

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

Cruise Report

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Cruise Dates: -

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National Oceanic and Atmospheric Administration
National Marine Fisheries Service
Southeast Fisheries Science Center
P O Drawer 1207
Pascagoula, MS 39568-1207

NOAA Ship *Oregon II* Cruise 323 (R2-17-03)
6/07/2017 – 7/20/2017

INTRODUCTION

NOAA ship *Oregon II* departed Pascagoula, MS on June 7, 2017 for the 42nd Summer Shrimp/Bottom Fish Survey, 37 of which have been 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 objectives of this survey are 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.

NOAA ship *Oregon II* was scheduled for 41 days at sea (June 7-July 20, 2017). On June 7, the EK-60 was calibrated aboard the ship. There were 46 hours lost due to weather and medical issues. The ship returned to Pascagoula, MS on July 19, a day earlier than scheduled due to weather. There were two scheduled port calls to exchange scientific personnel (Galveston, TX June 20 and Pascagoula, MS July 5).

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 structure
3. Record profiles through the water column of temperature, salinity, fluorescence, dissolved oxygen and turbidity using a Conductivity/Temperature/Depth (CTD) unit at all stations.
4. Collect depth water samples daily using a handheld Orion 3 Star Portable Dissolved Oxygen Meter to measure dissolved oxygen. Transmit the processed CTD profiles to NOAA National Center for Environmental Information at Stennis Space Center, Mississippi and other researchers to map the hypoxic zone.
5. Collect echologger data from select stations to monitor the efficiency of the trawl net and the contact with the sea floor.
6. Conduct bottom mapping using Olex software, EK-60 depth sounder, Side Scan Sonar and a Real-Time SCS program with a Global Positioning System (GPS) to determine

trawlable habitat on all East Delta Stations in depths less than 50 fm.

7. Collect select specimens for genetic, age, growth, abundance and/or distributional studies.

MATERIALS AND METHODS

The sampling gear consisted of 12-m (40 ft) shrimp nets with 2-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 (380) were randomly selected between 5 and 60 fm within Gulf Coast shrimp statistical reporting zones 1-21. Bathymetric data were obtained from NOAA's Environmental Satellite, Data, and Information Service (NESDIS) web site. 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 determined by depth contour, when possible. At stations deemed suitable for use, a Precision Autonomous Hydroacoustic Altimeter (Echologger, model AA400) was installed in the trawl net to monitor the trawl's contact with the bottom during fishing.

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 the Office of Marine & Aviation Operations. The FSCS was used in conjunction with the Scientific Computing System (SCS version 4.2.3) 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 for total catch weights and small capacity scales (6 kg max, 1 gm resolution) for individual species weights. Scales were calibrated before every station. Lengths were recorded using Limnoterra Limited electronic measuring boards. A maximum of 200 individuals of the three commercial shrimp species were selected for size measurement, weight, and sex. A maximum of 20 individuals per species of snapper, grouper, triggerfish, and lionfish were selected for individual size measurements, weight, and sex. For every other species, a maximum of 20 individuals were selected 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. Bottom water samples were taken at the first station after sunrise in order to perform three replicate bench-top Winkler titrations to calibrate DO sensors mounted on the environmental profiler. The values obtained from the Winkler titrations were manually recorded in the FSCS Access database. Second CTD casts were conducted when catches indicated tows may have transited hypoxic boundaries (little to no catch is expected where dissolved oxygen concentration falls below 2.0 mg/L).

CTD profiles were transmitted to a file transfer protocol website hosted by the NCEI. Realtime shrimp data were transmitted weekly to the Gulf States Marine Fisheries Commission (GSMFC) to consolidate data from all SEAMAP partners in order to monitor the abundance, distribution and size structure of commercial brown, white, and pink shrimp.

Due to the high occurrence of live bottom (sponges and corals) in the East Delta region, mitigation measures were used prior to and during the survey to avoid these areas.

Prior to leaving the dock:

A station that fell completely within a 2.0 nautical mile (nm) buffer of previously known untrawlable habitat was dropped prior to selecting the trawl stations. After selecting the 380 stations, any that intersected a 1.5 nm buffer of any geoform were then identified. Any stations that intersected a geoform not classified as "Flat Hard Bottom" had a recommended tow direction to avoid the geoform. Geoforms classified as "Flat Hard Bottom" were deemed trawlable habitat and no effort was made to avoid these areas.

Any station that fell within any of the West Florida Shelf Marine Protected Areas were moved 0.25 nm out of the area and a tow direction was chosen to avoid them. Snags, wrecks, artificial reefs, hydrophones, seagrass, or Panama City Laboratory Reef Sites were given a 0.25 nm buffer to avoid the habitat/obstruction. Stations that were 0.25 nm within a "Non-Flat Hard Bottom" geoform were moved 1.0 nm in a direction that avoided that habitat. Any movement of a station had to maintain the targeted starting depth of the original station and shrimp statistical zone before being moved.

At Sea:

The Olex System, a bottom mapping software, was installed and used along with the EK-60 bottom depth sounder, a Real Time SCS program and Global Positioning System to help identify and avoid any habitat or obstructions along the sea floor. Every station in depths less than 50 fm was surveyed at least once at a target speed of 5.0 kt. All three methods were used in combination to provide and assist the Watch Leaders (WL) and Field Party Chief (FPC) in designating whether a station was trawlable. If a transect was deemed untrawlable, the next transect was run 0.25 nm parallel from the last. A maximum of three transects were conducted at each station. If all transects were deemed untrawlable, the station was dropped at the discretion of the WL or FPC. In some cases, when time was available, the FPC opted to run one to two additional transects in an effort to find trawlable bottom. When a transect was deemed trawlable, a CTD and a trawl were completed.

There was an attempt to use an Edgetech 4125 dual frequency side scan sonar to help identify and avoid any habitat or obstructions along the sea floor.

RESULTS AND DISCUSSIONS

Two hundred and sixteen stations were planned for NOAA ship *Oregon II* to complete (164 stations were planned for the state partners). Of the 216 stations, 18 stations were dropped for

lack of time during the survey to make sure all stations satisfied the proportional allocations in each statistical zone and depth strata; a total of 180 stations were completed successfully. Eighteen stations were unsuccessful, 16 of those conducted have an operational code, which means the trawl was not fishing correctly, and two stations were dropped by the WL or FPC using the coral/sponge mitigation measures at sea (Table 3).

The total catch weight from all successful trawls was 6421.7 kg. There were approximately 53,907 measurements; 27,310 individual weights; and 14,395 sex determinations of the 366 species.

For summary purposes, NOAA ship *Oregon II* operated in three geographic areas; East Delta (81°00'-89°15' W Long), West Delta (89°15'-94°00' W Long) and Texas (94°00'-98°00' W Long). The West Delta and Texas regions were grouped together for this data summary because of their similar species composition.

The three most abundant species that accounted for at least 1% of the total catch in number and weight from the West Delta region included the Atlantic croaker, *Micropogonias undulatus* (n=61,359), the longspine porgy, *Stenotomus caprinus* (n=8,813), and brown shrimp, *Farfantepenaeus aztecus* (n=21,960). These three species represented 46.1% of the 199,961 total specimens caught in this region (Table 1).

In the East Delta region, the three most abundant species that accounted for at least 1 % of the total catch in number and weight included the Lane Snapper, *Lutjanus synagris* (n=371), the Sand Perch, *Diplectrum formosum* (n=557) and the Tomtate, *Haemulon aurolineatum* (n=761). These three species comprise 7.4% of the 22,751 total specimens caught in that region (Table 2).

Hypoxic conditions were defined as DO readings < 2.0 mg/L and are shown in Table 4. Each CTD cast was uploaded and sent to NCEI for distribution amongst interested organizations. The final chart of hypoxia conditions shows the occurrence of various levels of dissolved oxygen throughout the survey area (Figure 4).

Fish and invertebrate samples were frozen and returned to staff members at NOAA Fisheries Pascagoula, MS and Panama City, FL; University of Southern Mississippi-GCRL, Texas A&M University, and Tulane University.

QUALITY CONTROL

One of each species that were taken down to the lowest taxonomic level on each day/night watch were frozen and brought back to the National Marine Science Center in Pascagoula, MS to verify their accuracy.

ACKNOWLEDGMENTS

On behalf of the Mississippi Laboratory and the scientific party, we would like to thank the Commanding Officer and crew of NOAA ship *Oregon II* for a job well done throughout the survey.

CRUISE PARTICIPANTS

Leg I: June 7 – 20, 2017

Name	Title	Organization
Andre Debose	Field Party Chief/Watch Leader	NMFS
Alonzo Hamilton	Watch Leader	NMFS
Elizabeth Murphy	Graduate Assistant	Texas A&M University
Mike Cyrana	Graduate Student	Tulane University
Bryce Corbett	Undergraduate Student	Chicago, IL
Adam Kemberling	Graduate Student	GCRL, Ocean Springs, MS
Chris Murdock	Teacher at Sea	Teacher at Sea Program
Daniella Hanelin	Undergraduate Student/Intern	NOAA 5 College Consortium
Justin Lewis	Graduate Student	GCRL, Ocean Springs, MS
Vaden Fite	Intermittent Worker	NGI/NOAA

Leg II: June 22 – July 5, 2017

Name	Title	Organization
Andre Debose	Field Party Chief/Watch Leader	NMFS
Alonzo Hamilton	Watch Leader	NMFS
Tyler Steube	Graduate Student	Texas A&M University
Mike Cyrana	Graduate Student	Tulane University
Joe Panetta	Summer Undergraduate Assistant	Tulane University
Nick Wagner	Undergraduate Student	University of South Alabama
Helen Olmi	Graduate Student	GCRL, Ocean Springs, MS
David Ehrens	Intern	NOAA Hollings Scholar
Melissa Barker	Teacher At Sea	Teacher at Sea Program
Lydia Crawford	Graduate Student	Tulane University
Sarah Pedigo	Intermittent Worker	NGI/NOAA

Leg III: July 11 – 19, 2017

Name	Title	Organization
Andre Debose	Field Party Chief/Watch Leader	NMFS
Alonzo Hamilton	Watch Leader	NMFS
Kevin Rademacher	Fisheries Biologist	NMFS
Julia Lopez	Graduate Student	Texas A&M University
Elijah Ramsay	Volunteer	USM Long Beach, MS
Frances Arce	Graduate Student	Foreign National
Kenneth McKenzie	Undergraduate Student	Louisiana State University
Emily McMullen	Graduate Student	Undetermined
Anna Levy	Teacher At Sea	Teacher at Sea Program
Derien Duarte	Graduate Exchange Student	NOAA/Brazilian Cooperation
Jessica Panton	Undergraduate student/Intern	NOAA 5 College Consortium

Table 1: The most abundant species caught at 138 stations in the West Delta which accounted for at least 1% of the total catch in number and weight on NOAA ship *Oregon II* R2-17-03.

ZONE	TAXON	Frequenc y	Percent Number Caught (%)	Percent Weight Caught (%)	Percent Occurrence (%)
WEST	<i>Micropogonias undulatus</i>	88	30.6	37.8	63.7
WEST	<i>Stenotomus caprinus</i>	88	4.4	7.0	63.7
WEST	<i>Farfantepenaeus aztecus</i>	137	10.9	5.7	99.2
WEST	<i>Peprilus burti</i>	71	1.6	4.6	51.4
WEST	<i>Chloroscombrus chrysurus</i>	62	3.8	4.6	44.9
WEST	<i>Leiostomus xanthurus</i>	51	1.1	3.0	36.9
WEST	<i>Callinectes similis</i>	87	7.7	2.8	63.0
WEST	<i>Loligo pealeii</i>	67	3.4	1.6	48.5
WEST	<i>Cynoscion nothus</i>	64	1.4	1.6	46.3
WEST	<i>Litopenaeus setiferus</i>	39	1.0	1.5	28.2
WEST	<i>Prionotus longispinosus</i>	105	2.4	1.1	76.0
WEST	<i>Amusium papyraceum</i>	62	4.1	1.1	44.9

Table 2: The most abundant species caught at 42 stations in the East Delta which accounted for at least 1% of the total catch in number and weight on NOAA ship *Oregon II* R2-17-03.

ZONE	TAXON	Frequen cy	Percent Number Caught (%)	Percent Weight Caught (%)	Percent Occurrence (%)
EAST	<i>Lutjanus synagris</i>	21	1.6	5.0	50.0
EAST	<i>Diplectrum formosum</i>	38	2.4	4.8	90.4
EAST	<i>Haemulon aurolineatum</i>	18	3.3	4.7	42.8
EAST	<i>Calamus proridens</i>	13	1.1	4.3	30.9
EAST	<i>Synodus foetens</i>	38	1.6	3.8	90.4
EAST	<i>Syacium papillosum</i>	34	3.6	3.2	80.9
EAST	<i>Acanthostracion quadricornis</i>	29	1.0	2.8	69.0
EAST	<i>Stephanolepis hispida</i>	23	11.3	2.2	54.7
EAST	<i>Argopecten gibbus</i>	9	14.1	2.1	21.4
EAST	<i>Farfantepenaeus aztecus</i>	6	6.3	1.6	14.2
EAST	<i>Loligo pleii</i>	17	4.8	1.4	40.4
EAST	<i>Farfantepenaeus duorarum</i>	17	3.0	1.0	40.4

Table 3: Stations that were surveyed and dropped due to untrawlable habitat in the East Delta (n=2) on NOAA ship *Oregon II* R2-17-03.

SEAMAP Station #	Transect 1	Transect 2	Transect 3	Transect 4
E0710	29.5685N, -84.5966W 29.5894N, -84.5791W	29.5557N, -84.5944W 29.5683N, -84.5838W	29.5542N, -84.6332W 29.5699N, -84.6082W	
E0621	28.5821N, -84.0936W 28.5913N, -84.1258W	28.5995N, -84.1205W 28.5944N, -84.0958W	28.6102N, -84.0821W 28.6180N, -84.1048W	28.6107N, -84.0807W 28.5861N, -84.0797W

Figure 1: Trawl stations completed (n=164) by NOAA ship *Oregon II* R2-17-03. The areas where there are large gaps in sampling coverage are where SEAMAP state partners completed stations. See <http://seamap.gsmfc.org/listcruises.php> for further information.

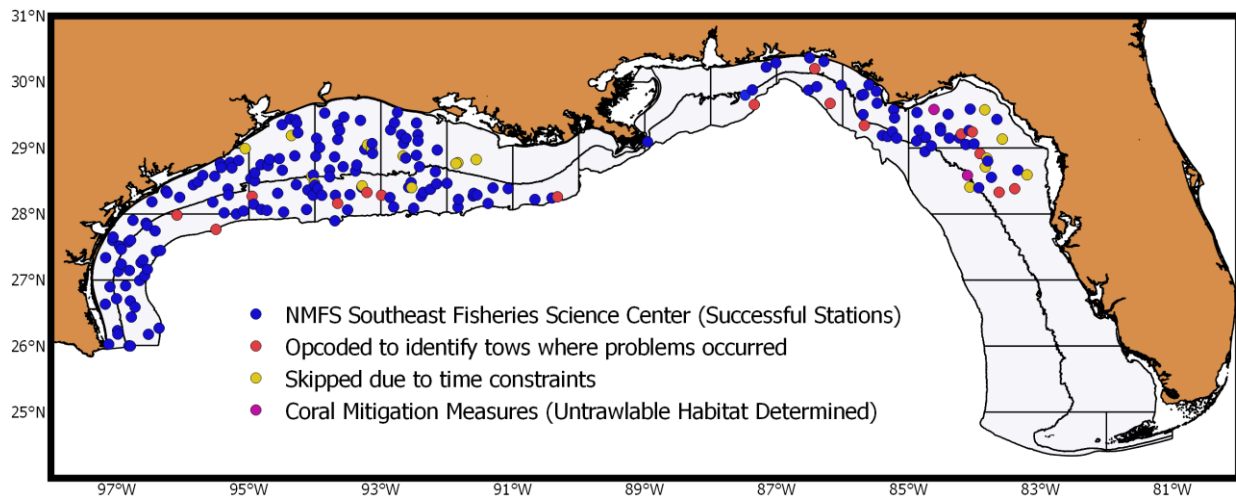


Figure 2. Dissolved oxygen levels as recorded by NOAA Ship *Oregon II* during cruise R2-17-03 (323). (<http://www.ncddc.noaa.gov/hypoxia/products/>)

