

U. S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Marine Fisheries Service
Southeast Fisheries Science Center

Cruise Report

Date Submitted:

Platform:

Cruise Number:

Project Title:

Cruise Dates: -

Submitted by:
Field Party Chief

Date:

Approved by:
Division Director

Date:

Approved by:
Director, SEFSC

Date:

CRUISE RESULTS

NOAA Ship *Oregon II*, Cruise R2-21-02 (340)

INTRODUCTION

NOAA Ship *Oregon II* departed Pascagoula, MS on July 4, 2021 for the Summer Shrimp/Bottom Fish Survey conducted under the auspices of the Southeast Area Monitoring and Assessment Program (SEAMAP). SEAMAP is a state-federal-university program for the collection, management and dissemination of fishery independent data. The primary objective of this survey was to monitor the relative abundance, spatial distribution, and size composition of penaeid shrimp stocks and other demersal organisms across the northern Gulf of Mexico (GOM) in water depths from 5 to 60 fm.

Sailing during the COVID-19 pandemic necessitated development of additional safety measures as well as risk assessment and approval for the survey through NOAA leadership. The port call was limited to the homeport of Pascagoula, MS to reduce exposure risks associated with COVID-19. The survey was reduced to two legs (20 and 18 days, respectively), and scientists and crew members were to stay aboard between legs or new crew could board only after Shelter in Place (SIP)/COVID-19 testing protocols were followed to maintain the shipboard quarantine “bubble.” The Office of Marine and Aviation Operations (OMAO) SIP protocols were defined as staying at home or in the current place of residence (hotel), leaving only for essential activities related to urgent or emergency medical issues, food, and outdoor exercise.

NOAA Ship *Oregon II* was scheduled for 38 days at sea, which was divided into two legs: Leg 1) June 13 – July 2 and Leg 2) July 4 – 21. Due to problems initially in finding sufficient ship’s personnel followed by non-negative COVID-19 test results that affected the vessel’s safe manning level, the entire first leg was canceled. The second leg sailed as scheduled. Shortly after sampling began in the Western Gulf, a tropical disturbance formed over the area where the ship was sampling. This resulted in a loss of 24 hours.

SUMMARY OF OBJECTIVES

1. Sample the northern GOM with SEAMAP standard trawl sampling gear to determine the abundance and distribution of benthic fauna.
2. Collect size measurements to determine population size structures.
3. Transmit real-time shrimp biological data weekly to Gulf States Marine Fisheries Commission (GSMFC) in Ocean Springs, MS.
4. Record profiles through the water column of temperature, salinity, fluorescence, dissolved oxygen, and turbidity using a Conductivity/Temperature/Depth (CTD) unit at SEAMAP stations and

transmit to NOAA National Center for Environmental Information (NCEI).

5. Collect water samples daily at max depth using the Winkler titration method on triplicate samples to monitor the accuracy of the CTD.
6. Use the NOTUS Trawlmaster Gear System to monitor the trawl's performance during the tow in real-time.
7. Attach cameras to the CTD unit to assess the bottom.
8. Attach a MiniDOT USB Oxygen Logger sensor to the headrope of the net and on one of the trawl doors at every station to monitor dissolved oxygen levels and temperature at bottom depth during the tow.
9. Use cameras to collect imagery on shrimp bycatch to train AI/ML models by placing cameras over the conveyor belt and on the back deck where the catch is dumped.
10. Conduct additional trawl sampling.
11. Conduct additional CTD casts.

SURVEY DESIGN

The sampling gear consisted of a 12 m (40 ft) shrimp net with 2.4 m by 1 m chain bracketed wooden doors towed with 54 m bridles and a single warp. A standard free tickler chain cut 106 cm shorter than the footrope was used to stimulate organisms out of the substrate and into the path of the oncoming net. Sample sites (300) were randomly selected between 5 and 60 fm within Gulf Coast shrimp statistical reporting zones 2-21. Bathymetric data were obtained from NOAA's Environmental Satellite, Data, and Information Service (NESDIS) website. Sampling sites were proportionally allocated according to surface area of statistical zones and two depth allocation units, 5-20 and 21-60 fm. Tow durations were 30 min at a targeted speed of 2.5 kt with tow direction left to the discretion of the bridge watch.

The NOTUS Trawlmaster Gear System was used at all stations to monitor the trawl gear performance. The NOTUS system assessed in real-time the accuracy of the trawl's deployment, as it is being towed, and during its retrieval. With sensors attached to the doors and footrope, the system calculated how far the doors were spread and monitored the trawl's position in reference to the sea floor using an inclinometer. The sensors and hydrophone communicate to a command center that collects and displays all of the appropriate data. Along with determining the functionality of the trawl, a dissolved oxygen sensor called a MiniDOT USB Oxygen logger was attached to the headrope and one of the trawl doors to monitor dissolved oxygen levels and temperature at bottom depth during the tow.

Catch data were electronically recorded at-sea with the Fishery Scientific Computing System (FSCS), version 1.6, developed by NOAA's Systems Development Branch of OMAO. The FSCS was used in conjunction with the Southeast Advanced Logger (SEAL, version 4.0.1) which recorded position, depth, date, time, and meteorological data. Catches were either processed in their entirety or subsampled, depending on the total catch weight. If catches exceeded 22.7 kg (50 lb), then at least 10% was taken as a subsample. Catches (or subsamples) were sorted to the lowest taxonomic level possible then enumerated and weighed. Taxa that were not identified to species level were returned to the laboratory for additional taxonomic resolution.

Weights were collected using Marel motion compensating M1100 scales. Large capacity scales

(30 kg max, 10 gm resolution) were used to obtain total catch weights and small capacity scales (6 kg max, 1 gm resolution) for individual species weights. Lengths were recorded using Limnoterra Limited electronic measuring boards. A maximum of 20 individuals per species of red snapper, grouper, lionfish and elasmobranchs per station were selected for individual size measurements, weight, and sex. A maximum of 50 individuals per commercial species of shrimp per station were selected for individual size measurements, weight, and sex. For all other species, a maximum of 20 individuals were selected per station for size measurements and every fifth individual collected weight and sex in that series of 20.

Vertical profiles of temperature, conductivity, dissolved oxygen, percent light transmission and fluorometer values were recorded with a Seabird SBE 911. Water color and percent cloud cover observations were also taken during daylight hours. To better characterize bottom habitat, a Sony action camera and a LED light system were attached to the carousel of the CTD profiler to illuminate bottom substrate at every station. When the CTD cast was complete, the camera was removed and downloaded. CTD profiles were transmitted to a FTP website hosted by the NCEI.

RESULTS

Two hundred and seven stations were planned for NOAA Ship *Oregon II* to complete, but an additional six were assigned to NMFS to assist state partners with completing their assigned stations. Of the 213 stations, 67 in the East were dropped due to the loss of the entire first leg. Twenty stations were dropped in the West before the start of the second leg for lack of time during the survey to make sure all stations satisfied the proportional allocations in each statistical zone and depth strata. After losing another 24 hours due to weather, another 16 stations were dropped for time to satisfy proportional allocations. A total of 101 stations were completed successfully and nine were given an operational code for an assortment of problems (e.g. torn net, mud tow, etc.).

The CTD was successfully deployed 111 times at 110 stations. Extra CTD casts are typically done during the SEAMAP Summer Groundfish Survey to collect more dissolved oxygen data when it is suspected that the ship has traversed through the edge of a hypoxic area (Figure 6). The CTD camera system was used at 103 stations where a trawl was conducted to characterize the bottom habitat type. In addition to the CTD camera system (Figure 2), the MiniDOT USB Oxygen Logger sensor was deployed on the headrope for 101 trawls (Figure 3) and the door for 109 trawls (Figure 4). The NOTUS Trawlmaster Gear System was deployed on all 110 trawls (Figure 5).

The total catch weight was 4,622.4 kg. There were approximately 22,971 measurements, 10,097 individual weights and 7,068 sex determinations recorded from 261 taxa.

The three most abundant species that accounted for at least 1% of the total catch in weight included Atlantic croaker, *Micropogonias undulatus* (1384.7 kg), brown shrimp, *Penaeus aztecus* (542.9 kg), and spot, *Leiostomus xanthurus* (437.6 kg) (Table 1). These three species represent 51.2% of the total weight of all specimens caught.

SAMPLE REQUESTS

Various fish and invertebrate samples were collected for outside partners and graduate studies and were frozen and returned to requestors at NOAA Fisheries Pascagoula, MS, NOAA Fisheries Galveston, TX, NOAA Fisheries Panama City, FL, University of Southern Mississippi-GCRL, and Texas A&M

University.

QUALITY CONTROL

As part of a study to determine accuracy of our identifications, five specimens of each species from both day and night watches from each stat zone were identified, saved and frozen. Specimens were a representation from each newly encountered species within each Shrimp Statistical Zone. These samples were brought back to NOAA Fisheries in Pascagoula, MS to verify for accuracy.

CRUISE PARTICIPANTS

Leg I (CANCELLED)

Name (Last, First)	Title	Affiliation
Stepongzi, Christina	FPC	ERT, Inc., MS Labs, Pascagoula, MS
Wallace, Taniya	Watch Leader	ERT, Inc., MS Labs, Pascagoula, MS
Hamilton, Alonzo	Watch Leader	NMFS, MS Labs, Pascagoula, MS
Drass, Denice	Watch Stander	NMFS, MS Labs, Pascagoula, MS
Garner, Steven	Watch Stander	CIMAS, Panama City, FL
Cooper, Josh	Watch Stander	AIS, Galveston, TX
LaMonica, Lauren	Watch Stander	CIMAS, Galveston, TX
Pollack, Adam	Watch Stander	NMFS, MS Labs, Pascagoula, MS
Falana, Kendall	FMES	NMFS, MS Labs, Pascagoula, MS

Leg II (4 July – 21 July 2021)

Name (Last, First)	Title	Affiliation
Stepongzi, Christina	FPC	ERT, Inc., MS Labs, Pascagoula, MS
Wallace, Taniya	Watch Leader	ERT, Inc., MS Labs, Pascagoula, MS
Hamilton, Alonzo	Watch Leader	NMFS, MS Labs, Pascagoula, MS
Barnett, Beverly	Watch Stander	NMFS, Panama City, FL
Salisbury, Joey	Watch Stander	ERT, Inc., MS Labs, Pascagoula, MS
Hopkins, Nick	FMES	NMFS, MS Labs, Pascagoula, MS
Ingram, Walter	Watch Stander	NMFS, MS Labs, Pascagoula, MS
Nylander-Asplin, Hannah	Watch Stander	CIMAS, Galveston, TX
Cooper, Josh	Watch Stander	AIS, Galveston, TX

Table 1: The most abundant species caught at 109 stations in the West Delta and Texas, which accounted for 1% of the total catch in number and weight on NOAA Ship *Oregon II* R2-21-02 (340).

ZONE	TAXON	Frequency	Total Number	Total Weight (kg)	Percent Number (%)	Percent Weight (%)	Percent Occurrence (%)
WEST	Atlantic croaker, <i>Micropogonias undulatus</i>	86	41038	1384.66	24.0223	30.1157	78.899
WEST	Brown shrimp, <i>Penaeus aztecus</i>	95	40974	542.91	23.9848	11.8081	87.156
WEST	Spot, <i>Leiostomus xanthurus</i>	48	6094	437.62	3.5672	9.5181	44.037
WEST	Lesser blue crab, <i>Callinectes similis</i>	62	20537	164.53	12.0217	3.5784	56.881
WEST	Longspine porgy, <i>Stenotomus caprinus</i>	54	3052	142.7	1.7865	3.1037	49.541
WEST	Paper scallop, <i>Euvola marenis</i>	46	12115	125.34	7.0917	2.726	42.202
WEST	Silver seatrout, <i>Cynoscion nothus</i>	57	2332	96.12	1.3651	2.0905	52.294
WEST	Atlantic cutlassfish, <i>Trichiurus lepturus</i>	55	1856	71.03	1.0864	1.5448	50.459

Figure 1: Outcomes of the trawl stations assigned to NOAA Ship *Oregon II* R2-21-02 (340).

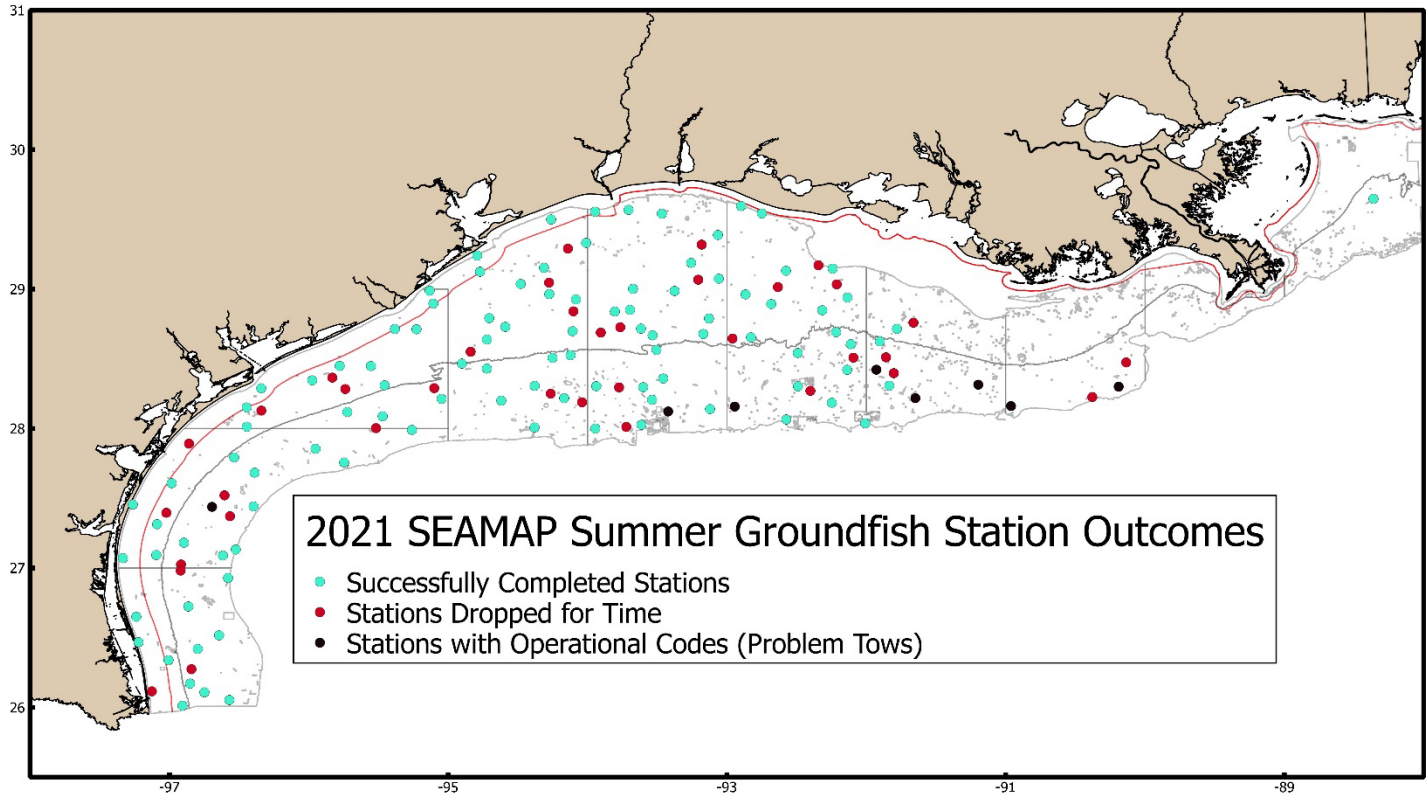


Figure 2: 2021 SEAMAP Summer Trawl Survey stations where a CTD camera was deployed.

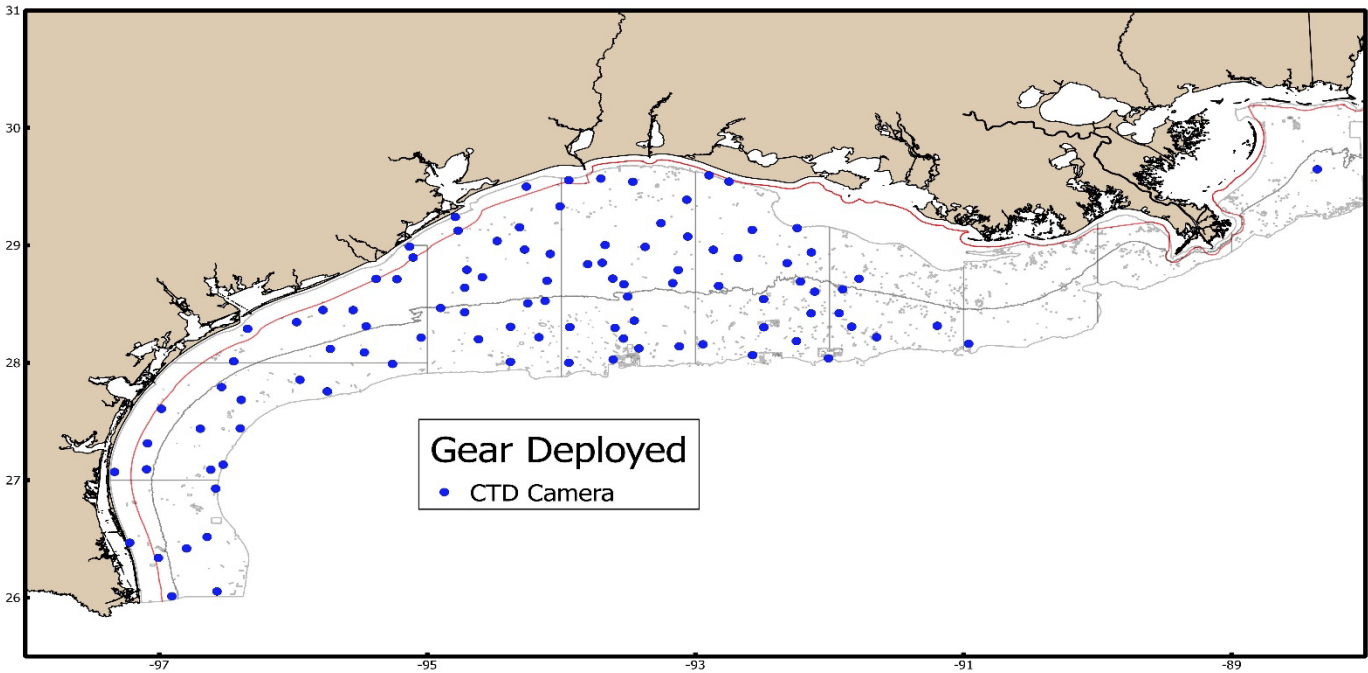


Figure 3: 2021 SEAMAP Summer Trawl Survey maps depicting the stations where a MiniDOT USB Oxygen Logger Sensor was deployed on the headrope of the net.

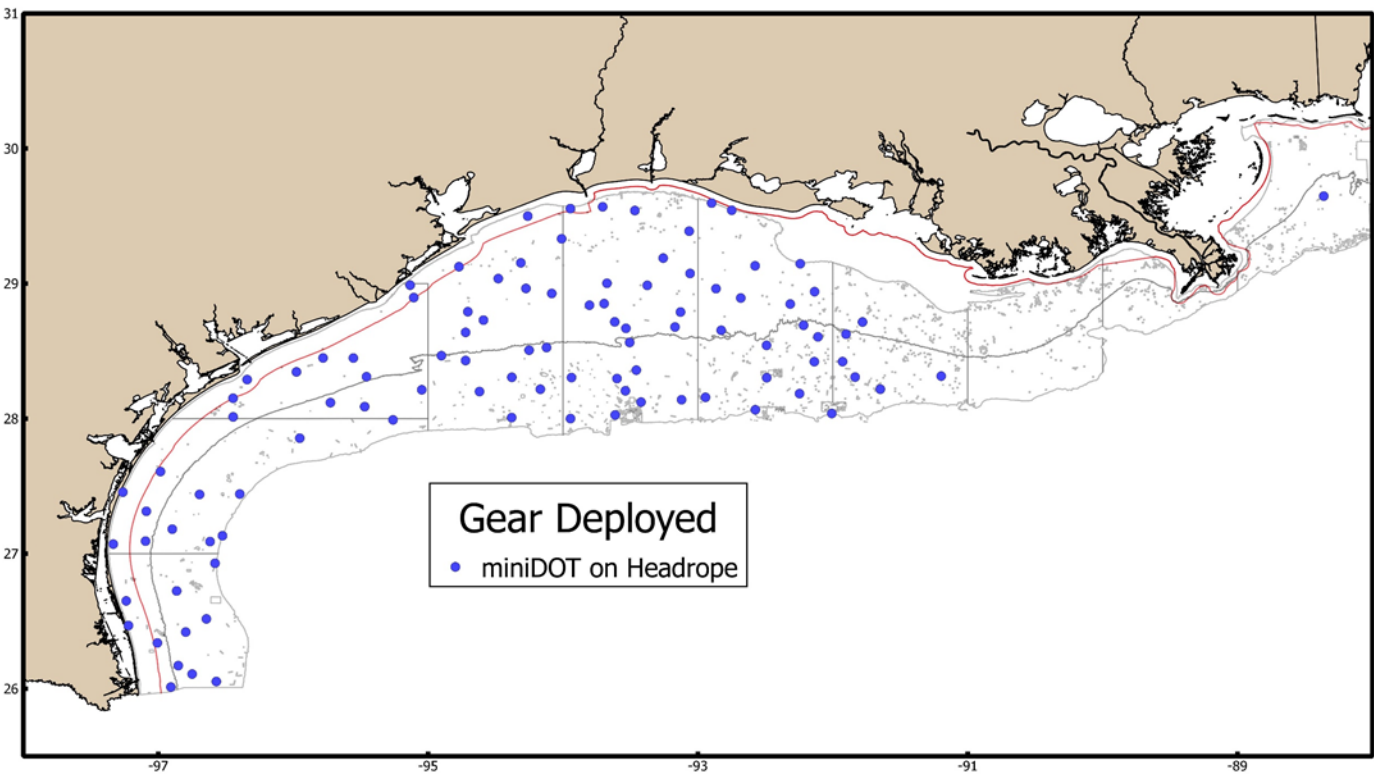


Figure 4: 2021 SEAMAP Summer Trawl Survey maps depicting the stations where a MiniDOT USB Oxygen Logger Sensor was deployed on a door of the net.

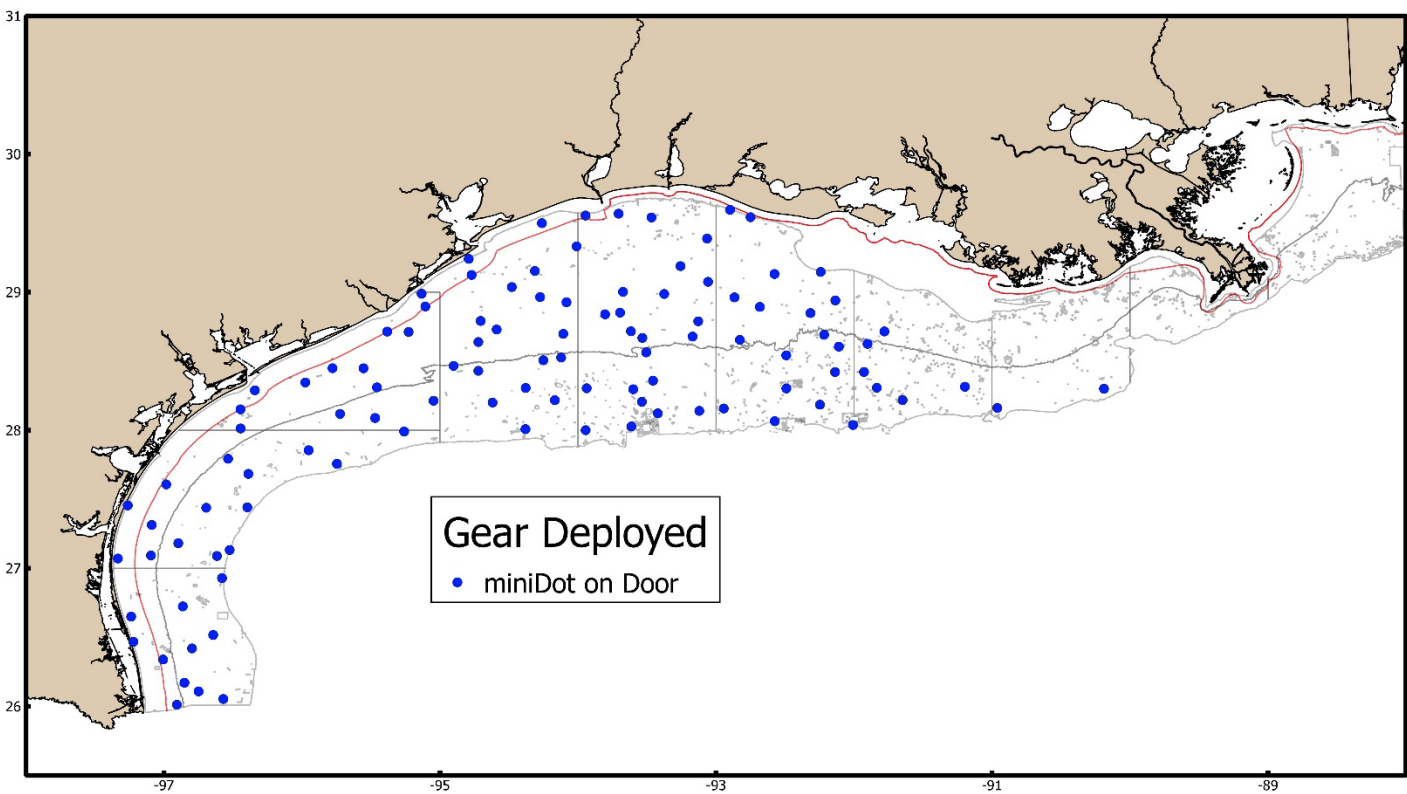


Figure 5: 2021 SEAMAP Summer Trawl Survey maps depicting the stations where NOTUS trawl monitoring gear was deployed.

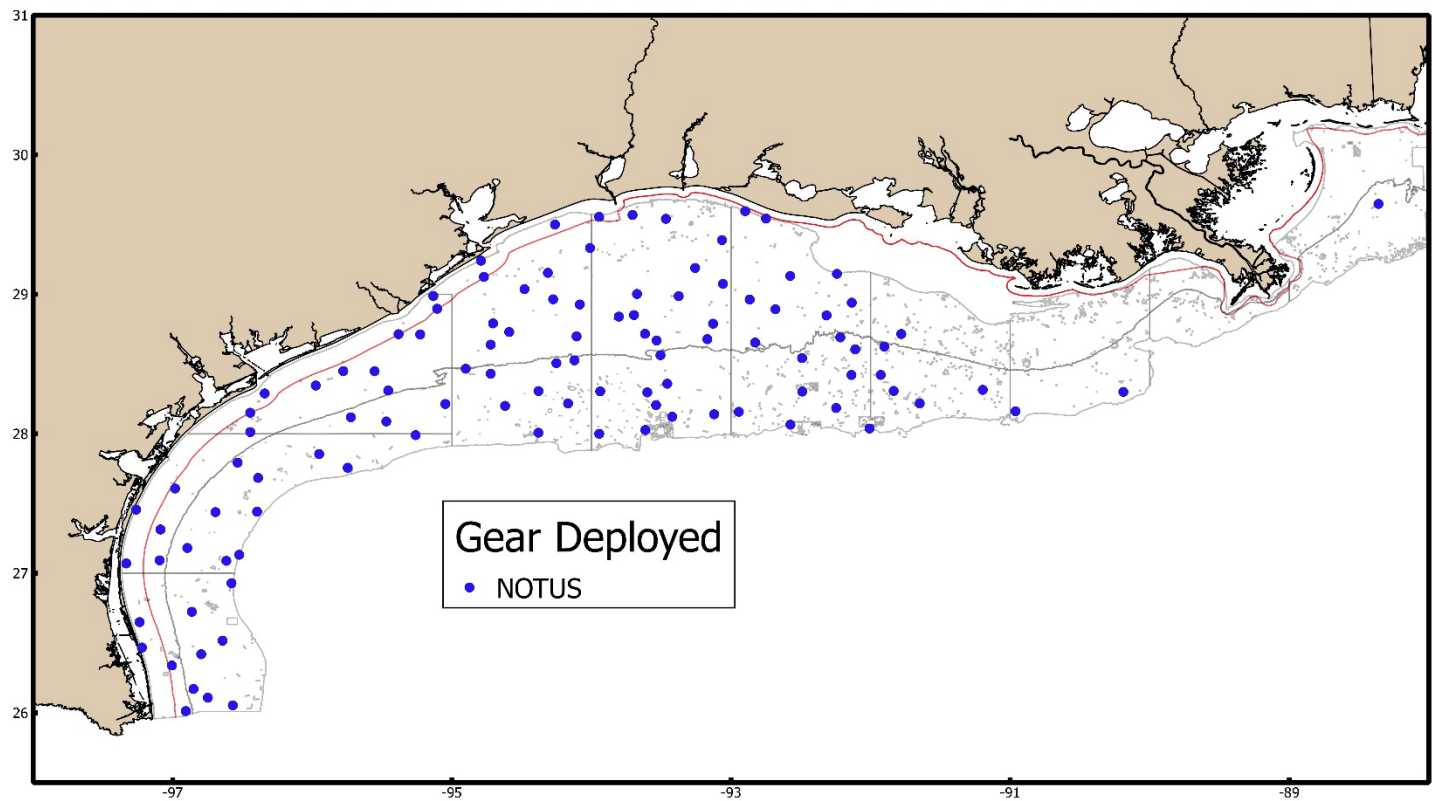


Figure 6: Dissolved oxygen levels as recorded by NOAA Ship *Oregon II* during cruise R2-21-02 (340). (<https://www.ncei.noaa.gov/products/gulf-mexico-hypoxia-watch>)

