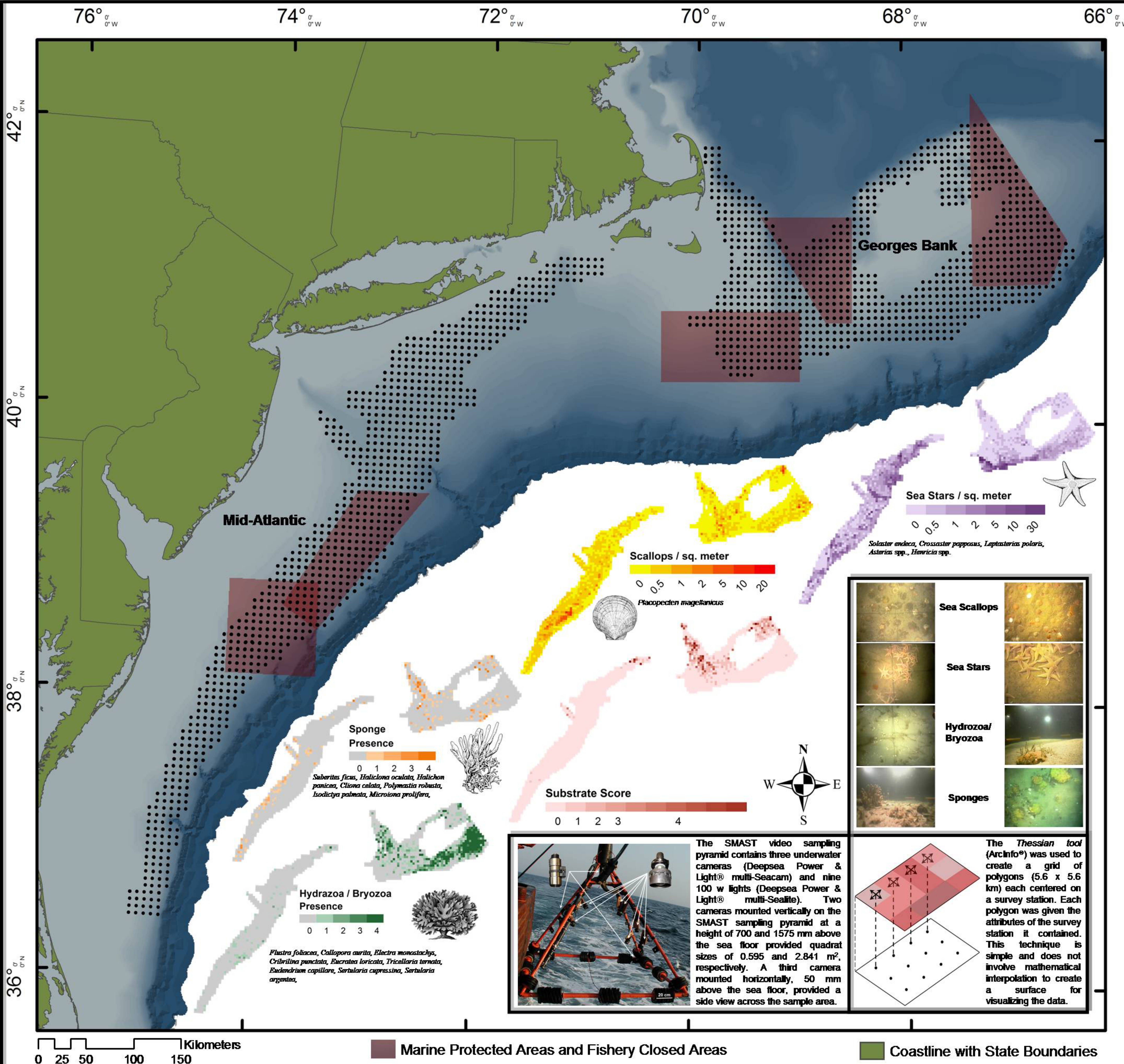


# Mapping Benthic Substrate and Macroinvertebrates along the Northwest Atlantic Ocean Continental Shelf with Underwater Video Surveys.



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## Abstract

Substrate is fundamental to the designation of Marine Protected Areas, Habitat Area of Particular Concern, and Essential Fish Habitat. We employed a centric, systematic underwater video survey of benthic substrates including sand, granule/pebble, cobble, boulder, and macroinvertebrates. We mapped the distribution of benthic substrates and macroinvertebrates using georeferenced video samples covering 60,000 km<sup>2</sup> of sea floor in waters 20 to 200 m deep.

## Introduction

Substrate data influenced the creation of three Marine Protected Areas encompassing 20,000 km<sup>2</sup> of sea floor on Georges Bank in 1994. A Habitat Area of Particular Concern on the Northern Edge of Georges Bank in 1998. Further, Essential Fish Habitat designations for many New England marine species rely heavily on substrate distributions. Unfortunately, substrate and macroinvertebrate data for the Mid-Atlantic and Georges Bank regions are spatially and temporally inconsistent, have low sampling frequencies, and dissimilar sampling methods.

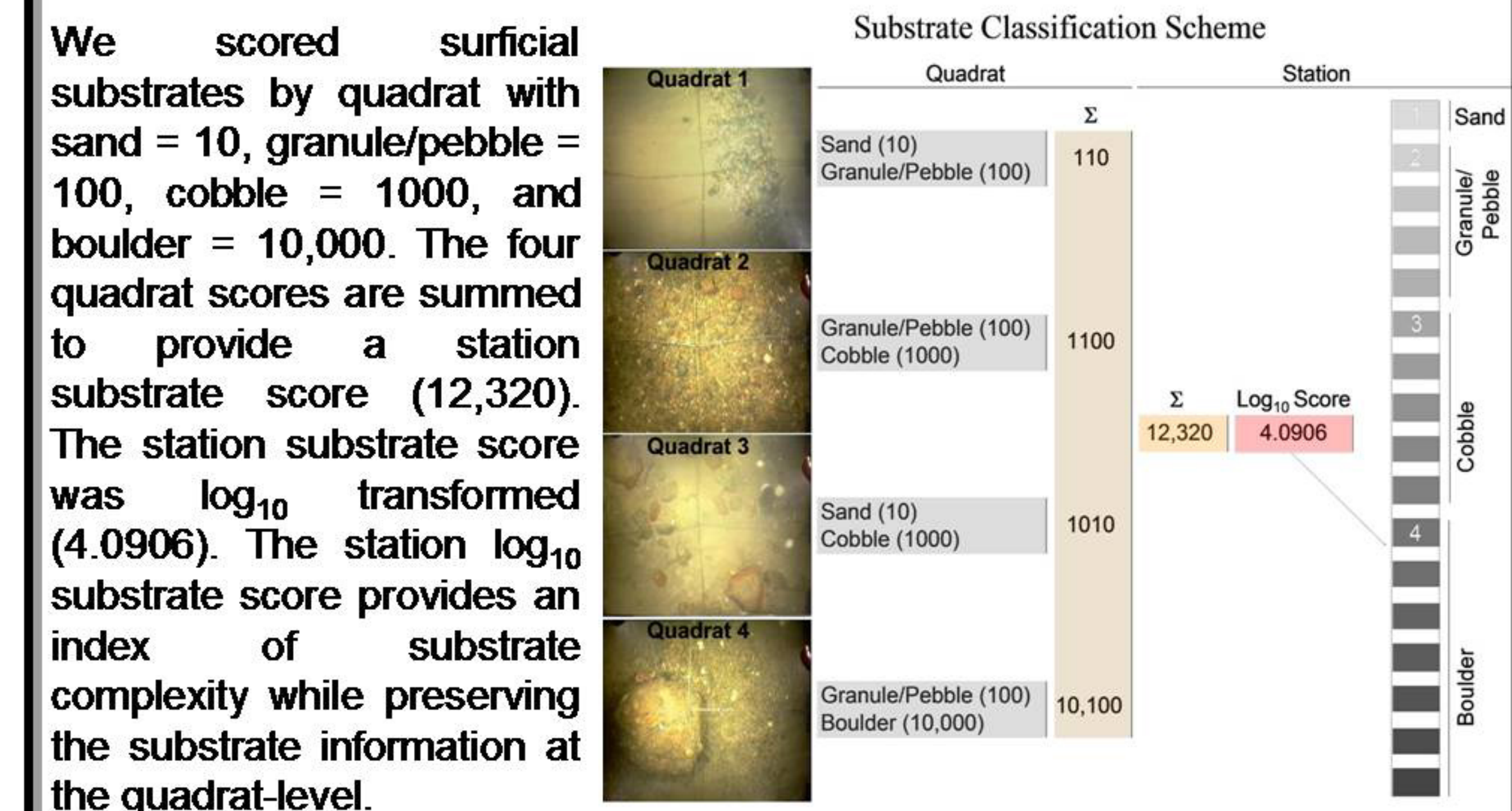
Using a video survey, we mapped sea scallop and sea star density distributions, benthic substrates, and the presence or absence of sponges and hydrazoa / bryozoa.

We have annually surveyed these 1850 stations since 2003. However, only the 2004 survey data are presented here.

## Methods

We positioned the survey stations on a 5.6 by 5.6 km grid covering historical and present sea scallop fishing grounds based on information from commercial fishermen and the satellite Vessel Monitoring System. We used ArcPad® mobile GIS software to target each station, where the survey vessel stopped and the video pyramid was lowered to the sea floor. Video footage was recorded on S-VHS tapes. The pyramid was lowered to the sea floor four times to record four quadrat samples. At each quadrat we recorded the time, depth, latitude and longitude, substrate and macroinvertebrates. After each survey the tapes were reviewed in the laboratory and an image of each quadrat was digitized using Image Pro Plus® software (TIF file format).

We measured scallop and sea star densities, and the presence or absence of sponges and hydrazoa / bryozoa at each station.



## Acknowledgements

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Projection: Transverse\_Mercator  
(NAD 1983 UTM Zone 19N)

Depth Contours: Based on "gome\_contours.shp"  
(USGS, Open-File Report 03-001, OFR 03-001)

Marine Protected Areas and Fishery Closed Areas  
Coastline with State Boundaries  
Video Survey Stations