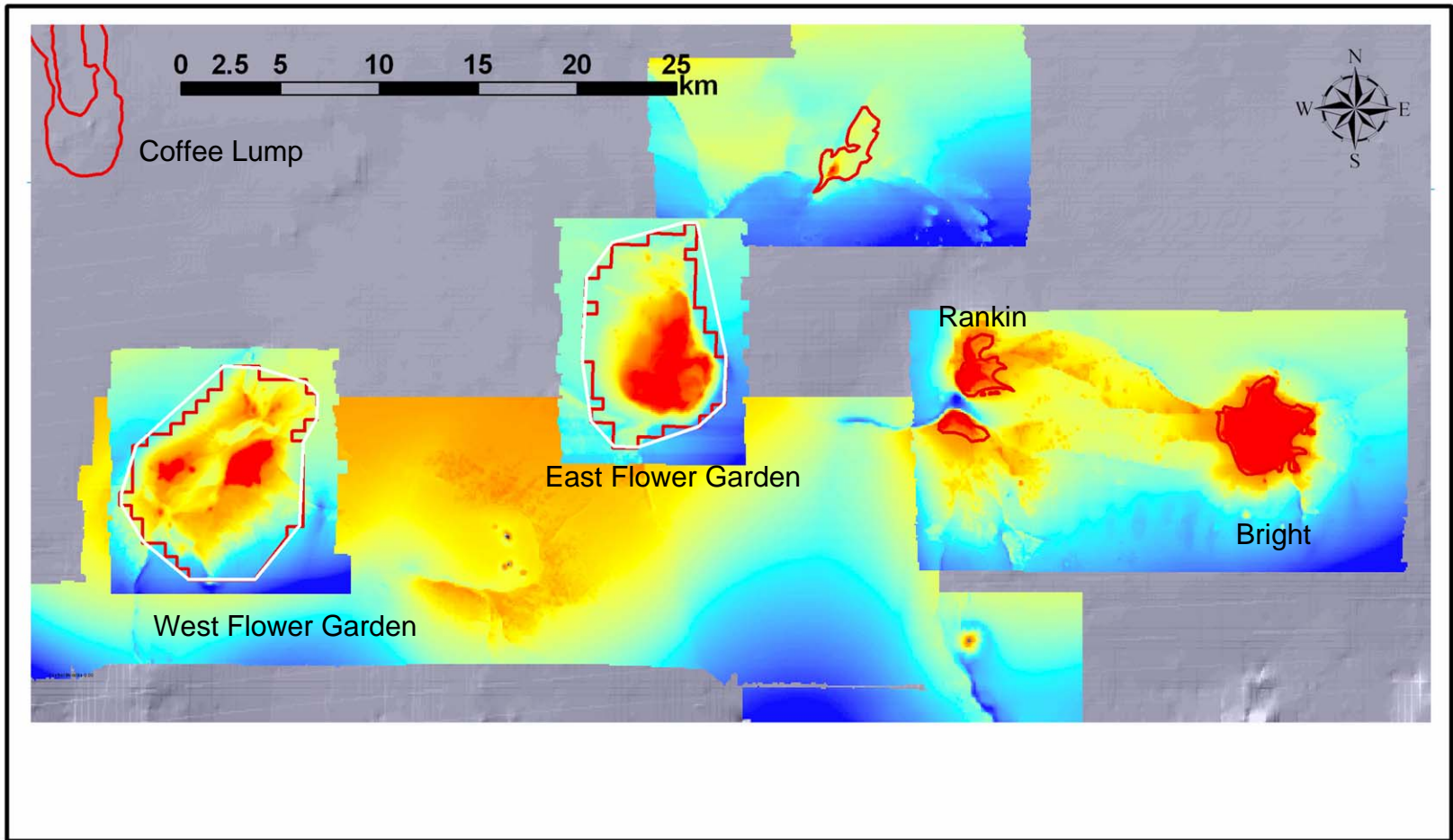
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Flower Garden Banks Region - FGBNMS Sanctuary boundaries (1992)



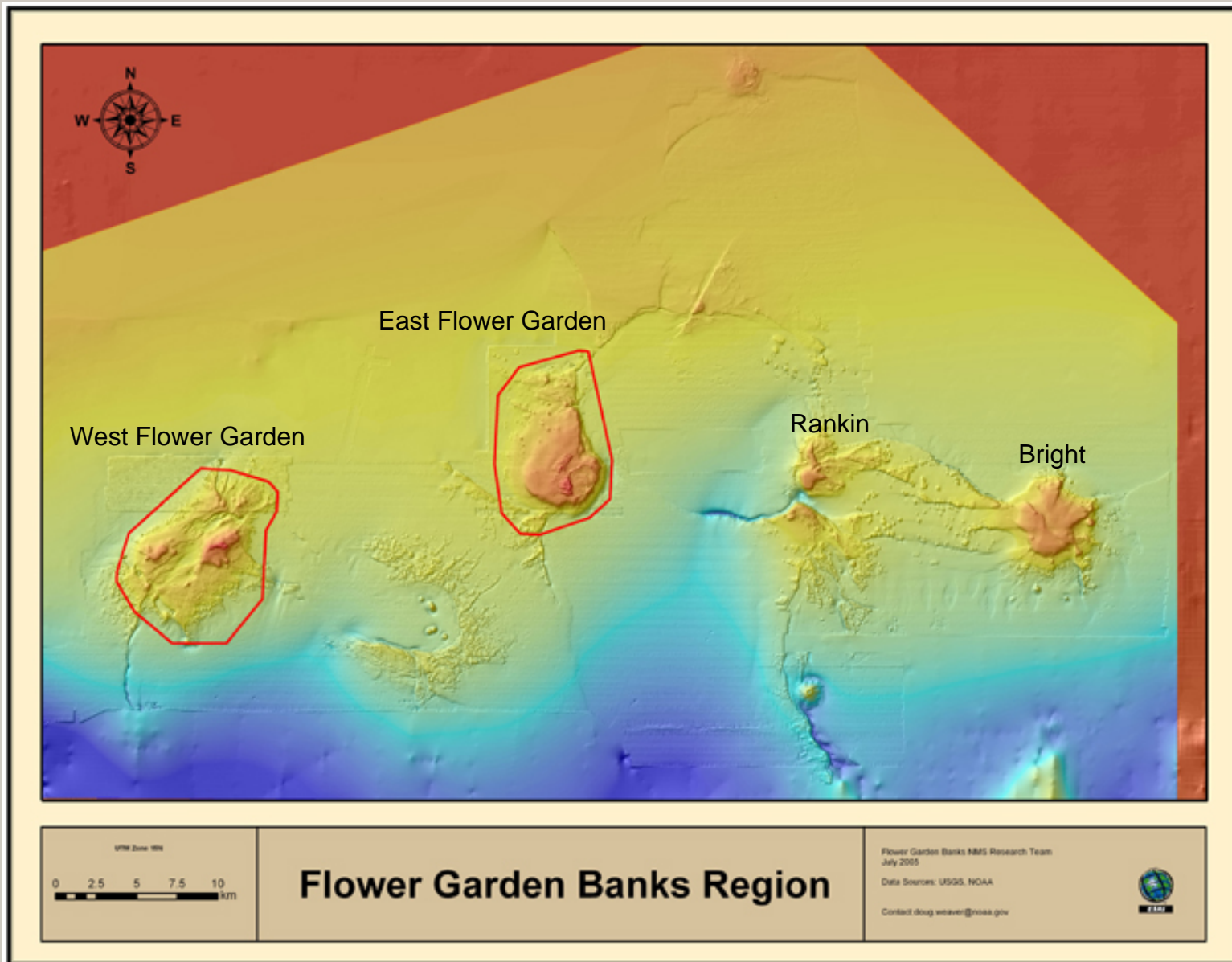
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Flower Garden Banks Region - USGS/NOAA/MMS surveys (1997-2005)



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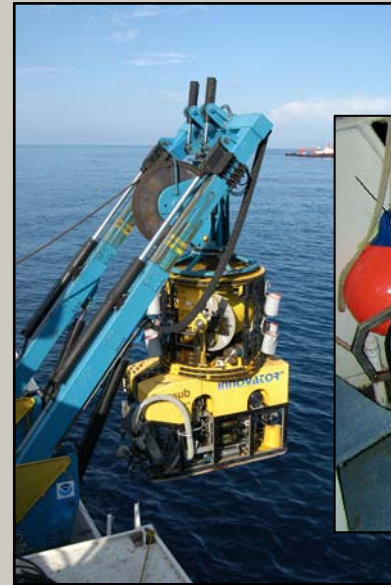


12 Submersible Cruises
218 hours of dive time

177 ROV Surveys
10 Submersible Surveys

East Flower Garden Bank - 50 surveys
West Flower Garden Bank - 81 surveys
Stetson Bank - 13 surveys
Bright Bank - 3 surveys
Alderdice Bank - 3 surveys
McGrail Bank - 20 surveys
Sonnier Bank - 1 survey

247 directed samples
8,497 digital images

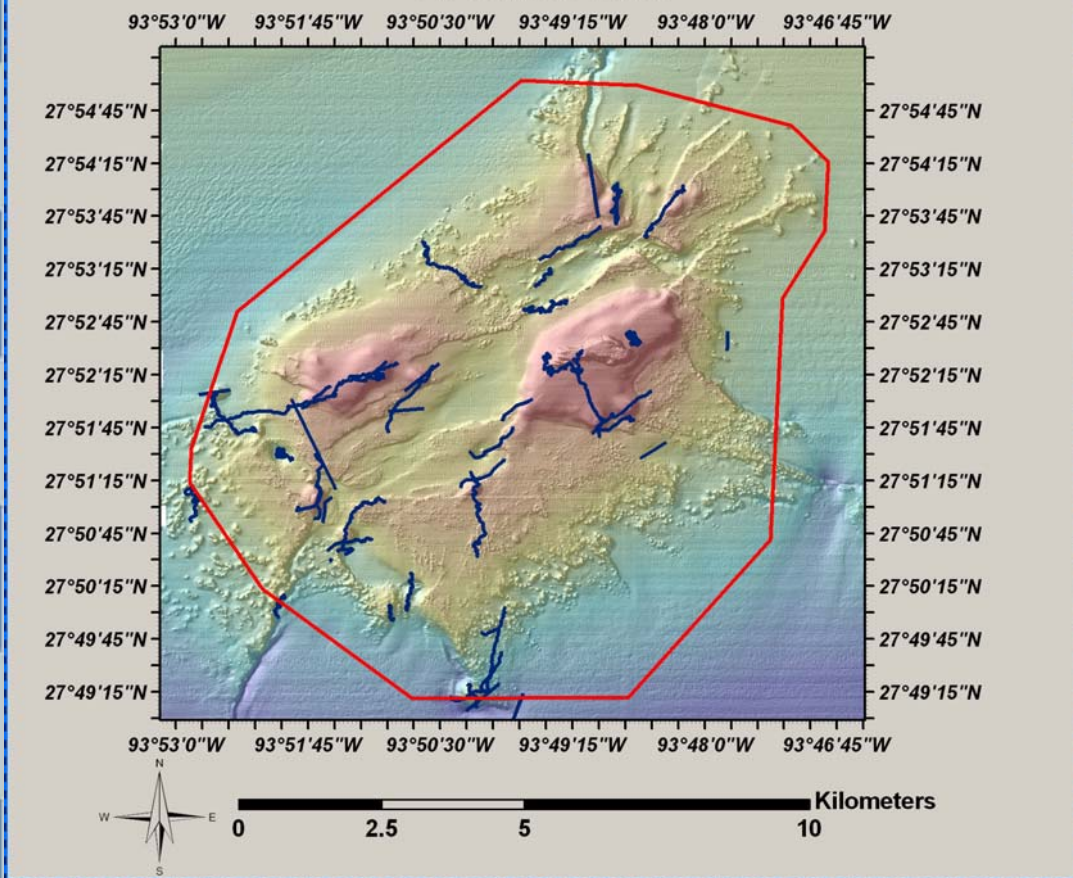




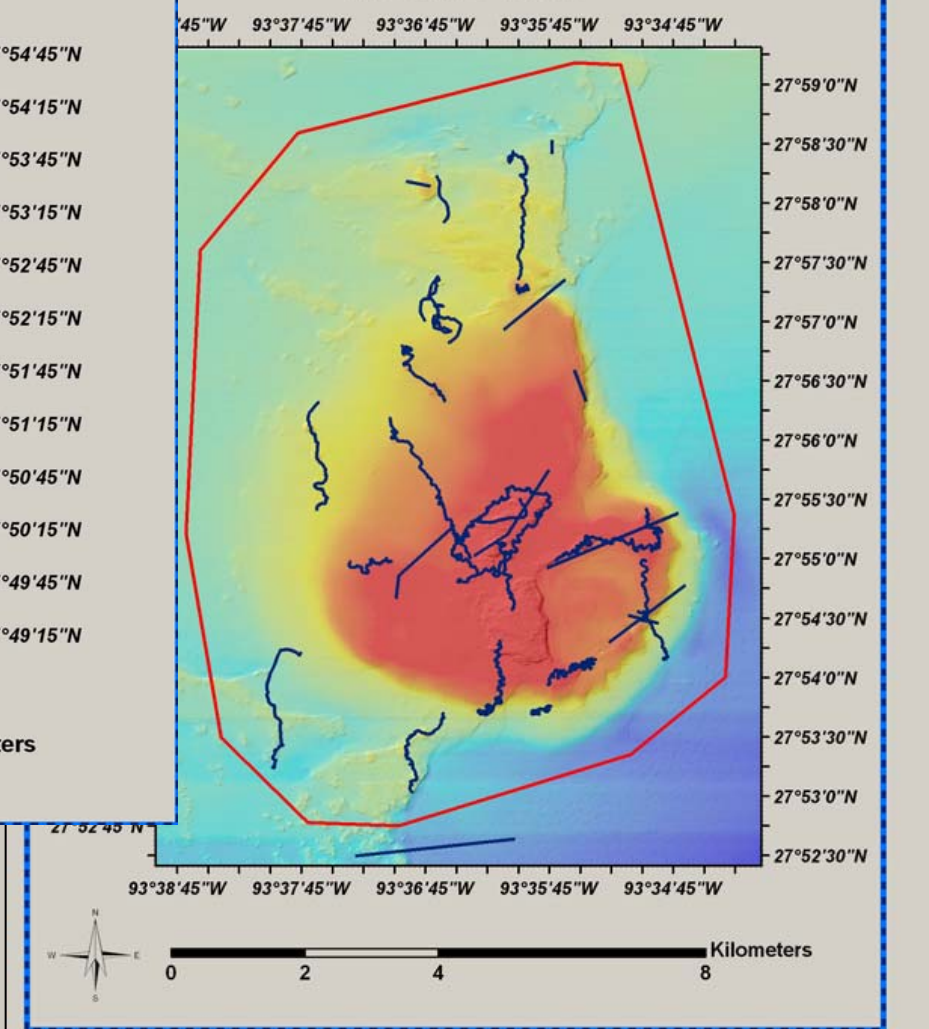
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WFGB ROV tracks



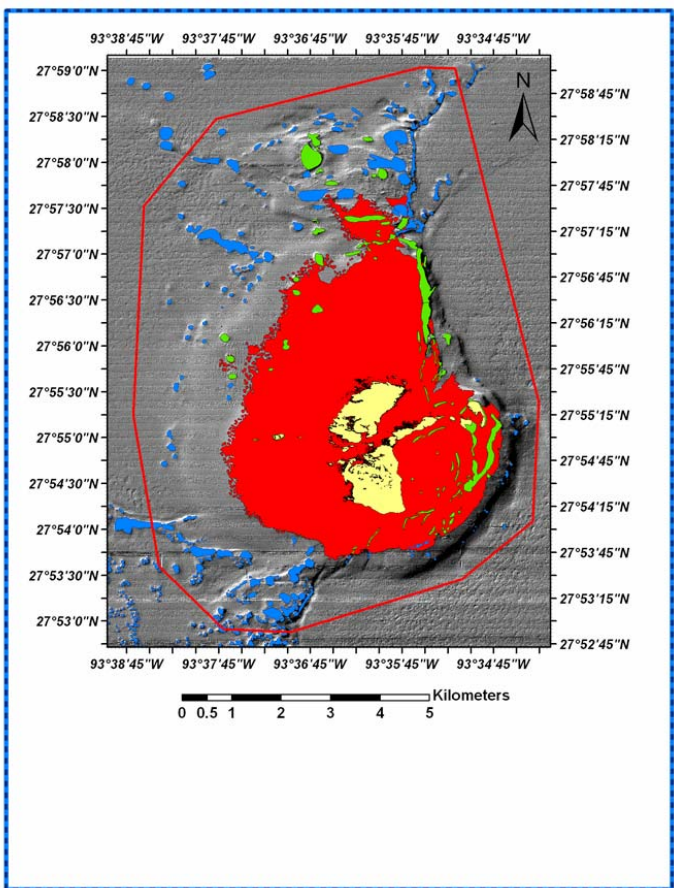
EFGB ROV tracks



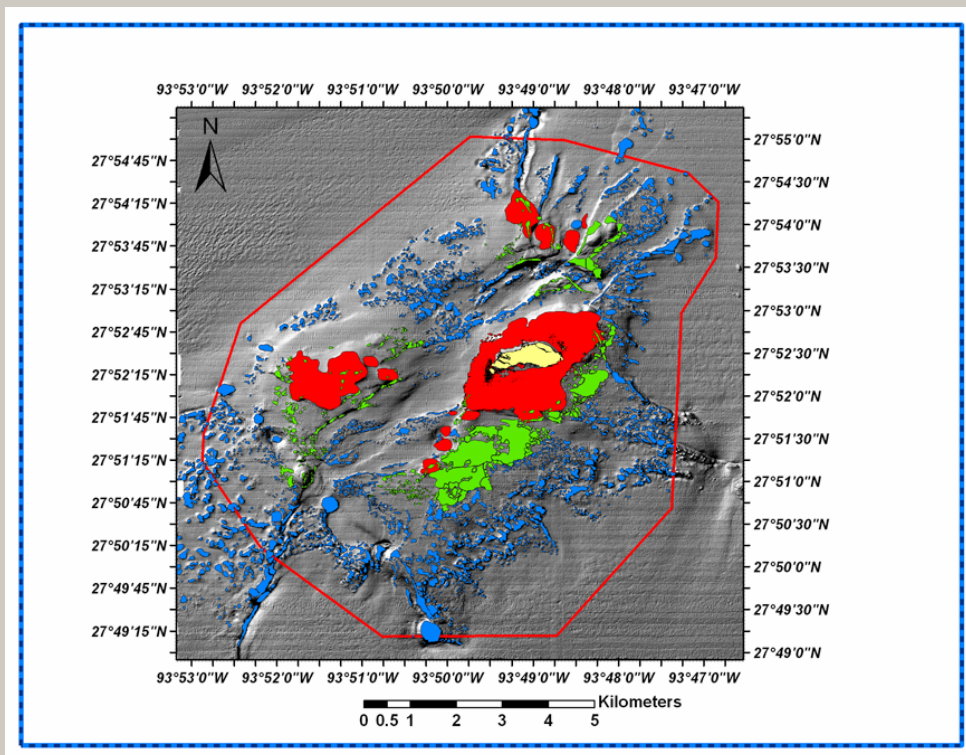
East and West Flower Garden Bank ROV Surveys: 131



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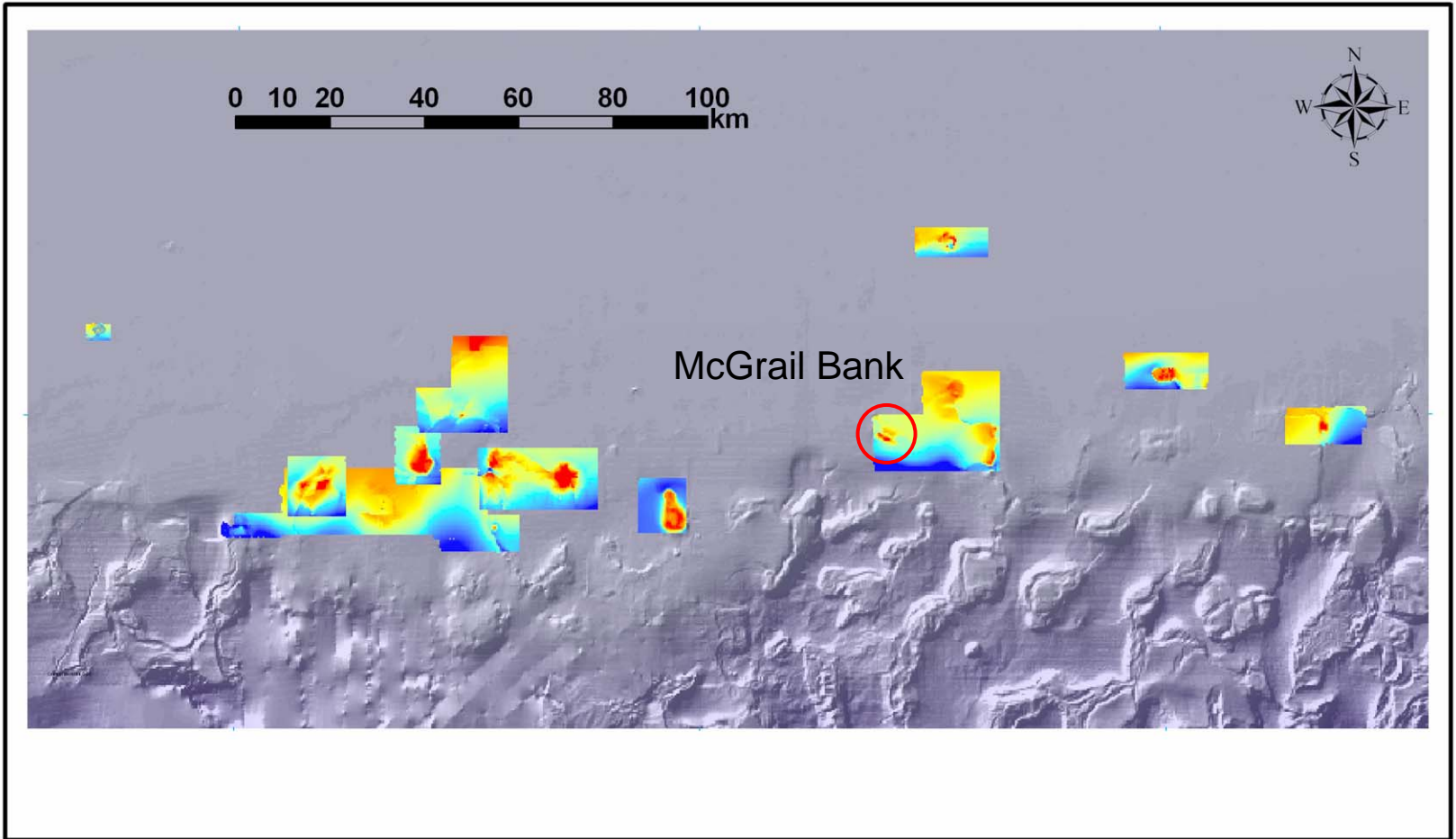


- Yellow** Coral Reef/Coral Community Zone
- Red** Algal Nodule Habitat within Coralline Algae Zone
- Green** Coralline Algae Reef Habitat within Coralline Algae Zone
- Blue** Deep Coral Zone
- Gray** Soft Bottom Community Zone



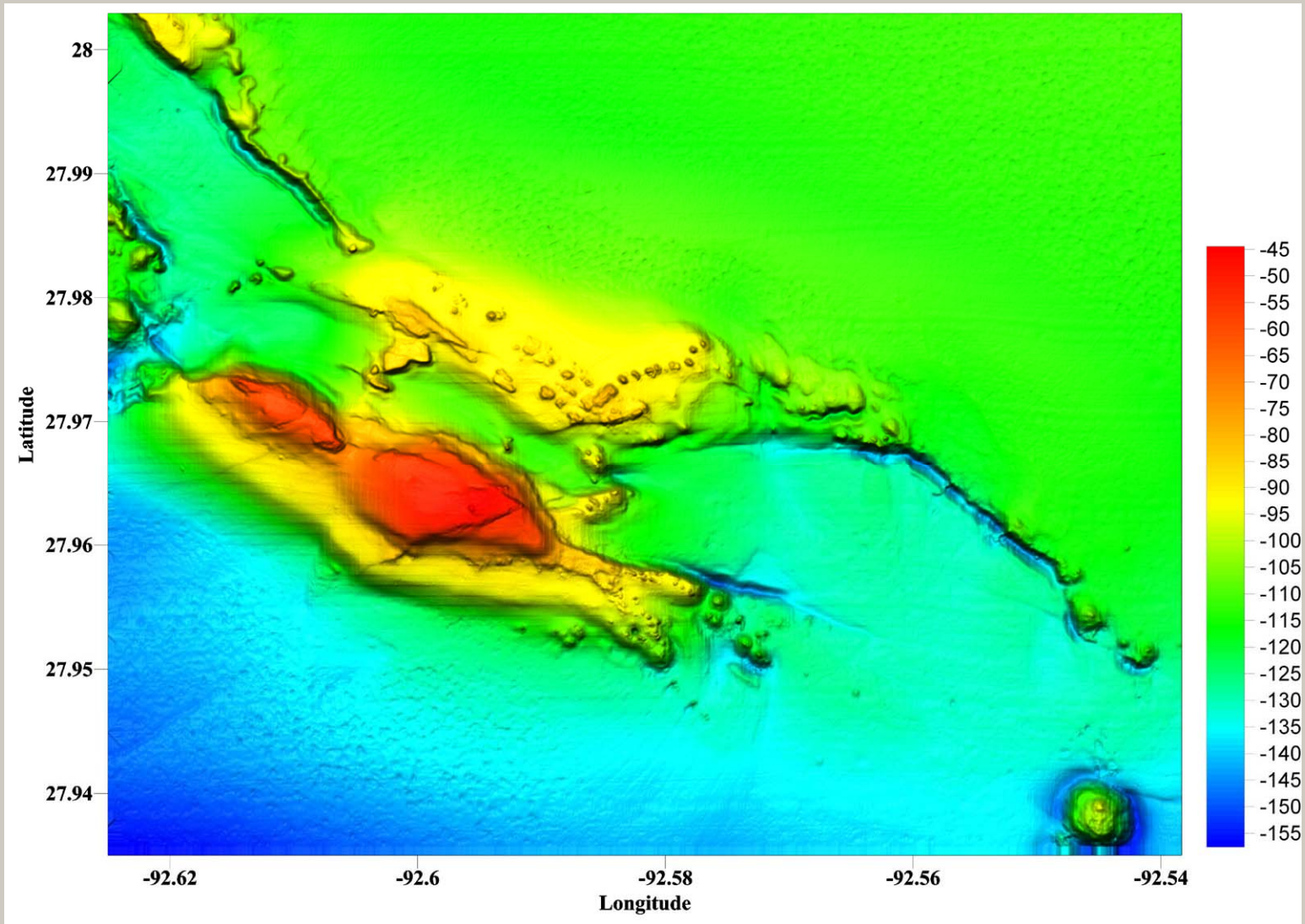


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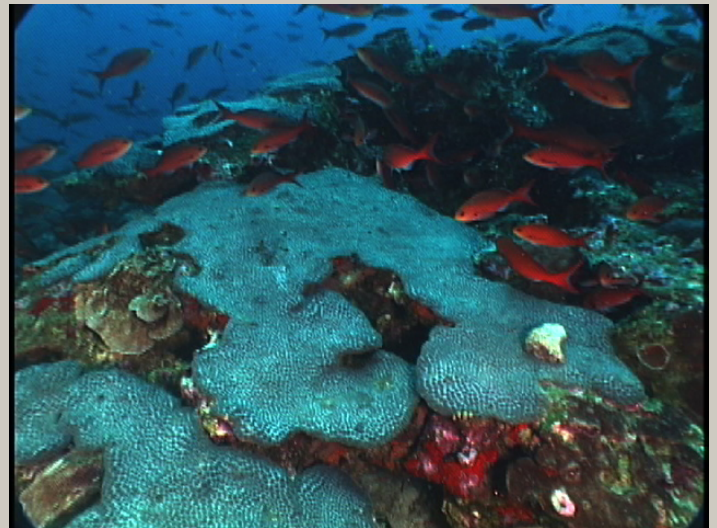
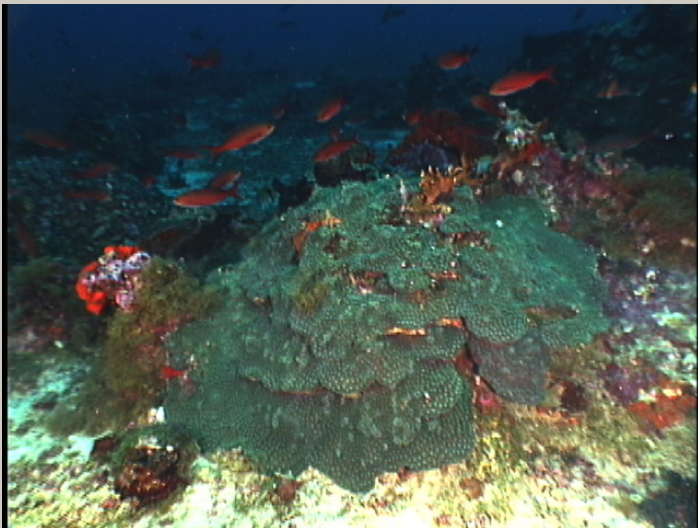
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McGrail Bank - Multibeam Bathymetry 2002

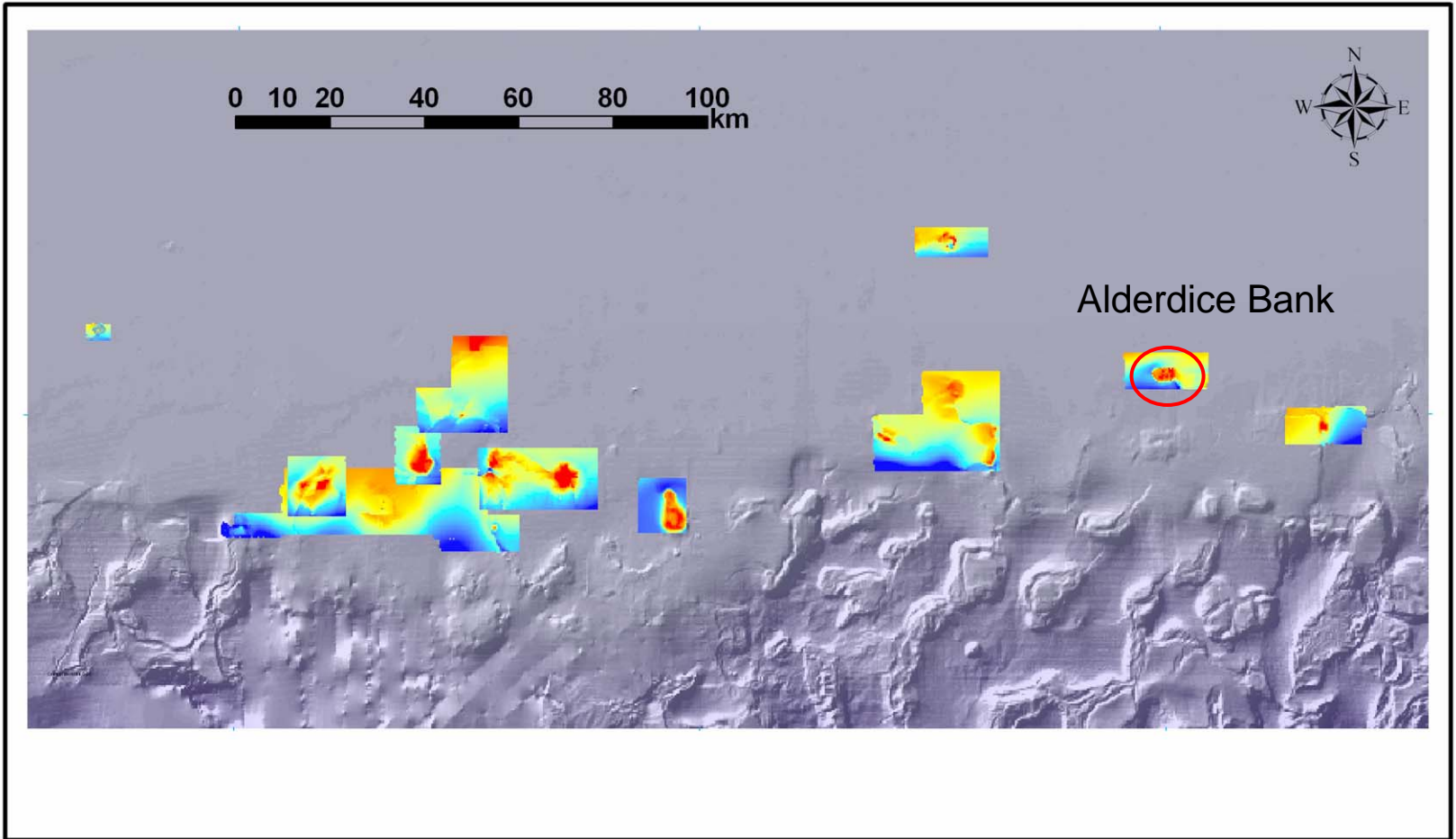


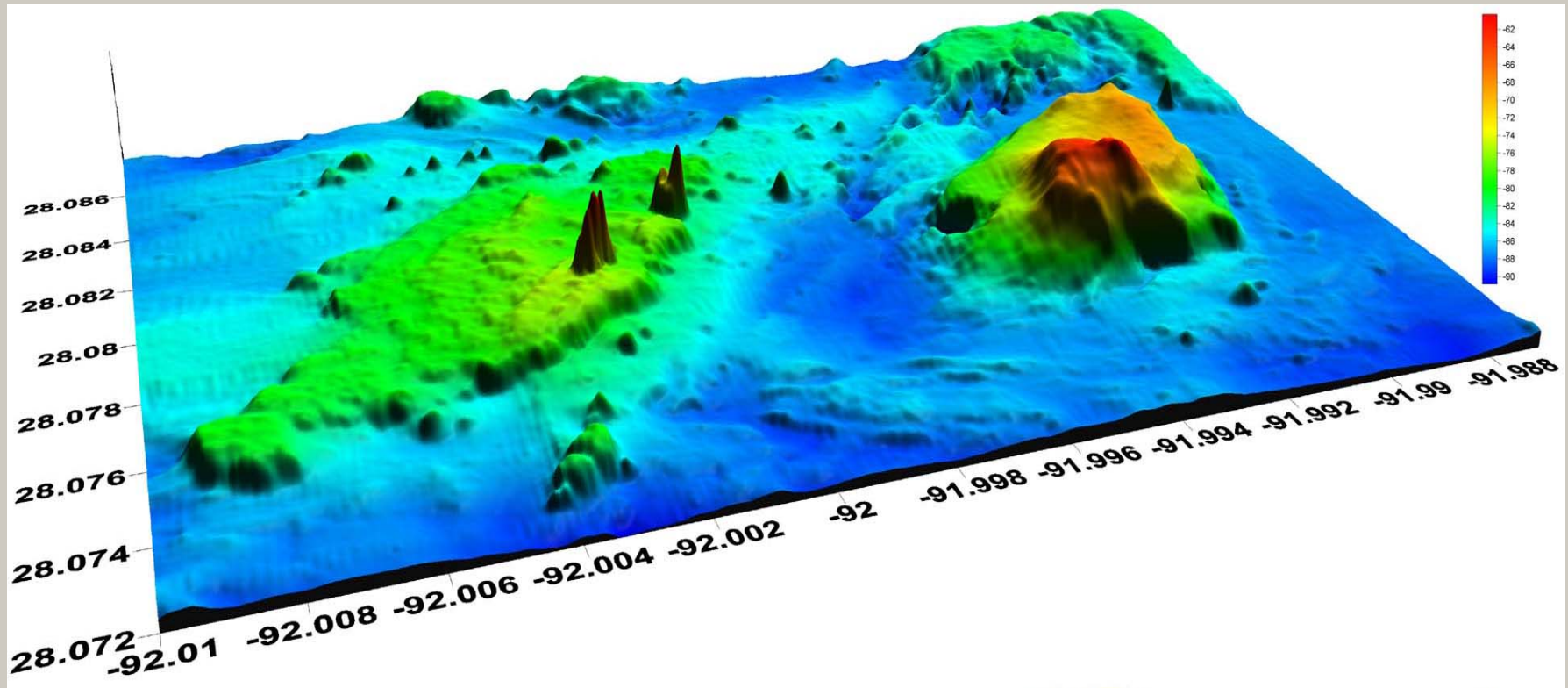
McGrail Bank - Coral Communities





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Alderdice Bank - Multibeam Bathymetry 2002



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Alderdice Bank

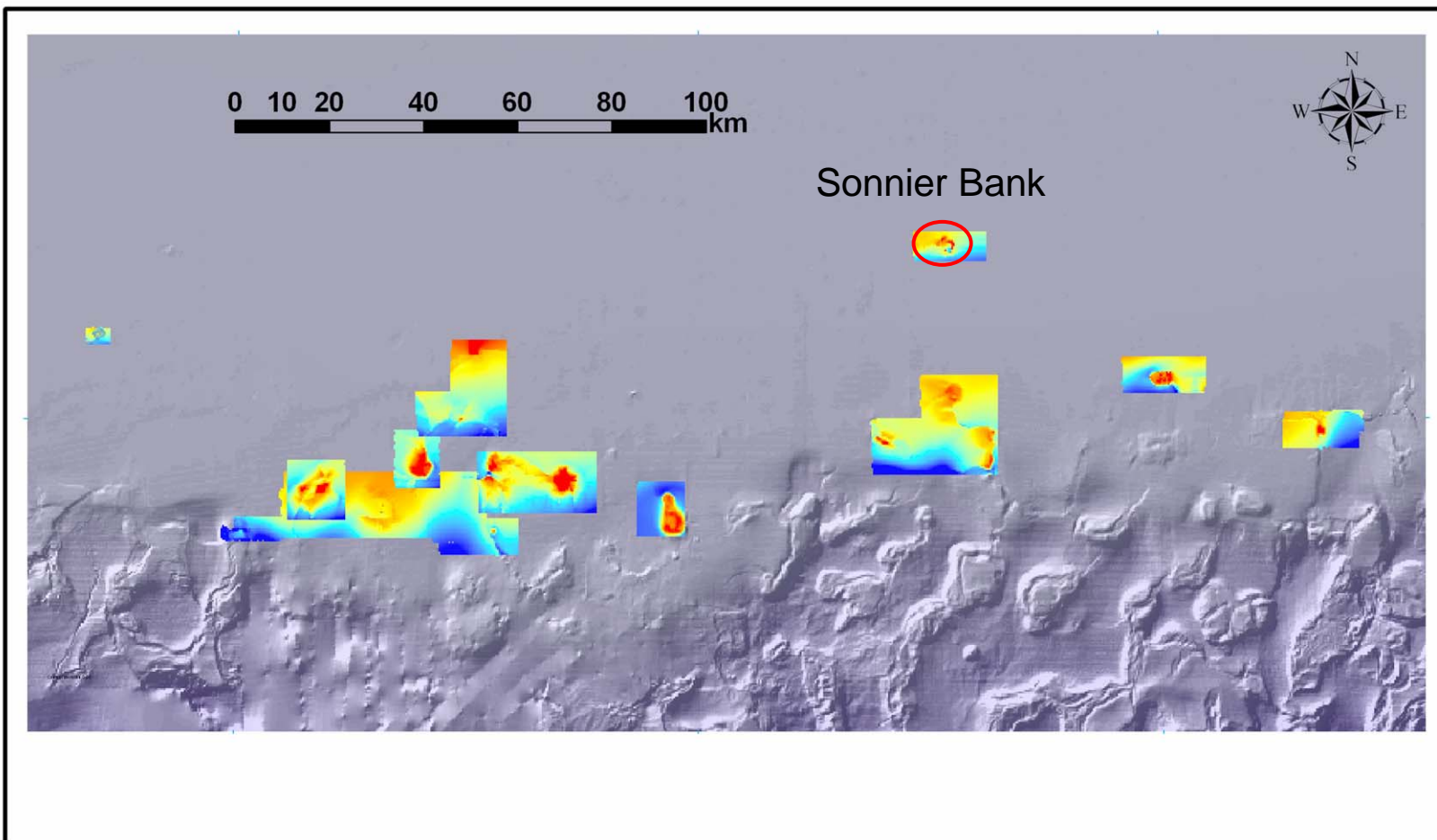


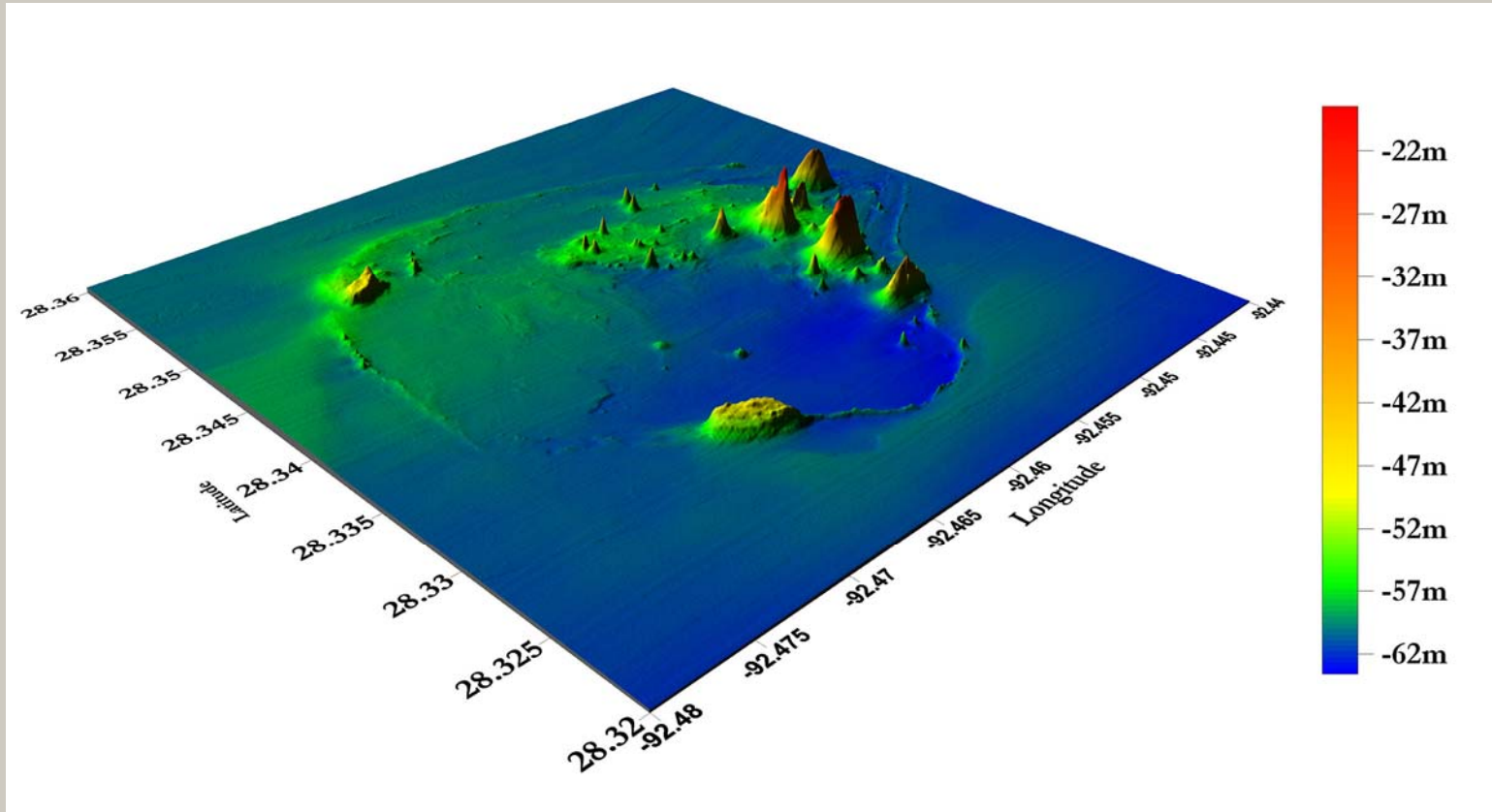
Basalt Spire



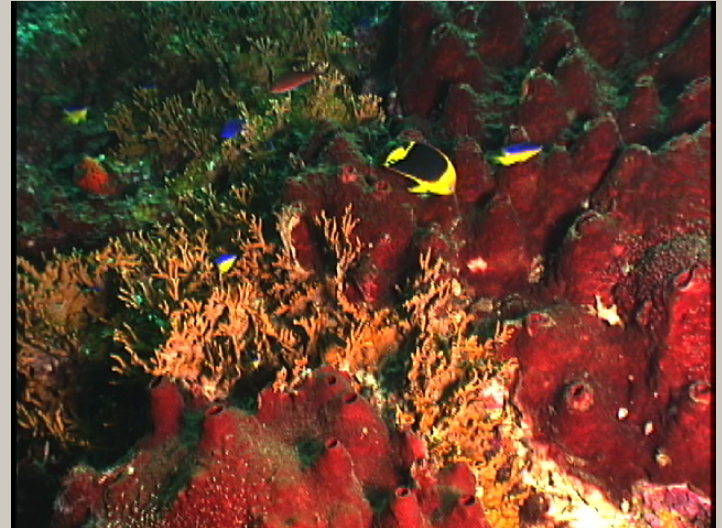
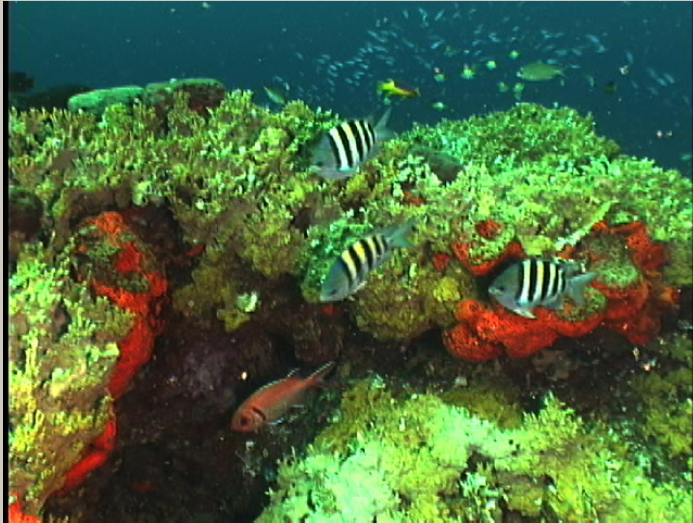


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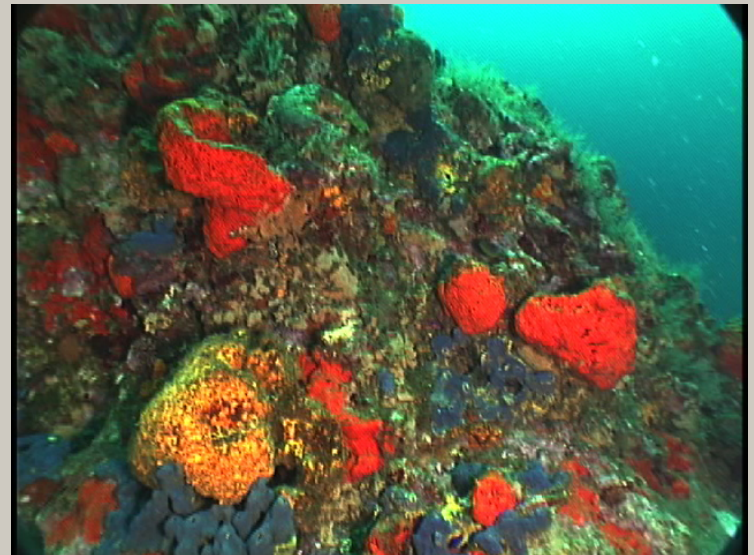
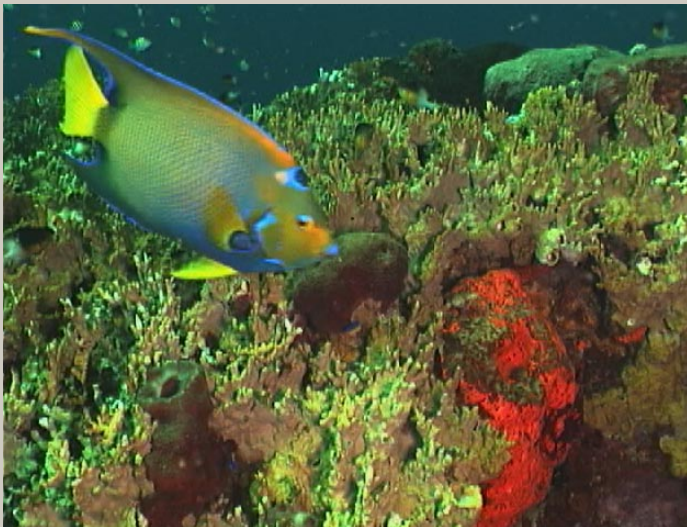




Sonnier Bank - Multibeam Bathymetry 2002

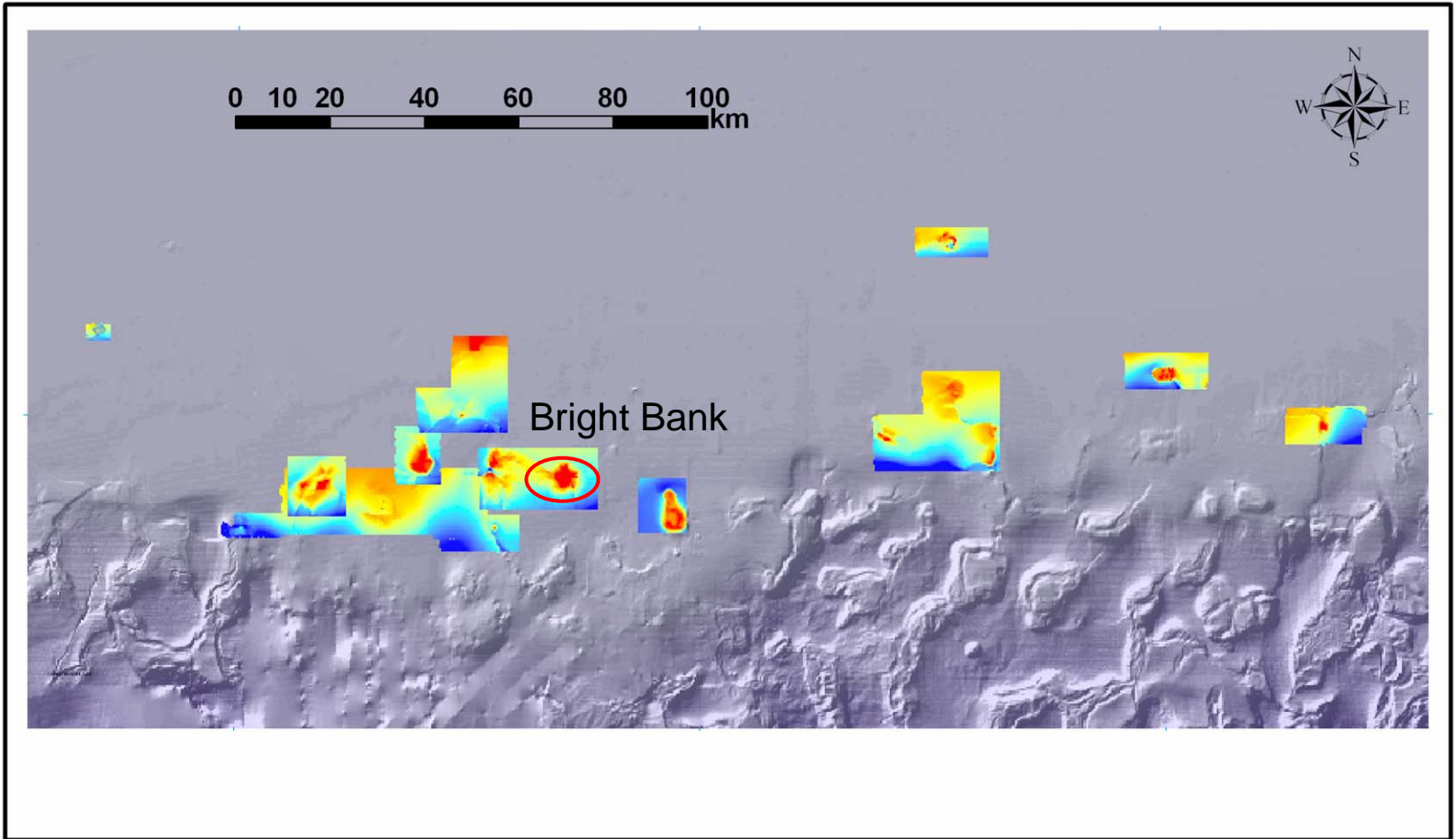


Sonnier Bank - *Millepora* / Sponge Habitat



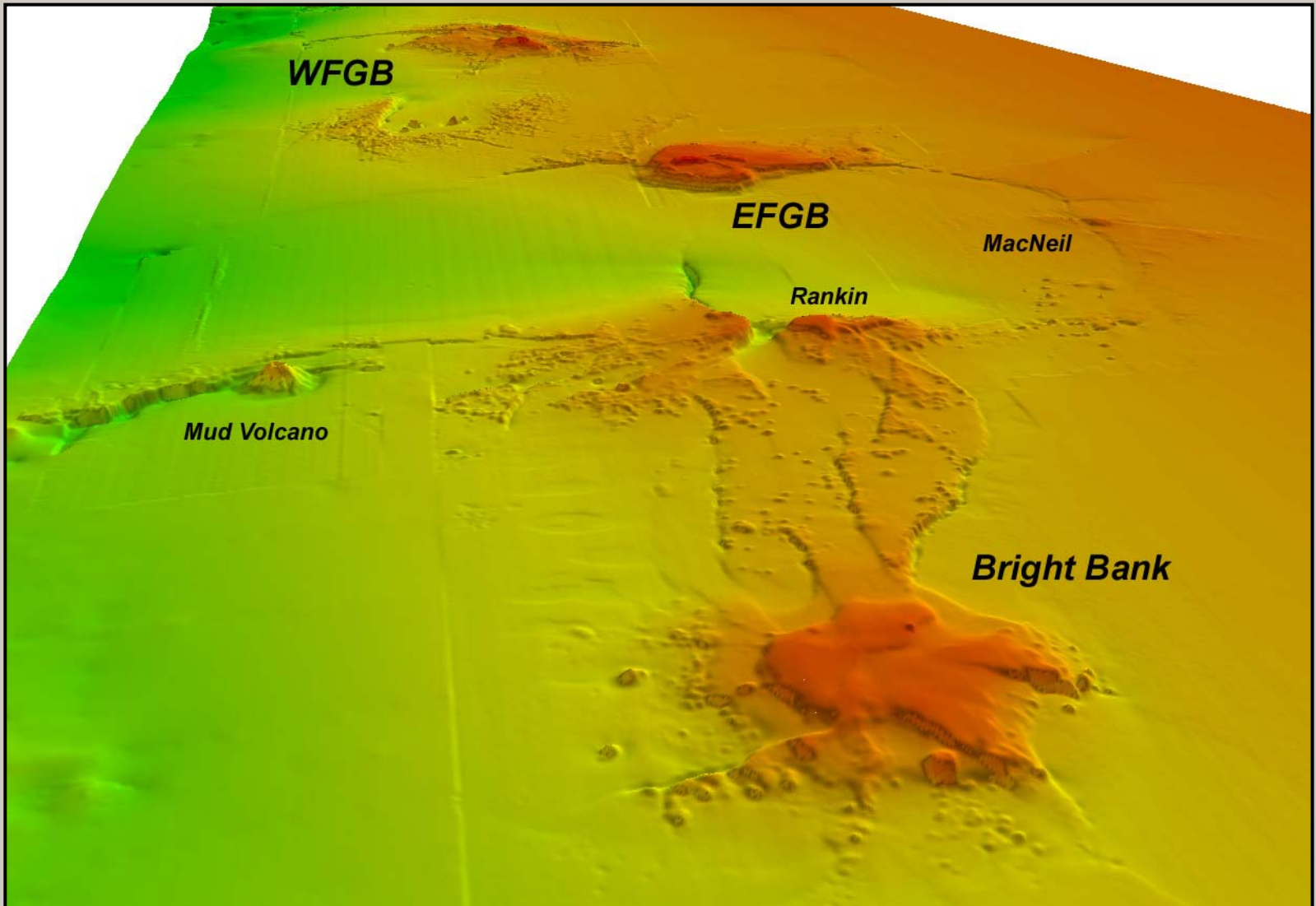


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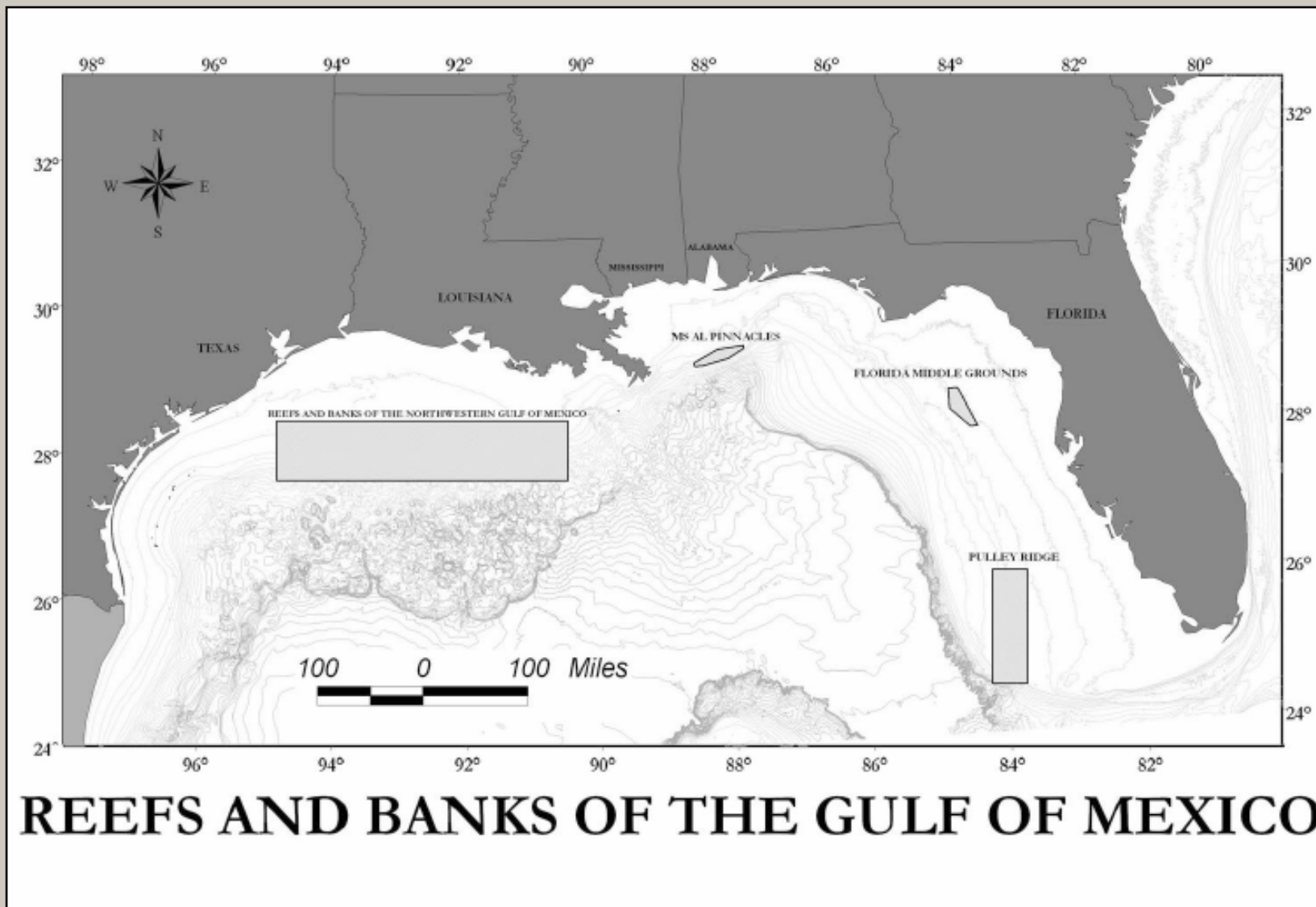


Bright Bank -
“Treasure “ salvage activities

Excavations in 1980's
Recent renewed interest



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