U. S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
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Cruise Report

Date Submitted: 09/15/2016

Platform: NOAA Ship OREGON II

Cruise Number: R2-16-03 (0318)

Project Title: SEAMAP Summer Groundfish

Cruise Dates: 06/07/2016 - 07/20/2016

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National Oceanic and Atmospheric Administration
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NOAA Ship *Oregon II* Cruise 318 (R2-16-03)
06/07/2016 – 07/20/2016

INTRODUCTION

NOAA Ship *Oregon II* departed Pascagoula, MS on June 7, 2016 for the 41st Summer Shrimp/Bottom Fish Survey, 36 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 goals 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 5 to 60 fm.

There were two scheduled port calls to exchange scientific personnel, Galveston, TX (June 22 to 24) and Pascagoula, MS (July 5 to 13). The ship returned to Pascagoula on July 20 and lost 2 days at sea because of personnel issues on the ship.

Summary of Objectives:

1. Determine size distribution of penaeid shrimp across the U.S. GOM.
2. Sample the U.S. GOM in depths of 5 to 60 fm with standard SEAMAP sampling gear to determine the abundance and distribution of benthic fauna.
3. Obtain size measurements to estimate size structure of sampled populations.
4. Conduct Conductivity, Temperature, Depth (CTD) casts to profile water temperature, salinity, dissolved oxygen (DO) concentration, fluorescence and light transmittance.
5. Transmit CTD profiles as realtime as possible to the NOAA National Centers for Environmental Information (NCEI) at Stennis Space Center, Bay St. Louis, MS.
6. Transmit realtime shrimp biological data to Gulf States Marine Fisheries Commission (GSMFC) in Ocean Springs, MS.
7. Collect ichthyoplankton samples with bongo and neuston samplers to determine the relative abundance and distribution of eggs and larvae of commercially and recreationally important fish species.
8. Collect: lionfish (*Pterois* sp.), grouper (*Epinephelus* sp. and *Mycteroperca* sp.), sharks, dogfish (*Mustelus* sp.), skates and rays (Elasmobranchii), red snapper (*Lutjanus campechanus*), vermilion snapper (*Rhomboplites aurorubens*), lane snapper (*Lutjanus synagris*), red porgy (*Pagrus pagrus*), king mackerel (*Scomberomorus cavalla*), tonguefish (*Symphurus* sp.), grey triggerfish (*Balistes capriscus*), batfish

(*Halieutichthys* sp.), scorpionfish (*Neomerinthe hemingwayi* and *Pontinus longispinus*), and searobins (*Prionotus* sp.), for genetic, age, growth, abundance and/or distributional studies.

MATERIALS AND METHODS

The sampling gear consisted of 40-ft shrimp nets with 8-ft by 40-in chain bracketed wooden doors towed with 30-fm bridles and a single warp. A standard free tickler chain cut 42 in shorter than the footrope was used to stimulate organisms out of the substrate and into the path of the oncoming net. Sample sites (400) were randomly selected between 5 and 60 fm within Gulf coast shrimp statistical reporting zones 3-21. Site locations were extracted from NOAA's Environmental Satellite, Data, and Information Service (NESDIS) web site which contains depth data per 3 arc-seconds (*NOAA National Centers for Environmental Information, U.S. Coastal Relief Model, 07/21/2016, http://www.ngdc.noaa.gov/mgg/coastal/crm.html*). 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.

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 metadata, including 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 lab 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 weigh total catch weights and small capacity scales (6 kg max, 1 gm resolution) for individual species weights. Lengths were recorded with Limnoterra Limited electronic measuring boards. A maximum of 20 individuals per species were selected for size measurements. Individual weight, sex and sexual stage were collected from one out of every fifth individual in the series of 20. All red snapper were measured, weighed and sexed. A maximum of 200 individuals of each commercial shrimp species was measured and sexed. The SCS was also used to collect metadata for ichthyoplankton stations and CTD casts.

Ichthyoplankton samples (conducted with bongo and neuston samplers) were collected at half-degree intervals of latitude and longitude within the defined survey area. Plankton sample sites were occasionally relocated to the nearest trawl sample site to optimize survey time. Bongo tows were made with two conical 61-cm nets with 0.335 mm mesh netting. General Oceanic flowmeters were suspended in each side of the frame to measure the amount of water filtered. Single oblique tows were made. Nets were towed at 1.5 to 2.0 kt to maintain a 45° wire angle of towing warp, and were fished to a maximum depth of 200 m or within 2 m of bottom in depths less than 200 m. Neuston sampling gear consisted of a 0.950 mm mesh net mounted on a 1 by 2 m frame. The net was towed for 10 min with the frame half submerged at the surface. Left bongo samples were initially preserved in 10% buffered formalin and then transferred to 95%

ethyl alcohol 36 h later. Right bongo and neuston samples were preserved in 95% ethyl alcohol, and transferred 24 h later using 95% ethyl alcohol.

Vertical profiles of temperature, conductivity, dissolved oxygen, percent light transmission and fluorometry values were recorded with a Seabird SBE 911 plus. 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 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.

RESULTS AND DISCUSSIONS

Three hundred and ninety two trawls were completed by the SEAMAP partners: 209 by NOAA Ship *Oregon II*, 15 by Louisiana (R/V *Point Sur*), 13 by Mississippi (R/V *Tommy Munro*), 4 by Alabama (R/V *Alabama Discovery*), and 151 by Florida (R/V *Tommy Munro*) (Figure 1). There were 272 stations completed during the cruise on NOAA Ship *Oregon II*. There were 209 trawls, of which 187 were successful. There were also 67 bongo tows, 63 neuston tows (Figure 2), 278 CTD casts (Figure 3), 162 cloud cover observations, and 158 gross water color observations.

For summary purposes, data were grouped into three geographical 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), and depth intervals; 5-9, 10-19, 20-29, 30-39, 40-49, and 50-60 fm. Eight species comprised 48.1% of the biomass and 41.1% of the total number of all organisms sampled (Table 1). The mean total catch rate for the survey was 73.9 kg per hour fished (kg/hr), a 19.4 % decrease when compared to last year's survey (91.7 kg/hr) and a 20.4% decrease relative to the mean for 2011-2015 (92.8 kg/hr) (Table 2). Although catch rates declined this may not indicate a reduction in population size but may be due to reduced spatial coverage by NOAA Ship *Oregon II* because of increased participation by state SEAMAP partners. Sciaenidae was the most abundant family caught with Atlantic croaker, *Micropogonias undulatus*, making the greatest contribution (Table 2). Brown shrimp, *Farfantepenaeus aztecus*, was the most abundant commercial shrimp species, followed by white shrimp, *Litopenaeus setiferus*, and pink shrimp, *F. duorarum*. There were 57,325 measurements; 29,703 individual weights; 29,710 sex determinations; and 20,378 sex stages recorded from 390 species (sex determinations and stages include instances where organisms were inspected but sex or stage could not be discerned).

Sixty seven bongo and 63 neuston stations were accomplished. The neuston samples and right side bongo samples were returned to Pascagoula for subsequent shipment to the Polish Sorting Center for sorting and identification according to standard SEAMAP protocol. The left

bongo samples were sent to the SEAMAP Plankton Archiving Center at the Gulf Coast Research Laboratory (GCRL) in Ocean Springs, MS.

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).

Realtime biological reports were electronically submitted weekly to the GSMFC each Monday of the survey. The Commission then consolidated SEAMAP partner data and created reports that are available at, http://www.gsmfc.org/seamap-rt.php. The data were also consolidated at the end of the survey and submitted to the GSMFC as a summary packet and is available on their website.

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, and Texas A&M (Table 5).

CRUISE PARTICIPANTS

June 07 – 20, 2016

NAME	TITLE	ORGANIZATION
Kimberley Johnson	Field Party Chief	NMFS, Pascagoula, MS
Andre Debose	Watch Leader	NMFS, Pascagoula, MS
Alonzo N. Hamilton, Jr.	Watch Leader	NMFS, Pascagoula, MS
Kristin Hannan	Fisheries Biologist	Riverside, Pascagoula, MS
Warren Brown	FMES	Riverside, Pascagoula, MS
Mike Cyrana	Graduate Student	Tulane University, LA
Elizabeth Hunt	Graduate Student	Texas A&M Univeristy, TX
Gina Zwicky	NOAA Hollings Scholar	Tulane University, LA
Erika Nuss	Ungrad. Student	Nicholl's State University, LA
Kristian Burns	NGI Intern	Southeastern University, LA
Heather King	NCCOS intern	Univ of Mass, Amherst, MA

June 22 – July 05, 2016

NAME	TITLE	ORGANIZATION
Andre Debose	Field Party Chief	NMFS, Pascagoula, MS
Alonzo Hamilton, Jr.	Watch Leader	NMFS, Pascagoula, MS
Chrissy Stepongzi	Watch Leader	Riverside, Pascagoula, MS
Mark Grace	Fisheries Biologist	NMFS, Pascagoula, MS
Warren Brown	FMES	Riverside, Pascagoula, MS
Mike Cyrana	Graduate Student	Tulane University, LA
Lydia Crawford	Graduate Student	Tulane University, LA
Shengjian (Jessy) Jiang	Graduate Student	Texas Tech Univ, TX
Kristian Burns	NGI Intern	Southeastern University, LA
Helen Wilson	Graduate Student	George Washington Univ, D.C.

July 13 – 20, 2016

NAME	TITLE	ORGANIZATION
Kimberley Johnson	Field Party Chief	NMFS, Pascagoula, MS
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Joey Salisbury	Fisheries Biologist	Riverside, Pascagoula, MS
Erika Nuss	Ungrad. Student	Nicholl's State University, LA
Katherine Bemis	Graduate Student	Florida Gulf Coast Univ., FL
Heather King	NGI Intern	Southeastern University, LA
Jenny Garten	NOAA Hollings Scholar	Univ. of Hawaii, HI

Table 1. Five most abundant species in terms of weight (kg) caught during NOAA Ship *Oregon II* Cruise 318 (R2-16-03), pink and white shrimp; and red snapper (n = 187).

	Taxon	Percent Of Total Number Caught	Percent Of Total Weight Caught	Percent Frequency Of Occurrence	Estimated* Weight Per Individual (gm)
1	Atlantic croaker (*Micropogonias undulatus*)	18.8	19.8	52.9	25.6
2	Gulf butterfish (*Peprilus burti)*	5.6	9.5	63.6	41.3
3	Longspine porgy (*Stenotomus caprinus*)	4.9	6.5	55.6	32.3
4	Brown shrimp (*Farfantepenaeus aztecus*)	8.2	5.0	74.9	14.6
5	Atlantic bumper (*Chloroscombrus chrysurus*)	2.4	4.2	32.6	42.4
6	Red snapper (*Lutjanus campechanus*)	0.2	2.2	47.6	264.1
7	Pink shrimp (*Farfantepenaeus duorarum)*	0.8	0.6	19.8	20.2
8	White shrimp (*Litopenaeus setiferus)*	0.2	0.3	20.9	42.8
		41.1	**48.1**		

* Estimated by the ratio of the cumulative weight of individuals caught divided by the cumulative number of individuals caught.

Table 2. Mean catch rates (kg/hr) of eight species and four catch categories listed in Table 1 by area, depth, and diurnal strata (N=number of tows) of observations during NOAA Ship *Oregon II* Cruise 318 (R2-16-03).

Atlantic croaker

	Depth												Diurnal Period				Total	
	05-09.9		10-19.9		20-29.9		30-39.9		40-49.9		50 +		Day		Night			
	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean
East Delta	4	0.0	24	0.0	2	0.0	1	0.0	.	.	.	.	16	0.0	15	0.0	31	0.0
West Delta	12	17.3	32	32.3	9	16.5	13	2.2	13	2.0	4	6.4	49	17.9	34	17.4	83	17.7
Texas	10	58.8	30	22.5	16	0.2	10	0.1	4	0.1	3	0.9	41	15.6	32	19.6	73	17.4
Areas Combined	26	30.6	86	19.9	27	5.696	24	1.2	17	1.5	7	4.0	106	14.3	81	15.1	187	14.6

Gulf butterfish

	Depth												Diurnal Period				Total	
	05-09.9		10-19.9		20-29.9		30-39.9		40-49.9		50 +		Day		Night			
	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean
East Delta	4	0.0	24	0.0	2	0.0	1	0.0	.	.	.	.	16	0.0	15	0.0	31	0.0
West Delta	12	1.0	32	8.1	9	3.7	13	0.7	13	1.7	4	22.4	49	3.65	34	7.5	83	5.1
Texas	10	2.6	30	5.7	16	37.5	10	1.2	4	5.1	3	17.6	41	16.3	32	6.8	73	12.1
Areas Combined	26	1.5	86	5.0	27	23.5	24	0.9	17	2.5	7	20.4	106	7.9	81	5.8	187	7.0

Longspine porgy

	Depth												Diurnal Period				Total	
	05-09.9		10-19.9		20-29.9		30-39.9		40-49.9		50 +		Day		Night			
	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean
East Delta	4	0.0	24	0.0	2	0.0	1	0.0	.	.	.	.	16	0.0	15	0.0	31	0.0
West Delta	12	0.0	32	7.9	9	14.9	13	3.1	13	2.7	4	8.6	49	6.4	34	5.5	83	6.0
Texas	10	0.0	30	2.1	16	15.0	10	6.0	4	3.3	3	5.1	41	4.5	32	6.5	73	5.4
Areas Combined	26	0.0	86	3.7	27	13.9	24	4.2	17	2.8	7	7.1	106	4.7	81	4.*	187	4.8

Table 2. Continued.

Brown shrimp

	Depth												Diurnal Period				Total	
	05-09.9		10-19.9		20-29.9		30-39.9		40-49.9		50 +		Day		Night			
	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean
East Delta	4	0.0	24	0.0	2	0.0	1	0.0	.	.	.	.	16	0.0	15	0.0	31	0.0
West Delta	12	0.3	32	6.3	9	3.2	13	4.2	13	5.5	4	2.3	49	3.0	34	6.5	83	4.4
Texas	10	0.0	30	6.0	16	2.6	10	6.2	4	6.0	3	3.4	41	4.3	32	4.4	73	4.4
Areas Combined	26	0.2	86	4.4	27	2.6	24	4.9	17	5.6	7	2.8	106	3.1	81	4.5	187	3.7

Atlantic bumper

	Depth												Diurnal Period				Total	
	05-09.9		10-19.9		20-29.9		30-39.9		40-49.9		50 +		Day		Night			
	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean
East Delta	4	0.1	24	0.0	2	0.0	1	0.0	.	.	.	.	16	0.0	15	0.0	31	0.0
West Delta	12	17.9	32	4.0	9	0.0	13	0.0	13	0.0	4	0.0	49	6.1	34	1.4	89	4.1
Texas	10	7.1	30	5.5	16	0.0	10	0.0	4	0.0	3	0.0	41	2.3	32	4.4	73	3.2
Areas Combined	26	11.0	86	3.4	27	0.0	24	0.0	17	0.0	7	0.0	106	3.7	81	2.3	187	3.1

Red snapper

	Depth												Diurnal Period				Total	
	05 - 09		10 - 19		20 - 29		30 - 39		40 - 49		50 - 60		Day		Night			
	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean
East Delta	4	0.0	24	2.6	2	0.0	1	0.0	.	.	.	.	16	1.0	15	3.1	31	2.0
West Delta	12	0.0	32	0.4	9	1.2	13	1.4	13	3.9	4	0.0	49	1.4	34	0.7	83	1.1
Texas	10	0.0	30	1.0	16	4.4	10	1.9	4	3.8	3	2.3	41	1.6	32	2.3	73	1.9
Areas Combined	26	0.0	86	1.2	27	3.0	24	1.5	17	3.9	7	1.0	106	1.4	81	1.8	187	1.6

Table 2. Continued.

Pink shrimp

	Depth												Diurnal Period				Total	
	05-09.9		10-19.9		20-29.9		30-39.9		40-49.9		50 +		Day		Night			
	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean
East Delta	4	0.0	24	1.0	2	0.3	1	0.0	.	.	.	.	16	1.2	15	0.5	31	0.8
West Delta	12	0.0	32	0.1	9	0.0	13	0.0	13	0.0	4	0.0	49	0.0	34	0.0	83	0.0
Texas	10	1.0	30	1.7	16	0.0	10	0.0	4	0.0	3	0.0	41	0.7	32	1.0	73	0.8
Areas Combined	26	0.4	86	0.9	27	0.0	24	0.0	17	0.0	7	0.0	106	0.5	81	0.5	187	0.5

White shrimp

	Depth												Diurnal Period				Total	
	05-09.9		10-19.9		20-29.9		30-39.9		40-49.9		50 +		Day		Night			
	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean
East Delta	4	0.0	24	0.0	2	0.0	1	0.0	.	.	.	.	16	0.0	15	0.0	31	0.0
West Delta	12	0.5	32	0.5	9	0.0	13	0.0	13	0.0	4	0.0	49	0.2	34	0.3	83	0.3
Texas	10	1.0	30	0.5	16	0.0	10	0.0	1	0.0	3	0.0	41	0.3	32	0.4	73	0.3
Areas Combined	26	0.6	86	0.4	27	0.0	24	0.0	17	0.0	7	0.0	106	0.2	81	0.3	187	0.2

Finfish

	Depth												Diurnal Period				Total	
	05-09.9		10-19.9		20-29.9		30-39.9		40-49.9		50 +		Day		Night			
	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean
East Delta	4	31.5	24	46.5	2	38.5	1	28.3	.	.	.	.	16	32.6	15	55.0	31	43.5
West Delta	12	46.1	32	72.2	9	72.9	13	20.0	13	30.6	4	57.0	49	54.0	34	51.8	83	53.1
Texas	10	86.3	30	60.5	16	79.7	10	21.1	4	30.0	3	74.9	41	64.0	32	58.9	73	61.8
Areas Combined	26	59.3	86	61.0	27	74.4	24	20.8	17	30.5	7	64.7	106	54.6	81	55.2	187	54.9

Table 2. Continued.

Crustaceans

	Depth												Diurnal Period				Total	
	05-09.9		10-19.9		20-29.9		30-39.9		40-49.9		50 +		Day		Night			
	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean
East Delta	4	0.3	24	2.5	2	6.7	1	3.7	.	.	.	.	16	3.5	15	1.6	31	2.6
West Delta	12	5.9	32	15.3	9	3.8	13	5.6	13	10.1	4	3.0	49	9.0	34	10.9	83	9.8
Texas	10	3.7	30	27.6	16	7.7	10	8.7	4	7.5	3	5.1	41	17.7	32	12.3	73	15.3
Areas Combined	26	4.2	86	16.0	27	6.3	24	6.8	17	9.5	7	3.9	106	11.5	81	9.7	187	10.7

Other invertebrates

	Depth												Diurnal Period				Total	
	05-09.9		10-19.9		20-29.9		30-39.9		40-49.9		50 +		Day		Night			
	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean
East Delta	4	20.5	24	35.6	2	13.5	1	3.0	.	.	.	.	16	26.3	15	36.3	31	31.1
West Delta	12	0.9	32	0.9	9	2.8	13	3.0	13	3.8	4	3.4	49	2.1	34	1.9	83	2.0
Texas	10	10.4	30	5.9	16	4.4	10	3.0	4	4.4	3	3.4	41	6.2	32	4.9	73	5.6
Areas Combined	26	7.6	86	12.3	27	4.5	24	3.0	17	3.9	7	3.4	106	7.3	81	9.5	187	8.2

Total Catch

	Depth												Diurnal Period				Total	
	05-09.9		10-19.9		20-29.9		30-39.9		40-49.9		50 +		Day		Night			
	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean
East Delta	4	52.3	24	84.6	2	58.7	1	34.9	.	.	.	.	16	62.4	15	92.9	31	77.2
West Delta	12	52.9	32	88.5	9	79.5	13	28.5	13	44.6	4	63.4	49	65.0	34	64.6	83	64.9
Texas	10	100.4	30	94.0	16	91.8	10	32.8	4	41.9	3	83.3	41	87.9	32	76.1	73	82.7
Areas Combined	26	71.1	86	89.3	27	85.2	24	30.6	17	44.0	7	71.9	106	73.5	81	74.4	187	73.9

Table 3. Tally of scientific observations acquired during NOAA Ship *Oregon II* Cruise 318 (R2-16-03).

		COUNT
1	CTD	27
2	Neuston	63
3	Bongo	67
4	Shrimp Trawl	209*
5	Cloud Cover	162
6	Water Color	158

* Includes 22 tows during which gear codes were applied to the station.

Table 4. Bottom dissolved oxygen concentrations (DO, mg/l) measured with a Sea-Bird model 911+ environmental profiler (Primary DO sensor is serial number 0089; Secondary DO sensor is serial number 1915) and benchtop Winkler titration values collected during NOAA Ship *Oregon II* Cruise 318 (R2-16-03). *First Station using the secondary sensor suite on the CTD.

Date (GMT)	Time (GMT)	Pascagoula Station Number	Depth (m)	CTD DO reading (mg/l)	Winkler Titration #1 (mg/l)	Winkler Titration #2 (mg/l)	Winkler Titration #3 (mg/l)	Comment
9 June	2206	001	82.3	5.8	5.5	5.3	5.4	1st Station of Leg
10 June	1215	008	62.8	6.2	6.2	6.1	6.2	
11 June	1507	018	78.8	5.2	5.1	5.1	5.1	
12 June	1237	027	28.7	2.7	2.7	2.7	2.8	
13 June	1203	036	37.6	3.4	3.3	3.3	3.3	
14 June	1150	046	23.4	2.5	2.4	2.4	2.5	
15 June	1349	056	27.2	3.1	3.2	3.0	3.2	
16 June	0635	067	48.7	5.4	5.4	5.3	5.3	
17 June	1151	078	81.9	4.8	4.7	4.7	4.8	
18 June	1107	088	22.2	2.8	2.7	2.8	2.7	
19 June	1321	100	16.0	1.8	2.0	2.0	1.9	
23 June	1531	112	12.7	.01	0.7	0.6	n/a	1st station of Leg
24 June	1006	122	25.5	2.8	3.2	3.1	3.1	
25 June	1349	132	25.2	1.3	1.6	1.8	1.6	
25 June	2122	135	29.4	4.3	4.6	4.6	4.6	
26 June	1230	141	68.7	5.5	5.7	5.6	5.7	
27 June	1819	154	29.2	5.2	5.4	5.5	5.5	
28 June	1210	161	82.7	4.6	4.9	4.9	5.0	
29 June	1753	174	29.9	4.5	5.3	5.3	5.4	
30 June	1740	183	26.7	4.0	4.6	4.8	4.6	
1 July	1926	193	66.8	3.9	4.6	4.7	5.2	
2 July	1340	201	36.2	3.0*	3.0	3.4	3.0	Started using 2nd
3 July	1352	211	89.9	3.2	4.1	3.7	4.2	
3 July	2053	214	47.8	3.6	3.7	3.7	3.7	
14 July	0254	221	24.6	2.6	2.6	2.7	2.4	1st station leg 3
14 July	1401	225	19.7	4.6	4.3	4.4	4.3	
15 July	1356	233	28.2	5.8	5.3	5.3	5.4	
16 July	1218	241	13.1	6.4	5.9	6.0	5.9	
17 July	1035	252	34.4	6.3	6.2	6.2	6.0	
18 July`	1102	261	16.7	6.4	6.0	6.0	6.2	
19 July	1303	272	24.8	6.5	5.9	5.9	5.9	

Table 5. List of specimen requests acquired during NOAA Ship *Oregon II* Cruise 318 (R2-16-03).

Requestor	Taxon	Location/ Depth	Size Range	Number Requested	Sample Type
Kimberley Johnson	*Halieutichthys sp.*	All	All	All	Frozen whole
Andre Claxton	*Micropogonias undulatus*	Louisiana coastline	All	20/station	Frozen Whole
Beverly Barnett	*Lutjanus campechanus* *Lutjanus synagris* *Epinephelus nigritus* *Epinephelus drummondhayi* *Epinephelus flavolimbatus*	All	All	All	Frozen whole
Dauphin Island Sea Lab	Chaetodontidae Monacanthidae Holocentridae Labridae Pomacanthidae Priacanthidae *Equetus spp.* *Sphoeroides spp.* *Pterois volitans/miles*	All	All	All	Frozen Whole
Christian Jones	*Alepisaurus sp* Chimaeridae Hexanchiformes Lamniformes Rajiformes *Rhinoptera spp.* *Seriola fasciata* Sparidae	All	All	All	Frozen whole
Eric Hoffmayer	*Raja spp.* *Rhizoprionodon terraenovae* *Mustelus spp.*	All	All	All	Biopsies
Chrissy Stepongzi/ Taniya Wallace	*Synodus spp.*	All	All	All	Frozen whole
Kevin Rademacher	*Calamus spp.*	All	All	All	Frozen whole
National Seafood Inspection Laboratory	Numerous species for DNA profiles	All	All	5/species	Frozen whole
Kristian Burns	*Cyclopsetta chittendeni*	All	All	All	Frozen whole
Michael Cyrana	*Various samples for DNA profiles*	All	All	All	Taken live for Tulane museum collection
David Portnoy	*Triglidae and Ogcocephalidae*	All	All	All	Frozen whole

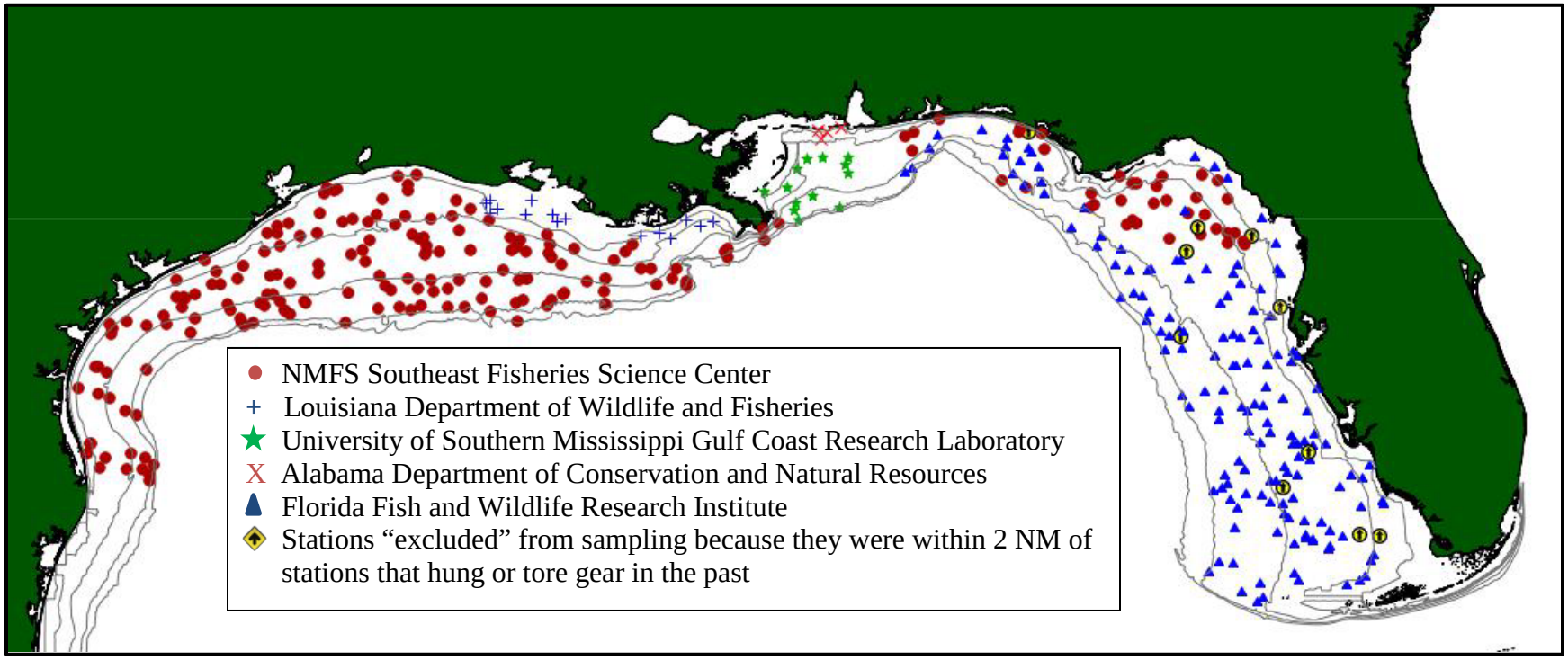

Figure 1. Trawl stations completed by SEAMAP partners during Summer 2016 Shrimp/Bottomfish survey.

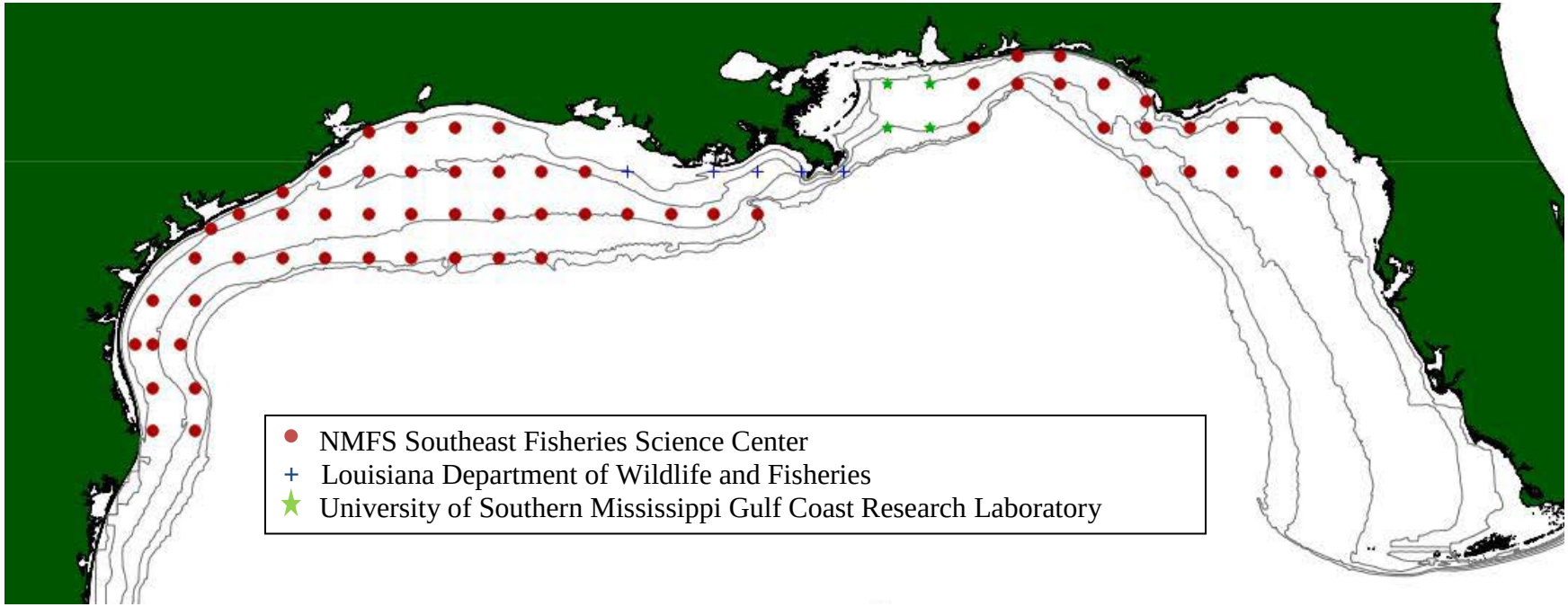

Figure 2. Ichthyoplankton stations completed by SEAMAP partners during Summer 2016 Shrimp/Bottomfish survey. *Florida was unable to complete ichthyoplankton stations this year.

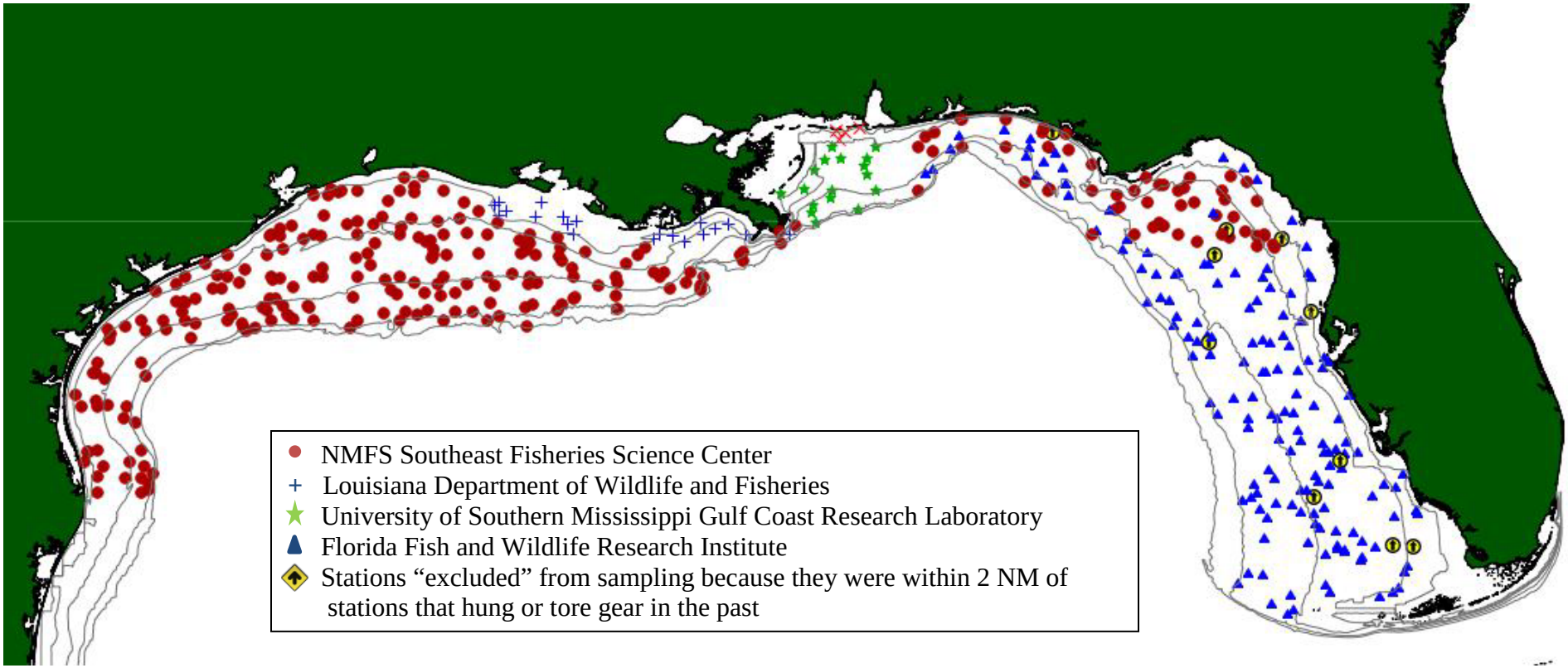

Figure 3. CTD stations completed by SEAMAP partners during Summer 2016 Shrimp/Bottomfish survey.

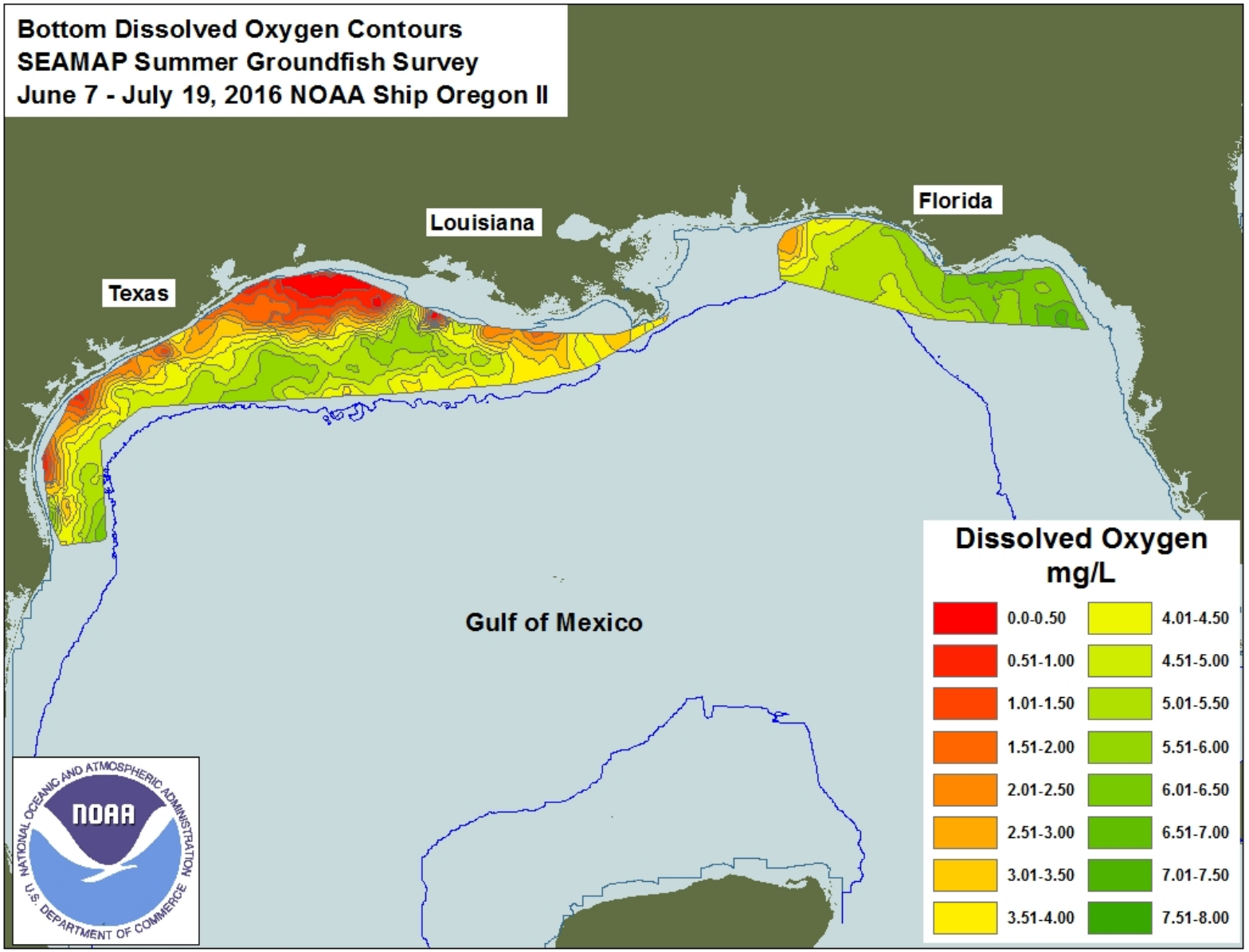

Figure 4. Dissolved oxygen levels as recorded by NOAA Ship *Oregon II* during cruise R2-16-03 (318). (http://www.ncddc.noaa.gov/hypoxia/products/)