Activity Title: Calculating Biodiversity from GroundfishTrawls in the Gulf of Mexico

Subject (Focus/Topic): Environmental Science, Biology

Grade Level: 11th and 12th

Average Learning Time: 3 periods of 90 minutes.

Lesson Summary (Overview/Purpose):

In small groups, students will analyze sets of data from a bottom trawl of the *Oregon II* by calculating a Shannon Diversity Index. When completed, students will compare their data to rank their biodiversity from highest to lowest.

Overall Concept (Big Idea/Essential Question):

Will all areas in the Gulf of Mexico have the same amount of biodiversity?

Specific Concepts (Key Concepts):

How to draw a food web.
Differentiate between herbivore, carnivore, omnivore, detritvore, decompose and scavenger.
Differentiate between primary consumer, secondary consumer and tertiary consumer.
Analyze and interpret data sets.

Focus Questions (Specific Questions):

How is math used to calculate biodiversity?
What is biodiversity?
How is biodiversity measured?
What is the difference between species diversity, species richness and species evenness?
How does biodiversity affect the health of an ecosystem?
How do humans effect the biodiversity of the ocean?

Objectives/Learning Goals:

Students will be able to use a Shannon Diversity Index to calculate the biodiversity in the Gulf of Mexico using data from the Oregon II for an assigned area.
Given 30 organisms, students will be able to create a food web for their assigned area using the data from the Oregon II and will give a presentation to the class with 95% accuracy.
Given 30 organisms, students will be able to identify them as producers, primary consumers, secondary consumers, tertiary consumers, detritivores, omnivore, carnivores, autotrophs and scavengers.

Background Information:

Students will need to know the difference between predator/prey and how each can be categorized (herbivore, omnivore, carnivore, primary consumer, secondary consumer, tertiary consumer, autotroph). They need to be introduced to how organisms are sampled to measure biodiversity (transect, trawl, capture-release). They then need to be introduced to a Shannon Diversity Index (H) and how it measures biodiversity. Students should practice with 2-3 small sample populations that they can easily calculate and compare H. Students often are confused with what H means. By itself, H is meaningless. It must be

compared to the H for multiple areas. When this is done, the higher the value of H, the greater the biodiversity of a population is.

Common Misconceptions/Preconceptions:

Students often believe that areas with a great number of organisms have a greater biodiversity. This is not necessarily true as the abundance of each individual species must also be factored in.
Student have difficulty with the math equations, it would be beneficial to walk them through a few calculations.

Materials:

Calculator, Graph Paper, Internet, Data sets

Technical Requirements: Access to laptop or computer with internet connection.

Teacher Preparation:

Make sure you understand how to do the calculations for the Shannon Diversity Index and prepare 2-3 simple sample tables for the student to complete. When calculating H values, have students round to one or two decimals. If they do not, they will obtain different answers.

Keywords: Intraspecific Competition, Interspecific Competition, Density Dependent Factor, Density Independent Factor, Shannon Diversity Index, Biodiversity.

Pre-assessment Strategy/Anticipatory Set (Optional):

Students will be introduced to NOAA through a video.

Lesson Procedure:

1. Give each group of students 1 set of data (there are 1 sets total). If you have multiple classes, spread the data across the classes.
2. Review with students the differences between food chain/food web and how each of these organisms can be classified (herbivore, producer, consumer, omnivore, carnivore, etc.).
3. Give students 2 periods to create a food web based on their data. They will need to look up pictures and determine what each consumes in order to familiarize themselves with the data.
4. Post all data around the classroom.
5. Students will present out their data to the class (draw, put on a poster, prezi, powerpoint, etc) in 5 minutes or less.
6. After each group has presented their information, students will walk around and observe the data to create a hypothesis (which station has the highest biodiversity).
7. Students will then work in their groups to calculate the H value for their station.
8. Each group will share out their H value.
9. After students answer the questions in the handout, discuss the results from the data. What was unexpected, was their hypothesis correct, etc
10. Have a discussion on the value of biodiversity and why it is important for humans.

Assessment and Evaluation:

Students will be assessed on the accuracy of their food web presentation and accuracy of their H value. They will also be graded on their written lab report.

Standards:

National Science Education Standard(s) Addressed:

Next Generation Science Standards:

HS-LS2-2. Use mathematical representations to support and revise explanations based on evidence about factors affecting biodiversity and populations in ecosystems of different scales

HS-LS2-1. Use mathematical and/or computational representations to support explanations of factors that affect carrying capacity of ecosystems at different scales.

Ocean Literacy Principles Addressed:

5. The ocean supports a great diversity of life and ecosystems.
   d. Ocean biology provides many unique examples of life cycles, adaptations, and important relationships among organisms (symbiosis, predator-prey dynamics, and energy transfer) that do not occur on land.
   e The ocean provides a vast living space with diverse and unique ecosystems from the surface through the water column and down to, and below, the seafloor. Most of the living space on Earth is in the ocean.

6. The ocean and humans are inextricably interconnected.

   b The ocean provides food, medicines, and mineral and energy resources. It supports jobs and national economies, serves as a highway for transportation of goods and people, and plays a role in national security.

   c The ocean is a source of inspiration, recreation, rejuvenation, and discovery. It is also an important element in the heritage of many cultures.

Advanced Placement Environmental Science Standards Addressed:

I. Earth Systems and Resources
   - C. Global Water Resources and Use

II. The Living World
   - A. Ecosystem Structure
   - B. Energy Flow
   - C. Ecosystem Diversity

III. Population
   - A. Population Biology Concepts

IV. Land and Water Use
   - F. Fishing

VII. Global Change
   - C. Loss of Biodiversity

Additional Resources:

Author: Crystal Davis, Hawthorne Math and Science Academy, 4467 West Broadway, Hawthorne CA 90250. Based on a lesson created by David Hong, Diamond Bar High School, 21400 Pathfinder Rd., Diamond Bar CA 91765.

Creation date: September 18, 2014.

Species Diversity Lab

The diversity of species present in an ecosystem can be used as one gauge of the health of an ecosystem. Species richness is a measure of the number of different species present in an ecosystem, while species evenness measures the relative abundance of the various populations present in an ecosystem. In an ecological survey designed to measure species diversity, a wildlife biologist might determine the number of individuals of each species present in an area, then calculate a "diversity index" for the area. Comparison of the diversity index with that of other areas provides insights into the species diversity and the health of the ecosystem.

In this activity your ecosystem will be the data sample collected onboard the *Oregon II*. As a class, we will be comparing the species diversity each sample location. The diversity index we will use is the Shannon Diversity Index. After determining the number of each species, the Shannon Diversity Index will be calculated separately for each sample. A ***rich ecosystem*** with high species diversity has a large value for the Shannon Diversity Index (H'), while an ecosystem with ***little diversity*** has a low H'.

$$p_i = \frac{n_i}{N}$$

(equation 1)

$$H' = -\sum_{i=1}^{S} p_i (\ln (p_i))$$

(equation 2)

n_i = number of individuals of species "i"
N = total number of individuals of all species
p_i = relative abundance of species "i" (see equation 1)
S = total number of species
H' = The Shannon Diversity Index (see equation 2)

Objective:

Determine which station is the most diverse and identify this on a map of the Gulf of Mexico

Hypothesis

1. Use the food web presentations from all of the groups to decide which station you think will have the highest diversity

Materials

- ☐ Data from the *Oregon II*

Procedure

1. Prepare a data table. There must be enough space for all of your species.

Sample Data Table

✐ Use an entire page in your lab notebook for your data table. There must be enough space for all species

***Sample* Table 1: Data collected for Station Number < >, Latitude: < > Longtitude: < >**

Species	i	n_i	p_i	$\ln (p_i)$	$p_i (\ln (p_i))$
	1				
	2				
	3				
	4				
	5				
	•				
	•				
	•				
	•				
	•				
	*				
•					
totals	—				

Your data table may be longer than this sample. Use an entire page of your lab notebook for your data table.

Data Analysis

1. Determine the value for the Shannon Diversity Index for the data collected by your group. Show all of your work.
2. Tabulate the values calculated by each group for the Shannon Diversity Index.
3. Compare the values for the Shannon Diversity Index.
4. Obtain all Shannon Diversity Index numbers for the class.

Postlab Questions—Write out and answer the following questions

1. Identify the Station Number that was the most diverse. Based on your observations during the lab, explain why your prediction was supported or not supported.
2. List the single most abundant species in each set of data, and write a plausible explanation to explain why these are the most abundant species.
3. Determine the maximum and minimum values for the Shannon Diversity Index in the station you surveyed.
4. If you conducted this lab in a coral reef, predict whether the Shannon Diversity Index would be high or low, and how it would compare to the Gulf of Mexico.
5. If you conducted this lab in the tundra, predict whether the Shannon Diversity Index would be high or low, and how it would compare to the Gulf of Mexico.

Species Diversity Lab Grade Sheet

Name _____

_____/100 Table of contents updated

_____/100 Ink Only

_____/100 No Obliterated Data

_____/400 Data tabulated/calculated

_____/100 Diversity Index tabulated

_____/500 Postlab Questions

_____/1300 Total

Species Diversity Lab Grade Sheet

Name _____

_____/100 Table of contents updated

_____/100 Ink Only

_____/100 No Obliterated Data

_____/400 Data tabulated/calculated

_____/100 Diversity Index tabulated

_____/500 Postlab Questions

_____/1300 Total

Species Diversity Lab Grade Sheet

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_____/100 No Obliterated Data

_____/400 Data tabulated/calculated

_____/100 Diversity Index tabulated

_____/500 Postlab Questions

_____/1300 Total

Species Diversity Lab Grade Sheet

Name _____

_____/100 Table of contents updated

_____/100 Ink Only

_____/100 No Obliterated Data

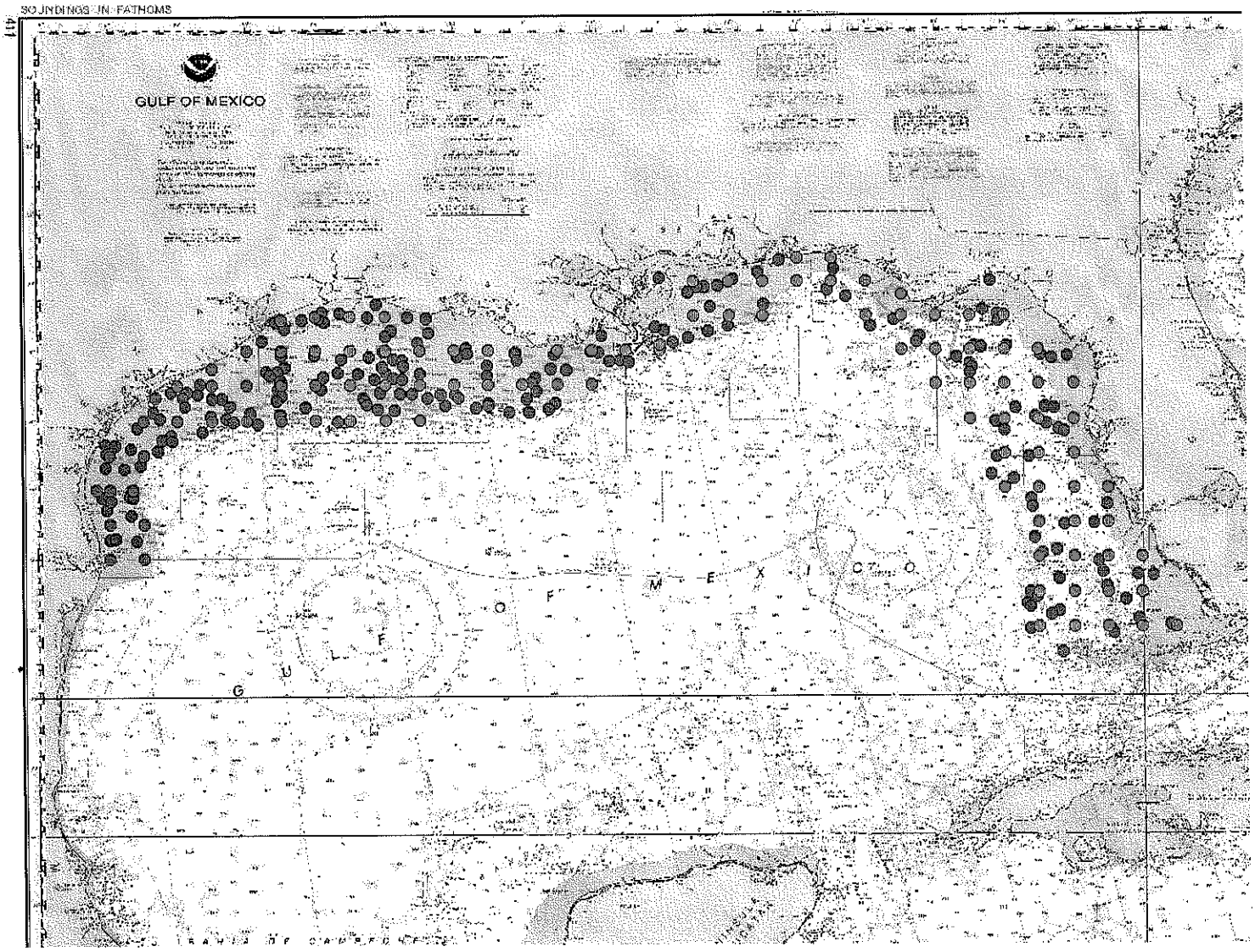
_____/400 Data tabulated/calculated

_____/100 Diversity Index tabulated

_____/500 Postlab Questions

_____/1300 Total

Map of Survey Sites



Practice Problems before beginning lab.

DEFINITIONS

i = one specific species
n_i = # of individuals in species "i"
N = total # of individuals in all species
p_i = relative abundance of species "i" $= \frac{n_i}{N}$

S = total number of species
ln = the function of natural log
need a negative sign to make the answer positive

$$H' = -\sum_{i=1}^{S'} [p_i (\ln (p_i))]$$ In other words, the sum of all the $[p_i (\ln p_i)]$

The theoretical maximum for H' is ln S
The minimum value when N>>S is $\ln \frac{[N]}{[N-S]}$

Example 1

species	n_i	$p_i = n_i/N$	ln (p_i)	p_i (ln (p_i))
1	10 indiv	0.2	-1.6	-0.32
2	10			
3	10			
4	10			
5	10			
S = 5 species	N = 50 individuals			H' =

Example 2

species	n_i	$p_i = n_i/N$	ln (p_i)	p_i (ln (p_i))
1	20 indiv			
2	35			
3	10			
4	30			
5	5			
S = 5 species	N = 100 individuals			H' =

Example 3

species	n_i	$p_i = n_i/N$	ln (p_i)	p_i (ln (p_i))
1	2 indiv			
2	1000			
3	1			
4	2			
5	3			
S = 5 species	N = 1008 individuals			H' =

Example 4

species	n_i	$p_i = n_i/N$	ln (p_i)	p_i (ln (p_i))
1	10 indiv			
2	1			
3	38			
4	15			
5	19			
6	10			
7	1			
8	1			
9	10			
10	5			
S = species	N = individuals			H' =

Example 5: If had 100 species of 100 individuals in each species

species	n_i	$p_i = n_i/N$	ln (p_i)	p_i (ln (p_i))
1	100 indiv			
2	150			
3	50			
4	100			
5				
S = species	N = 10,000 individuals			H' =

Example 5: If had 100 species of 100 individuals in each species

species	n_i	$p_i = n_i/N$	ln (p_i)	p_i (ln (p_i))
elephant	82 indiv			
giraffe	2			
cat	2			
lion	2			
rhino	2			
oryx	2			
hippo	2			
blackbuck	2			
gorilla	2			
hyena	2			
	N = 100 total individuals			H' =

Practice Problems Cont...

Example 8

species	n_i	$p_i = n_i/N$	ln (p_i)	p_i (ln (p_i))
elephant	10			
giraffe	20			
cat	20			
lion	15			
rhino	10			
oryx	10			
hippo	0			
blackbuck	5			
gorilla	5			
hyena	5			
	N = 100 total individuals			H' =

Data Sets for 13 Stations

Date/Time: Sunday,July,06,2014 /08:28:02 Station Check Form, Station 006

Vessel	Pascagoula Station Number	Cruise	Time Zone	Start Date	Start Time	Start Latitude	Start Longitude	Start Depth
04	006	0308	GMT	06/10/2014	14:55:14	2607.26	09700.05	14.6

SEAMAP Number	End Date	End Time	End Latitude	End Longitude	End Depth
T2103	06/10/2014	15:25:18	2605.89	09659.82	14.7

Statistical Zone	Faunal Zone	Data Source	Temperature Sea Surface	Temperature Air
21	7	US	26.0	27.6

Barometric Pressure	Wind Speed	Wind Direction	Wave Height	Beaufort Sea State	Towing Speed	Tow Number	Net Code
1011.0	7.7	182	1.0	3	2.7568	01	01-Port Side

Gear Size	Gear Type	Mesh Size	Operation Code	Minutes Fished	Total Catch
40	ST	1.63		30.067	27.520

Watch Leader: Taniya Wallace Field Party Chief: Kim Johnson

TAXONOMIC NAME	NUMBER CAUGHT	NUMBER MEASURED	ERROR STATUS	SAMPLE WEIGHT	TOTAL WEIGHT	SAMPLED /SELECT	EXPANSION FACTOR
1. ANCYLOPSETTA QUADROCELLATA	6	6	OK	.185	.352	SAMPLED	1.903247
2. CENTROPRISTIS PHILADELPHICUS	1	1	OK	.012	.023	SAMPLED	1.903247
3. CHLOROSCOMBRUS CHRYSURUS	4	4	OK	.128	.244	SAMPLED	1.903247
4. DIPLECTRUM BIVITTATUM	4	4	OK	.092	.175	SAMPLED	1.903247
5. ETROPUS CROSSOTUS	1	1	OK	.030	.057	SAMPLED	1.903247
6. HAEMULON AUROLINEATUM	1	1	OK	.024	.024	SELECT	1.000000
7. LAGOCEPHALUS LAEVIGATUS	8	8	OK	.112	.213	SAMPLED	1.903247
8. LUIDIA CLATHRATA	2	2	OK	.082	.156	SAMPLED	1.903247
9. LUTJANUS CAMPECHANUS	14	14	OK	.377	.377	SELECT	1.000000
10. PRISTIPOMOIDES AQUILONARIS	1	1	OK	.014	.027	SAMPLED	1.903247
11. SCOMBER JAPONICUS	4	4	OK	.108	.206	SAMPLED	1.903247
12. SICYONIA BREVIROSTRIS	4	4	OK	.035	.067	SAMPLED	1.903247
13. STENOTOMUS CAPRINUS	105	20	OK	.671	1.277	SAMPLED	1.903247
14. STYELA PLICATA	5	5	OK	.086	.086	SELECT	1.000000
15. SYACIUM GUNTERI	7	7	OK	.237	.451	SAMPLED	1.903247
16. SYNODUS FOETENS	16	16	OK	.769	1.464	SAMPLED	1.903247
17. TRASH	1	0	OK	.607	1.155	SAMPLED	1.903247
18. UROPHYCIS FLORIDANUS	1	1	OK	.024	.046	SAMPLED	1.903247

Vessel: 04 Cruise: 0308 Station: 006

TAXONOMIC NAME	NUMBER CAUGHT	NUMBER MEASURED	ERROR STATUS	SAMPLE WEIGHT	TOTAL WEIGHT	SAMPLED /SELECT	EXPANSION FACTOR
19. APLYSIA BADISTES	1	1	OK	.152	.152	SELECT	1.000000
20. CALAPPA SULCATA	1	1	OK	.370	.370	SELECT	1.000000
21. ETRUMEUS TERES	14	14	OK	.124	.236	SAMPLED	1.903247
22. LAGODON RHOMBOIDES	3	3	OK	.062	.118	SAMPLED	1.903247
23. LOLIGO PLEII	129	20	OK	1.567	2.982	SAMPLED	1.903247
24. LUTJANUS SYNAGRIS	1	1	OK	.218	.218	SELECT	1.000000
25. PORTUNUS GIBBESII	7	7	OK	.080	.152	SAMPLED	1.903247
26. SARDINELLA AURITA	3	3	OK	.186	.186	SELECT	1.000000
27. SAURIDA BRASILIENSIS	8	8	OK	.017	.032	SAMPLED	1.903247
28. SHRIMP-PENAEUS AZTECUS	24	24	OK	.321	.321	SELECT	1.000000
29. SHRIMP-PENAEUS DUORARUM	8	8	OK	.174	.174	SELECT	1.000000
30. TRACHURUS LATHAMI	772	20	OK	6.703	12.757	SAMPLED	1.903247
31. UPENEUS PARVUS	101	20	OK	1.798	3.422	SAMPLED	1.903247
				15.365	27.520		

Date/Time: Sunday,July,06,2014 /08:28:25 Station Check Form, Station 016

2

Vessel	Pascagoula Station Number	Cruise	Time Zone	Start Date	Start Time	Start Latitude	Start Longitude	Start Depth
04	016	0308	GMT	06/11/2014	12:36:11	2643.99	09639.99	45.8

SEAMAP Number	End Date	End Time	End Latitude	End Longitude	End Depth
T2106	06/11/2014	13:06:18	2642.68	09640.14	43.1

Statistical Zone	Faunal Zone	Data Source	Temperature Sea Surface	Temperature Air
21	7	US	27.2	28.0

Barometric Pressure	Wind Speed	Wind Direction	Wave Height	Beaufort Sea State	Towing Speed	Tow Number	Net Code
1010.9	11.4	191	2.0	4	2.6183	01	01-Port Side

Gear Size	Gear Type	Mesh Size	Operation Code	Minutes Fished	Total Catch
40	ST	1.63		30.117	26.510

Watch Leader: Taniya Wallace Field Party Chief: Kim Johnson

TAXONOMIC NAME	NUMBER CAUGHT	NUMBER MEASURED	ERROR STATUS	SAMPLE WEIGHT	TOTAL WEIGHT	SAMPLED /SELECT	EXPANSION FACTOR
1. AMUSIUM PAPYRACEUM	4	4	OK	.092	.176	SAMPLED	1.908023
2. ANASIMUS LATUS	1	1	OK	.002	.004	SAMPLED	1.908023
3. ASTROPECTEN DUPLICATUS	1	1	OK	.001	.002	SAMPLED	1.908023
4. BATHYANTHIAS MEXICANA	3	3	OK	.048	.048	SELECT	1.000000
5. CALAPPA SULCATA	2	2	OK	.667	1.273	SAMPLED	1.908023
6. CYCLOPSETTA CHITTENDENI	1	1	OK	.141	.141	SELECT	1.000000
7. HALIEUTICHTHYS	2	0	OK	.017	.032	SAMPLED	1.908023
8. ILIACANTHA INTERMEDIA	1	1	OK	.006	.011	SAMPLED	1.908023
9. LAGODON RHOMBOIDES	1	1	OK	.068	.130	SAMPLED	1.908023
10. LEIOLAMBRUS NITIDUS	1	1	OK	.001	.002	SAMPLED	1.908023
11. LOLIGO PEALEII	22	20	OK	.369	.704	SAMPLED	1.908023
12. LUTJANUS CAMPECHANUS	1	1	OK	.132	.132	SELECT	1.000000
13. OGCOCEPHALUS PANTOSTICTUS	1	1	OK	.013	.025	SAMPLED	1.908023
14. PARAPENAEUS POLITUS	1	1	OK	.002	.004	SAMPLED	1.908023
15. PEPRILUS BURTI	168	20	OK	2.898	5.529	SAMPLED	1.908023
16. PITAR CORDATUS	2	2	OK	.047	.090	SAMPLED	1.908023
17. PODOCHELA SIDNEYI	2	2	OK	.006	.011	SAMPLED	1.908023
18. POLYSTIRA ALBIDA	3	3	OK	.046	.088	SAMPLED	1.908023

Vessel: 04 Cruise: 0308 Station: 016

TAXONOMIC NAME	NUMBER CAUGHT	NUMBER MEASURED	ERROR STATUS	SAMPLE WEIGHT	TOTAL WEIGHT	SAMPLED /SELECT	EXPANSION FACTOR
19. PORTUNUS SPINICARPUS	10	10	OK	.059	.113	SAMPLED	1.908023
20. PRIONOTUS STEARNSI	7	7	OK	.083	.158	SAMPLED	1.908023
21. PSEUDORHOMBILA QUADRIDENTATA	1	1	OK	.009	.017	SAMPLED	1.908023
22. SAURIDA BRASILIENSIS	3	3	OK	.012	.023	SAMPLED	1.908023
23. SAURIDA NORMANI	2	2	OK	.208	.397	SAMPLED	1.908023
24. SCONSIA STRIATA	1	1	OK	.013	.025	SAMPLED	1.908023
25. SERRANUS ATROBRANCHUS	27	20	OK	.422	.805	SAMPLED	1.908023
26. SOLENOCERA VIOSCAI	6	6	OK	.049	.093	SAMPLED	1.908023
27. STENOTOMUS CAPRINUS	44	20	OK	1.525	2.910	SAMPLED	1.908023
28. SYNODUS FOETENS	3	3	OK	.680	1.297	SAMPLED	1.908023
29. TAMOYA HAPLONEMA	1	1	OK	.106	.202	SAMPLED	1.908023
30. TRACHURUS LATHAMI	47	20	OK	2.197	4.192	SAMPLED	1.908023
31. TRASH	1	0	OK	.479	.914	SAMPLED	1.908023
32. UPENEUS PARVUS	30	20	OK	1.054	2.011	SAMPLED	1.908023
33. UROPHYCIS CIRRATUS	2	2	OK	.023	.044	SAMPLED	1.908023
34. UROPHYCIS FLORIDANUS	2	2	OK	.123	.235	SAMPLED	1.908023
35. ANADARA BAUGHMANI	13	13	OK	.180	.343	SAMPLED	1.908023
36. ASTROPECTEN CINGULATUS	11	11	OK	.134	.256	SAMPLED	1.908023
37. PRIONOTUS LONGISPINOSUS	2	2	OK	.091	.174	SAMPLED	1.908023
38. PRISTIPOMOIDES AQUILONARIS	8	8	OK	.856	1.633	SAMPLED	1.908023
39. RHOMBOPLITES AURORUBENS	2	2	OK	.222	.222	SELECT	1.000000
40. SHRIMP-PENAEUS AZTECUS	28	28	OK	1.115	1.115	SELECT	1.000000
41. SQUILLA CHYDAEA	3	3	OK	.022	.042	SAMPLED	1.908023
42. STENORHYNCHUS SETICORNIS	3	3	OK	.003	.006	SAMPLED	1.908023
43. TRICHIURUS LEPTURUS	1	1	OK	.031	.059	SAMPLED	1.908023
44. TRICHOPSETTA VENTRALIS	22	20	OK	.431	.822	SAMPLED	1.908023
				14.683	26.510		

3

Date/Time: Sunday,July,06,2014 /08:28:56 Station Check Form, Station 039

Vessel	Pascagoula Station Number	Cruise	Time Zone	Start Date	Start Time	Start Latitude	Start Longitude	Start Depth
04	039	0308	GMT	06/13/2014	22:51:15	2737.75	09620.36	42.6

SEAMAP Number	End Date	End Time	End Latitude	End Longitude	End Depth
T2014	06/13/2014	23:21:05	2736.86	09619.30	44.8

Statistical Zone	Faunal Zone	Data Source	Temperature Sea Surface	Temperature Air
20	7	US	28.4	28.8

Barometric Pressure	Wind Speed	Wind Direction	Wave Height	Beaufort Sea State	Towing Speed	Tow Number	Net Code
1011.4	11.0	132	0.0	4	2.6025	01	02-Starboard Side

Gear Size	Gear Type	Mesh Size	Operation Code	Minutes Fished	Total Catch
40	ST	1.63		29.833	46.145

Watch Leader: Lee Saxon

Field Party Chief: Kim Johnson

TAXONOMIC NAME	NUMBER CAUGHT	NUMBER MEASURED	ERROR STATUS	SAMPLE WEIGHT	TOTAL WEIGHT	SAMPLED /SELECT	EXPANSION FACTOR
1. AMUSIUM PAPYRACEUM	153	20	OK	2.174	4.785	SAMPLED	2.200816
2. ANASIMUS LATUS	3	3	OK	.011	.024	SAMPLED	2.200816
3. ANCYLOPSETTA DILECTA	1	1	OK	.128	.282	SAMPLED	2.200816
4. CALAPPA SULCATA	1	1	OK	.254	.559	SAMPLED	2.200816
5. GYMNACHIRUS TEXAE	1	1	OK	.022	.048	SAMPLED	2.200816
6. HALIEUTICHTHYS	12	0	OK	.085	.187	SAMPLED	2.200816
7. KATHETOSTOMA ALBIGUTTA	2	2	OK	.081	.178	SAMPLED	2.200816
8. LOLIGO PEALEII	14	14	OK	.142	.313	SAMPLED	2.200816
9. PEPRILUS BURTI	42	20	OK	1.544	3.398	SAMPLED	2.200816
10. POLYSTIRA ALBIDA	3	3	OK	.031	.068	SAMPLED	2.200816
11. PRIONOTUS PARALATUS	2	2	OK	.060	.132	SAMPLED	2.200816
12. PRIONOTUS STEARNSI	92	20	OK	1.285	2.828	SAMPLED	2.200816
13. PRISTIPOMOIDES AQUILONARIS	3	3	OK	.290	.638	SAMPLED	2.200816
14. RAJA TEXANA	1	1	OK	.610	.610	SELECT	1.000000
15. RYPTICUS MACULATUS	1	1	OK	.025	.055	SAMPLED	2.200816
16. SCONSIA STRIATA	1	1	OK	.024	.053	SAMPLED	2.200816
17. SERRANUS ATROBRANCHUS	73	20	OK	.906	1.994	SAMPLED	2.200816
18. SQUATINA DUMERIL	1	1	OK	2.900	2.900	SELECT	1.000000

Vessel: 04 Cruise: 0308 Station: 039

3

TAXONOMIC NAME	NUMBER CAUGHT	NUMBER MEASURED	ERROR STATUS	SAMPLE WEIGHT	TOTAL WEIGHT	SAMPLED /SELECT	EXPANSION FACTOR
19. STENORHYNCHUS SETICORNIS	1	1	OK	.002	.004	SAMPLED	2.200816
20. SYNODUS POEYI	5	5	OK	.037	.081	SAMPLED	2.200816
21. TRACHURUS LATHAMI	44	20	OK	1.482	3.262	SAMPLED	2.200816
22. TRASH	1	0	OK	.962	2.117	SAMPLED	2.200816
23. ASTROPECTEN CINGULATUS	10	10	OK	.104	.229	SAMPLED	2.200816
24. CENTROPRISTIS PHILADELPHICUS	4	4	OK	.254	.559	SAMPLED	2.200816
25. LUTJANUS CAMPECHANUS	3	3	OK	.446	.446	SELECT	1.000000
26. OGCOCEPHALUS DECLIVIROSTRIS	6	6	OK	.250	.550	SAMPLED	2.200816
27. PARAPENAEUS POLITUS	3	3	OK	.007	.015	SAMPLED	2.200816
28. PITAR CORDATUS	1	1	OK	.043	.095	SAMPLED	2.200816
29. PORICHTHYS PLECTRODON	3	3	OK	.081	.178	SAMPLED	2.200816
30. PORTUNUS SPINICARPUS	42	20	OK	.182	.401	SAMPLED	2.200816
31. RANINOIDES LOUISIANENSIS	1	1	OK	.020	.044	SAMPLED	2.200816
32. SAURIDA BRASILIENSIS	8	8	OK	.042	.092	SAMPLED	2.200816
33. SELENE SETAPINNIS	1	1	OK	.110	.242	SAMPLED	2.200816
34. SHRIMP-PENAEUS AZTECUS	2	2	OK	.116	.116	SELECT	1.000000
35. STENOTOMUS CAPRINUS	102	20	OK	5.264	11.585	SAMPLED	2.200816
36. SYNODUS FOETENS	10	10	OK	1.505	3.312	SAMPLED	2.200816
37. TRICHIURUS LEPTURUS	4	4	OK	.353	.777	SAMPLED	2.200816
38. TRICHOPSETTA VENTRALIS	38	20	OK	.741	1.631	SAMPLED	2.200816
39. UPENEUS PARVUS	15	15	OK	.496	1.092	SAMPLED	2.200816
40. UROPHYCIS CIRRATUS	2	2	OK	.025	.055	SAMPLED	2.200816
41. UROPHYCIS FLORIDANUS	1	1	OK	.095	.209	SAMPLED	2.200816
				23.189	46.145		

4

Date/Time: Sunday,July,06,2014 /08:29:19 Station Check Form, Station 055

Vessel	Pascagoula Station Number	Cruise	Time Zone	Start Date	Start Time	Start Latitude	Start Longitude	Start Depth
04	055	0308	GMT	06/15/2014	11:39:50	2828.03	09552.91	10.5

SEAMAP Number	End Date	End Time	End Latitude	End Longitude	End Depth
T1907	06/15/2014	12:09:51	2826.80	09553.33	11.2

Statistical Zone	Faunal Zone	Data Source	Temperature Sea Surface	Temperature Air
19	7	US	27.3	28.3

Barometric Pressure	Wind Speed	Wind Direction	Wave Height	Beaufort Sea State	Towing Speed	Tow Number	Net Code
1011.0	15.2	173	0.0	4	2.5883	01	01-Port Side

Gear Size	Gear Type	Mesh Size	Operation Code	Minutes Fished	Total Catch
40	ST	1.63		30.017	22.400

Watch Leader: Taniya Wallace

Field Party Chief: Kim Johnson

TAXONOMIC NAME	NUMBER CAUGHT	NUMBER MEASURED	ERROR STATUS	SAMPLE WEIGHT	TOTAL WEIGHT	SAMPLED /SELECT	EXPANSION FACTOR
1. CHLOROSCOMBRUS CHRYSURUS	7	7	OK	.180	.252	SAMPLED	1.399888
2. CYNOSCION	3	0	OK	.006	.008	SAMPLED	1.399888
3. HARENGULA JAGUANA	3	3	OK	.161	.225	SAMPLED	1.399888
4. LEPIDOCHELYS KEMPI	1	1	OK	1.325	1.325	SELECT	1.000000
5. LOLIGO PLEII	85	20	OK	1.212	1.697	SAMPLED	1.399888
6. LUIDIA CLATHRATA	4	3	Caught not equal to measured	.051	.071	SAMPLED	1.399888
7. LUTJANUS CAMPECHANUS	2	2	OK	.036	.036	SELECT	1.000000
8. OPISTHONEMA OGLINUM	1	1	OK	.098	.137	SAMPLED	1.399888
9. PEPRILUS BURTI	186	20	OK	1.826	2.556	SAMPLED	1.399888
10. SELENE SETAPINNIS	56	20	OK	2.396	3.354	SAMPLED	1.399888
11. SHRIMP-PENAEUS AZTECUS	56	56	OK	.400	.400	SELECT	1.000000
12. SPHYRNA TIBURO	1	1	OK	5.600	5.600	SELECT	1.000000
13. TRASH	1	0	OK	1.770	2.478	SAMPLED	1.399888
14. TRICHIURUS LEPTURUS	9	9	OK	.023	.032	SAMPLED	1.399888
15. ANCHOA HEPSETUS	2	2	OK	.042	.059	SAMPLED	1.399888
16. BROTULA BARBATUM	1	1	OK	.010	.010	SELECT	1.000000
17. CALLINECTES SIMILIS	13	13	OK	.075	.105	SAMPLED	1.399888
18. CYNOSCION NOTHUS	8	8	OK	.329	.461	SAMPLED	1.399888

Vessel: 04 Cruise: 0308 Station: 055

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TAXONOMIC NAME	NUMBER CAUGHT	NUMBER MEASURED	ERROR STATUS	SAMPLE WEIGHT	TOTAL WEIGHT	SAMPLED /SELECT	EXPANSION FACTOR
19. LAGOCEPHALUS LAEVIGATUS	7	7	OK	.049	.069	SAMPLED	1.399888
20. LAGODON RHOMBOIDES	2	2	OK	.047	.066	SAMPLED	1.399888
21. LOLLIGUNCULA BREVIS	24	20	OK	.203	.284	SAMPLED	1.399888
22. PERSEPHONA CRINITA	1	1	OK	.004	.004	SELECT	1.000000
23. PORTUNUS GIBBESII	1	1	OK	.007	.010	SAMPLED	1.399888
24. PRIONOTUS LONGISPINOSUS	1	1	OK	.008	.011	SAMPLED	1.399888
25. RENILLA MULLERI	27	20	OK	.126	.176	SAMPLED	1.399888
26. SAURIDA BRASILIENSIS	10	10	OK	.015	.021	SAMPLED	1.399888
27. SQUILLA EMPUSA	2	2	OK	.015	.021	SAMPLED	1.399888
28. STENOTOMUS CAPRINUS	44	20	OK	.264	.370	SAMPLED	1.399888
29. SYACIUM GUNTERI	8	8	OK	.152	.213	SAMPLED	1.399888
30. SYNODUS FOETENS	9	9	OK	.510	.714	SAMPLED	1.399888
31. TRACHURUS LATHAMI	65	20	OK	1.136	1.590	SAMPLED	1.399888
32. TRACHYPENEUS CONSTRICTUS	5	5	OK	.017	.024	SAMPLED	1.399888
33. UPENEUS PARVUS	1	1	OK	.015	.021	SAMPLED	1.399888
				18.108	22.400		

Date/Time: Sunday,July,06,2014 /08:29:43 Station Check Form, Station 067

5

Vessel	Pascagoula Station Number	Cruise	Time Zone	Start Date	Start Time	Start Latitude	Start Longitude	Start Depth
04	067	0308	GMT	06/16/2014	15:59:29	2840.64	09521.02	11.3

SEAMAP Number	End Date	End Time	End Latitude	End Longitude	End Depth
T1903	06/16/2014	16:29:43	2839.33	09521.13	12.2

Statistical Zone	Faunal Zone	Data Source	Temperature Sea Surface	Temperature Air
19	7	US	27.6	29.3

Barometric Pressure	Wind Speed	Wind Direction	Wave Height	Beaufort Sea State	Towing Speed	Tow Number	Net Code
1017.1	13.2	148	1.5	4	2.5986	01	01-Port Side

Gear Size	Gear Type	Mesh Size	Operation Code	Minutes Fished	Total Catch
40	ST	1.63		30.233	58.310

Watch Leader: Taniya Wallace Field Party Chief: Kim Johnson

TAXONOMIC NAME	NUMBER CAUGHT	NUMBER MEASURED	ERROR STATUS	SAMPLE WEIGHT	TOTAL WEIGHT	SAMPLED /SELECT	EXPANSION FACTOR
1. ANCHOA HEPSETUS	3	3	OK	.069	.165	SAMPLED	2.389812
2. ASTROPECTEN DUPLICATUS	1	1	OK	.001	.002	SAMPLED	2.389812
3. CYNOSCION	2	0	OK	.026	.062	SAMPLED	2.389812
4. HARENGULA JAGUANA	47	20	OK	2.367	5.657	SAMPLED	2.389812
5. LAGOCEPHALUS LAEVIGATUS	1	1	OK	.012	.029	SAMPLED	2.389812
6. LEIOSTOMUS XANTHURUS	190	20	OK	12.246	29.266	SAMPLED	2.389812
7. RENILLA MULLERI	3	3	OK	.014	.033	SAMPLED	2.389812
8. SHRIMP-PENAEUS AZTECUS	194	194	OK	2.032	2.032	SELECT	1.000000
9. SHRIMP-PENAEUS DUORARUM	2	2	OK	.025	.025	SELECT	1.000000
10. TRACHYPENEUS CONSTRICTUS	2	2	OK	.004	.010	SAMPLED	2.389812
11. TRASH	1	0	OK	1.392	1.392	SELECT	2.389812
12. CALLINECTES SIMILIS	37	20	OK	.252	.602	SAMPLED	2.389812
13. CENTROPRISTIS PHILADELPHICUS	1	1	OK	.013	.031	SAMPLED	2.389812
14. CHLOROSCOMBRUS CHRYSURUS	89	20	OK	1.716	4.101	SAMPLED	2.389812
15. CYCLOPSETTA CHITTENDENI	1	1	OK	.068	.163	SAMPLED	2.389812
16. CYNOSCION NOTHUS	64	20	OK	3.236	7.733	SAMPLED	2.389812
17. LAGODON RHOMBOIDES	1	1	OK	.025	.060	SAMPLED	2.389812
18. LARIMUS FASCIATUS	2	2	OK	.134	.320	SAMPLED	2.389812

Vessel: 04 Cruise: 0308 Station: 067

TAXONOMIC NAME	NUMBER CAUGHT	NUMBER MEASURED	ERROR STATUS	SAMPLE WEIGHT	TOTAL WEIGHT	SAMPLED /SELECT	EXPANSION FACTOR
19. LOLIGO PLEII	6	6	OK	.111	.265	SAMPLED	2.389812
20. LOLLIGUNCULA BREVIS	7	7	OK	.070	.167	SAMPLED	2.389812
21. LUTJANUS CAMPECHANUS	2	2	OK	.062	.062	SELECT	1.000000
22. OPHIOLEPIS ELEGANS	1	1	OK	.002	.005	SAMPLED	2.389812
23. PEPRILUS BURTI	72	20	OK	.838	2.003	SAMPLED	2.389812
24. PEPRILUS PARU	1	1	OK	.063	.151	SAMPLED	2.389812
25. SELENE SETAPINNIS	2	2	OK	.122	.292	SAMPLED	2.389812
26. SPHYRAENA GUACHANCHO	1	1	OK	.144	.144	SELECT	1.000000
27. STENOTOMUS CAPRINUS	5	5	OK	.039	.093	SAMPLED	2.389812
28. SYACIUM GUNTERI	3	3	OK	.037	.088	SAMPLED	2.389812
29. SYNODUS FOETENS	2	2	OK	.318	.760	SAMPLED	2.389812
30. TRICHIURUS LEPTURUS	34	20	OK	1.087	2.598	SAMPLED	2.389812
				26.525	58.310		

Date/Time: Sunday,July,06,2014 /08:30:22 Station Check Form, Station 090

6

Vessel	Pascagoula Station Number	Cruise	Time Zone	Start Date	Start Time	Start Latitude	Start Longitude	Start Depth
04	090	0308	GMT	06/19/2014	02:11:58	2826.64	09350.85	26.2

SEAMAP Number	End Date	End Time	End Latitude	End Longitude	End Depth
W1725	06/19/2014	02:42:07	2825.31	09350.75	27.4

Statistical Zone	Faunal Zone	Data Source	Temperature Sea Surface	Temperature Air
18	7	US	28.1	28.4

Barometric Pressure	Wind Speed	Wind Direction	Wave Height	Beaufort Sea State	Towing Speed	Tow Number	Net Code
1015.3	18.1	121	0.0	5	2.6373	01	01-Port Side

Gear Size	Gear Type	Mesh Size	Operation Code	Minutes Fished	Total Catch
40	ST	1.63		30.150	26.630

Watch Leader: Lee Saxon

Field Party Chief: Kim Johnson

TAXONOMIC NAME	NUMBER CAUGHT	NUMBER MEASURED	ERROR STATUS	SAMPLE WEIGHT	TOTAL WEIGHT	SAMPLED /SELECT	EXPANSION FACTOR
1. ASTROPECTEN CINGULATUS	1	1	OK	.009	.017	SAMPLED	1.862850
2. BELLATOR MILITARIS	2	2	OK	.026	.048	SAMPLED	1.862850
3. CALAPPA SULCATA	1	1	OK	.014	.026	SAMPLED	1.862850
4. CENTROPRISTIS PHILADELPHICUS	10	10	OK	.705	1.313	SAMPLED	1.862850
5. CYCLOPSETTA CHITTENDENI	2	2	OK	.088	.164	SAMPLED	1.862850
6. GYMNACHIRUS TEXAE	1	1	OK	.016	.030	SAMPLED	1.862850
7. HOPLUNNIS MACRURUS	1	1	OK	.008	.015	SAMPLED	1.862850
8. LAEVICARDIUM LAEVIGATUM	1	1	OK	.036	.067	SAMPLED	1.862850
9. LEIOSTOMUS XANTHURUS	1	1	OK	.088	.164	SAMPLED	1.862850
10. PORICHTHYS PLECTRODON	1	1	OK	.024	.045	SAMPLED	1.862850
11. PRIONOTUS LONGISPINOSUS	14	14	OK	.491	.915	SAMPLED	1.862850
12. PRIONOTUS STEARNSI	1	1	OK	.014	.026	SAMPLED	1.862850
13. SHRIMP-PENAEUS AZTECUS	35	35	OK	1.556	1.556	SELECT	1.000000
14. SICYONIA BREVIROSTRIS	2	2	OK	.018	.034	SAMPLED	1.862850
15. SQUILLA CHYDAEA	21	20	OK	.116	.216	SAMPLED	1.862850
16. STYELA PLICATA	1	1	OK	.087	.162	SAMPLED	1.862850
17. SYACIUM GUNTERI	3	3	OK	.077	.143	SAMPLED	1.862850
18. SYMPHURUS DIOMEDIANUS	1	1	OK	.021	.039	SAMPLED	1.862850

Vessel: 04 Cruise: 0308 Station: 090

6

TAXONOMIC NAME	NUMBER CAUGHT	NUMBER MEASURED	ERROR STATUS	SAMPLE WEIGHT	TOTAL WEIGHT	SAMPLED /SELECT	EXPANSION FACTOR
19. SYNGNATHUS PELAGICUS	1	1	OK	.003	.006	SAMPLED	1.862850
20. SYNODUS POEYI	2	2	OK	.019	.035	SAMPLED	1.862850
21. TRACHYPENEUS SIMILIS	10	10	OK	.076	.142	SAMPLED	1.862850
22. TRASH	1	0	OK	1.160	2.161	SAMPLED	1.862850
23. AMUSIUM PAPYRACEUM	273	20	OK	2.094	3.901	SAMPLED	1.862850
24. ANCYLOPSETTA DILECTA	2	2	OK	.022	.041	SAMPLED	1.862850
25. CYNOSCION ARENARIUS	1	1	OK	.142	.265	SAMPLED	1.862850
26. LAGODON RHOMBOIDES	5	5	OK	.253	.471	SAMPLED	1.862850
27. LEPOPHIDIUM BREVIBARBE	7	7	OK	.281	.523	SAMPLED	1.862850
28. LOLIGO PEALEII	1	1	OK	.129	.240	SAMPLED	1.862850
29. LUTJANUS CAMPECHANUS	21	21	OK	2.364	2.364	SELECT	1.000000
30. MICROPOGONIAS UNDULATUS	1	1	OK	.120	.224	SAMPLED	1.862850
31. PORTUNUS SPINICARPUS	132	20	OK	.418	.779	SAMPLED	1.862850
32. PRISTIPOMOIDES AQUILONARIS	7	7	OK	.158	.294	SAMPLED	1.862850
33. SERRANUS ATROBRANCHUS	19	19	OK	.246	.458	SAMPLED	1.862850
34. SOLENOCERA VIOSCAI	24	20	OK	.072	.134	SAMPLED	1.862850
35. STENOTOMUS CAPRINUS	88	20	OK	4.128	7.690	SAMPLED	1.862850
36. SYNODUS FOETENS	9	9	OK	.998	1.859	SAMPLED	1.862850
37. UROPHYCIS CIRRATUS	4	4	OK	.034	.063	SAMPLED	1.862850
				16.111	26.630		

Date/Time: Sunday,July,06,2014 /08:30:42 Station Check Form, Station 119

7

Vessel	Pascagoula Station Number	Cruise	Time Zone	Start Date	Start Time	Start Latitude	Start Longitude	Start Depth
04	119	0308	GMT	06/25/2014	06:53:02	2802.89	09233.11	56.1

SEAMAP Number	End Date	End Time	End Latitude	End Longitude	End Depth
W1626	06/25/2014	07:23:03	2801.92	09232.00	55.3

Statistical Zone	Faunal Zone	Data Source	Temperature Sea Surface	Temperature Air
16	7	US	27.9	28.8

Barometric Pressure	Wind Speed	Wind Direction	Wave Height	Beaufort Sea State	Towing Speed	Tow Number	Net Code
1017.7	10.5	177	1.0	3	2.7644	01	02-Starboard Side

Gear Size	Gear Type	Mesh Size	Operation Code	Minutes Fished	Total Catch
40	ST	1.63		30.017	42.450

Watch Leader: Taniya Wallace Field Party Chief: Kim Johnson

TAXONOMIC NAME	NUMBER CAUGHT	NUMBER MEASURED	ERROR STATUS	SAMPLE WEIGHT	TOTAL WEIGHT	SAMPLED /SELECT	EXPANSION FACTOR
1. AMUSIUM PAPYRACEUM	6	6	OK	.078	.204	SAMPLED	2.619465
2. ANASIMUS LATUS	1	1	OK	.005	.013	SAMPLED	2.619465
3. ANCYLOPSETTA DILECTA	2	2	OK	.067	.176	SAMPLED	2.619465
4. BROTULA BARBATUM	3	3	OK	.511	1.339	SAMPLED	2.619465
5. CAULOLATILUS INTERMEDIUS	1	1	OK	.074	.194	SAMPLED	2.619465
6. CENTROPRISTIS PHILADELPHICUS	4	4	OK	.445	1.166	SAMPLED	2.619465
7. CYNOSCION ARENARIUS	1	1	OK	.352	.352	SELECT	1.000000
8. EQUETUS IWAMOTOI	2	2	OK	.085	.223	SAMPLED	2.619465
9. HALIEUTICHTHYS	1	0	OK	.011	.029	SAMPLED	2.619465
10. LEPOPHIDIUM JEANNAE	1	1	OK	.073	.191	SAMPLED	2.619465
11. NEOMERINTHE HEMINGWAYI	1	1	OK	.049	.128	SAMPLED	2.619465
12. PEPRILUS BURTI	1	1	OK	.106	.278	SAMPLED	2.619465
13. PORTUNUS SPINICARPUS	2	2	OK	.015	.039	SAMPLED	2.619465
14. PRIONOTUS LONGISPINOSUS	1	1	OK	.060	.157	SAMPLED	2.619465
15. PRIONOTUS PARALATUS	18	18	OK	.656	1.718	SAMPLED	2.619465
16. SERRANUS ATROBRANCHUS	16	16	OK	.199	.521	SAMPLED	2.619465
17. SHRIMP-PENAEUS AZTECUS	13	13	OK	.627	.627	SELECT	1.000000
18. TRASH	1	0	OK	2.120	5.553	SAMPLED	2.619465

Vessel: 04 Cruise: 0308 Station: 119

7

TAXONOMIC NAME	NUMBER CAUGHT	NUMBER MEASURED	ERROR STATUS	SAMPLE WEIGHT	TOTAL WEIGHT	SAMPLED /SELECT	EXPANSION FACTOR
19. TRICHOPSETTA VENTRALIS	7	7	OK	.187	.490	SAMPLED	2.619465
20. PSEUDORHOMBILA QUADRIDENTATA	1	1	OK	.016	.016	SELECT	1.000000
21. AURELIA AURITA	2	2	OK	.072	.189	SAMPLED	2.619465
22. CHAETODON AYA	1	1	OK	.027	.027	SELECT	1.000000
23. EQUETUS UMBROSUS	2	2	OK	.160	.419	SAMPLED	2.619465
24. HILDEBRANDIA FLAVA	1	1	OK	.037	.097	SAMPLED	2.619465
25. MULLUS AURATUS	1	1	OK	.075	.196	SAMPLED	2.619465
26. PARALICHTHYS SQUAMILENTUS	1	1	OK	.279	.279	SELECT	1.000000
27. PERISTEDION GRACILE	1	1	OK	.025	.065	SAMPLED	2.619465
28. PORICHTHYS PLECTRODON	1	1	OK	.040	.040	SELECT	1.000000
29. PRIONOTUS STEARNSI	1	1	OK	.019	.050	SAMPLED	2.619465
30. PRISTIPOMOIDES AQUILONARIS	90	20	OK	7.752	20.306	SAMPLED	2.619465
31. SOLENOCERA VIOSCAI	2	2	OK	.016	.042	SAMPLED	2.619465
32. SQUILLA CHYDAEA	2	2	OK	.009	.009	SELECT	1.000000
33. STENOCIONOPS FURCATA	1	1	OK	.009	.009	SELECT	1.000000
34. STENOTOMUS CAPRINUS	21	20	OK	1.183	3.099	SAMPLED	2.619465
35. SYNODUS FOETENS	1	1	OK	.151	.396	SAMPLED	2.619465
36. TRACHURUS LATHAMI	8	8	OK	.484	1.268	SAMPLED	2.619465
37. TRICHIURUS LEPTURUS	1	1	OK	.099	.099	SELECT	1.000000
38. UROPHYCIS FLORIDANUS	15	15	OK	.934	2.447	SAMPLED	2.619465
				17.107	42.450		

Date/Time: Sunday,July,06,2014 /08:30:58 Station Check Form, Station 129

Vessel	Pascagoula Station Number	Cruise	Time Zone	Start Date	Start Time	Start Latitude	Start Longitude	Start Depth
04	129	0308	GMT	06/26/2014	14:33:04	2905.45	09321.70	11.7

SEAMAP Number	End Date	End Time	End Latitude	End Longitude	End Depth
W1714	06/26/2014	15:03:09	2904.25	09320.92	12.1

Statistical Zone	Faunal Zone	Data Source	Temperature Sea Surface	Temperature Air
17	7	US	28.0	29.0

Barometric Pressure	Wind Speed	Wind Direction	Wave Height	Beaufort Sea State	Towing Speed	Tow Number	Net Code
1016.3	13.7	124	1.5	4	2.7431	01	02-Starboard Side

Gear Size	Gear Type	Mesh Size	Operation Code	Minutes Fished	Total Catch
40	ST	1.63		30.083	51.090

Watch Leader: Taniya Wallace Field Party Chief: Kim Johnson

TAXONOMIC NAME	NUMBER CAUGHT	NUMBER MEASURED	ERROR STATUS	SAMPLE WEIGHT	TOTAL WEIGHT	SAMPLED /SELECT	EXPANSION FACTOR
1. ANCHOA HEPSETUS	2	2	OK	.039	.098	SAMPLED	2.516729
2. ANCYLOPSETTA QUADROCELLATA	1	1	OK	.052	.131	SAMPLED	2.516729
3. CALLINECTES SIMILIS	3	3	OK	.045	.113	SAMPLED	2.516729
4. CHLOROSCOMBRUS CHRYSURUS	21	20	OK	.955	2.403	SAMPLED	2.516729
5. CYNOSCION ARENARIUS	1	1	OK	.113	.113	SELECT	1.000000
6. CYNOSCION NOTHUS	1	1	OK	.079	.079	SELECT	1.000000
7. HARENGULA JAGUANA	1	1	OK	.039	.098	SAMPLED	2.516729
8. LEIOSTOMUS XANTHURUS	43	20	OK	3.012	7.580	SAMPLED	2.516729
9. OPISTHONEMA OGLINUM	2	2	OK	.239	.601	SAMPLED	2.516729
10. PEPRILUS PARU	4	4	OK	.339	.853	SAMPLED	2.516729
11. PORTUNUS GIBBESII	2	2	OK	.012	.012	SELECT	1.000000
12. SELENE SETAPINNIS [Large]	3	3	OK	.072	.181	SAMPLED	2.516729
13. SELENE SETAPINNIS [Small]	5	5	OK	.006	.015	SAMPLED	2.516729
14. SHRIMP-PENAEUS DUORARUM	2	2	OK	.071	.071	SELECT	1.000000
15. SHRIMP-PENAEUS SETIFERUS	3	3	OK	.177	.177	SELECT	1.000000
16. STENOTOMUS CAPRINUS	99	20	OK	.890	2.240	SAMPLED	2.516729
17. SYACIUM GUNTERI	1	1	OK	.018	.045	SAMPLED	2.516729
18. SYNODUS FOETENS	3	3	OK	.147	.147	SELECT	1.000000

Vessel: 04 Cruise: 0308 Station: 129

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TAXONOMIC NAME	NUMBER CAUGHT	NUMBER MEASURED	ERROR STATUS	SAMPLE WEIGHT	TOTAL WEIGHT	SAMPLED /SELECT	EXPANSION FACTOR
19. TRASH	1	0	OK	.105	.264	SAMPLED	2.516729
20. TRICHIURUS LEPTURUS	46	20	OK	1.279	3.219	SAMPLED	2.516729
21. LARIMUS FASCIATUS	7	7	OK	.421	1.060	SAMPLED	2.516729
22. LOLLIGUNCULA BREVIS	2	2	OK	.079	.199	SAMPLED	2.516729
23. MICROPOGONIAS UNDULATUS	257	20	OK	8.955	22.537	SAMPLED	2.516729
24. PEPRILUS BURTI	143	20	OK	3.230	8.129	SAMPLED	2.516729
25. SHRIMP-PENAEUS AZTECUS	75	75	OK	.695	.695	SELECT	1.000000
26. SQUILLA EMPUSA	1	1	OK	.011	.028	SAMPLED	2.516729
				21.080	51.090		

Date/Time: Sunday,July,06,2014 /08:31:15 Station Check Form, Station 135

9

Vessel	Pascagoula Station Number	Cruise	Time Zone	Start Date	Start Time	Start Latitude	Start Longitude	Start Depth
04	135	0308	GMT	06/27/2014	09:17:41	2919.88	09350.75	7.8

SEAMAP Number	End Date	End Time	End Latitude	End Longitude	End Depth
W1708	06/27/2014	09:47:44	2918.72	09349.99	8.7

Statistical Zone	Faunal Zone	Data Source	Temperature Sea Surface	Temperature Air
18	7	US	27.8	27.4

Barometric Pressure	Wind Speed	Wind Direction	Wave Height	Beaufort Sea State	Towing Speed	Tow Number	Net Code
1012.8	18.7	130	1.0	5	2.6554	01	01-Port Side

Gear Size	Gear Type	Mesh Size	Operation Code	Minutes Fished	Total Catch
40	ST	1.63		30.050	63.020

Watch Leader: Taniya Wallace Field Party Chief: Kim Johnson

TAXONOMIC NAME	NUMBER CAUGHT	NUMBER MEASURED	ERROR STATUS	SAMPLE WEIGHT	TOTAL WEIGHT	SAMPLED /SELECT	EXPANSION FACTOR
1. CYNOSCION NOTHUS	9	9	OK	.267	.919	SAMPLED	3.443408
2. PRIONOTUS TRIBULUS	5	5	OK	.067	.231	SAMPLED	3.443408
3. SHRIMP-PENAEUS AZTECUS	145	145	OK	1.159	1.159	SELECT	1.000000
4. SHRIMP-PENAEUS SETIFERUS	58	58	OK	2.806	2.806	SELECT	1.000000
5. TRASH	1	0	OK	.480	1.653	SAMPLED	3.443408
6. ANCHOA HEPSETUS	1	1	OK	.021	.072	SAMPLED	3.443408
7. ANCYLOPSETTA QUADROCELLATA	3	3	OK	.099	.099	SELECT	1.000000
8. ARIUS FELIS	3	3	OK	.459	1.581	SAMPLED	3.443408
9. CALLINECTES SAPIDUS	4	4	OK	.709	.709	SELECT	1.000000
10. CALLINECTES SIMILIS	367	20	OK	1.853	6.381	SAMPLED	3.443408
11. CENTROPRISTIS PHILADELPHICUS	2	2	OK	.026	.090	SAMPLED	3.443408
12. CHLOROSCOMBRUS CHRYSURUS	18	18	OK	.470	1.618	SAMPLED	3.443408
13. CHRYSAORA QUINQUECIRRHA	3	3	OK	.137	.472	SAMPLED	3.443408
14. ETROPUS CROSSOTUS	2	2	OK	.027	.093	SAMPLED	3.443408
15. HEPATUS EPHELITICUS	1	1	OK	.015	.052	SAMPLED	3.443408
16. LARIMUS FASCIATUS	1	1	OK	.034	.117	SAMPLED	3.443408
17. LEIOSTOMUS XANTHURUS	57	20	OK	3.830	13.188	SAMPLED	3.443408
18. LOLLIGUNCULA BREVIS	1	1	OK	.022	.076	SAMPLED	3.443408

Vessel: 04 Cruise: 0308 Station: 135

9

TAXONOMIC NAME	NUMBER CAUGHT	NUMBER MEASURED	ERROR STATUS	SAMPLE WEIGHT	TOTAL WEIGHT	SAMPLED /SELECT	EXPANSION FACTOR
19. MENTICIRRHUS AMERICANUS	3	3	OK	.467	.467	SELECT	1.000000
20. MICROPOGONIAS UNDULATUS	239	20	OK	6.492	22.355	SAMPLED	3.443408
21. MUSTELUS CANIS	1	1	OK	.285	.285	SELECT	1.000000
22. OPHIDION WELSHI	1	1	OK	.052	.052	SELECT	1.000000
23. OPISTHONEMA OGLINUM	1	1	OK	.062	.213	SAMPLED	3.443408
24. PEPRILUS BURTI	23	20	OK	.319	1.098	SAMPLED	3.443408
25. PEPRILUS PARU	5	5	OK	.356	1.226	SAMPLED	3.443408
26. PORICHTHYS PLECTRODON	1	1	OK	.047	.047	SELECT	1.000000
27. PORTUNUS GIBBESII	180	20	OK	.533	1.835	SAMPLED	3.443408
28. PORTUNUS SAYI	2	2	OK	.011	.011	SELECT	1.000000
29. PRIONOTUS LONGISPINOSUS	70	20	OK	.517	1.780	SAMPLED	3.443408
30. RHIZOPRIONODON TERRAENOVAE	1	1	OK	.113	.113	SELECT	1.000000
31. SHRIMP-PENAEUS DUORARUM	1	1	OK	.024	.024	SELECT	1.000000
32. SQUILLA EMPUSA	45	20	OK	.394	1.357	SAMPLED	3.443408
33. STELLIFER LANCEOLATUS	1	1	OK	.023	.079	SAMPLED	3.443408
34. SYMPHURUS PLAGIUSA	1	1	OK	.022	.022	SELECT	1.000000
35. TRACHYPENEUS SIMILIS	86	20	OK	.215	.740	SAMPLED	3.443408
				22.413	63.020		

Date/Time: Sunday,July,06,2014 /08:31:35 Station Check Form, Station 145

10

Vessel	Pascagoula Station Number	Cruise	Time Zone	Start Date	Start Time	Start Latitude	Start Longitude	Start Depth
04	145	0308	GMT	06/28/2014	11:27:48	2913.31	09301.76	10.7

SEAMAP Number	End Date	End Time	End Latitude	End Longitude	End Depth
W1712	06/28/2014	11:57:50	2912.23	09301.01	10.5

Statistical Zone	Faunal Zone	Data Source	Temperature Sea Surface	Temperature Air
17	7	US	27.7	28.7

Barometric Pressure	Wind Speed	Wind Direction	Wave Height	Beaufort Sea State	Towing Speed	Tow Number	Net Code
1014.5	16.2	167	2.0	4	2.5271	01	02-Starboard Side

Gear Size	Gear Type	Mesh Size	Operation Code	Minutes Fished	Total Catch
40	ST	1.63		30.033	60.750

Watch Leader: Taniya Wallace Field Party Chief: Kim Johnson

TAXONOMIC NAME	NUMBER CAUGHT	NUMBER MEASURED	ERROR STATUS	SAMPLE WEIGHT	TOTAL WEIGHT	SAMPLED /SELECT	EXPANSION FACTOR
1. CALLINECTES SAPIDUS	2	2	OK	.443	.443	SELECT	1.000000
2. CHLOROSCOMBRUS CHRYSURUS	23	20	OK	.785	2.699	SAMPLED	3.438156
3. CYNOSCION	4	0	OK	.030	.103	SAMPLED	3.438156
4. HEPATUS EPHELITICUS	1	1	OK	.052	.179	SAMPLED	3.438156
5. MICROPOGONIAS UNDULATUS	470	20	OK	9.114	31.335	SAMPLED	3.438156
6. OPISTHONEMA OGLINUM	1	1	OK	.114	.114	SELECT	1.000000
7. PRIONOTUS LONGISPINOSUS	2	2	OK	.017	.058	SAMPLED	3.438156
8. RHIZOPRIONODON TERRAENOVAE	1	1	OK	.095	.095	SELECT	1.000000
9. SHRIMP-PENAEUS SETIFERUS	13	13	OK	.656	.656	SELECT	1.000000
10. STEPHANOLEPIS HISPIDA	2	2	OK	.012	.041	SAMPLED	3.438156
11. TRACHYPENEUS SIMILIS	1	1	OK	.005	.017	SAMPLED	3.438156
12. TRASH	1	0	OK	.065	.223	SAMPLED	3.438156
13. TRICHIURUS LEPTURUS	6	6	OK	.077	.265	SAMPLED	3.438156
14. CALLINECTES SIMILIS	12	12	OK	.093	.320	SAMPLED	3.438156
15. CYNOSCION NOTHUS	8	8	OK	.299	1.028	SAMPLED	3.438156
16. LEIOSTOMUS XANTHURUS	19	19	OK	.713	2.451	SAMPLED	3.438156
17. LOLLIGUNCULA BREVIS	1	1	OK	.015	.052	SAMPLED	3.438156
18. PEPRILUS BURTI	270	20	OK	5.854	20.127	SAMPLED	3.438156

Vessel: 04 Cruise: 0308 Station: 145

10

TAXONOMIC NAME	NUMBER CAUGHT	NUMBER MEASURED	ERROR STATUS	SAMPLE WEIGHT	TOTAL WEIGHT	SAMPLED /SELECT	EXPANSION FACTOR
19. PORTUNUS GIBBESII	7	7	OK	.038	.131	SAMPLED	3.438156
20. SELENE SETAPINNIS	2	2	OK	.073	.251	SAMPLED	3.438156
21. SHRIMP-PENAEUS AZTECUS	10	10	OK	.079	.079	SELECT	1.000000
22. SHRIMP-PENAEUS DUORARUM	3	3	OK	.072	.072	SELECT	1.000000
23. SQUILLA EMPUSA	1	1	OK	.003	.010	SAMPLED	3.438156
				18.704	60.750		

Date/Time: Sunday,July,06,2014 /08:32:23 Station Check Form, Station 171

Vessel	Pascagoula Station Number	Cruise	Time Zone	Start Date	Start Time	Start Latitude	Start Longitude	Start Depth
04	171	0308	GMT	06/30/2014	22:25:22	2809.08	09127.79	51.2

SEAMAP Number	End Date	End Time	End Latitude	End Longitude	End Depth
W1520	06/30/2014	22:55:23	2809.22	09126.22	51.1

Statistical Zone	Faunal Zone	Data Source	Temperature Sea Surface	Temperature Air
15	7	US	28.5	28.8

Barometric Pressure	Wind Speed	Wind Direction	Wave Height	Beaufort Sea State	Towing Speed	Tow Number	Net Code
1016.0	8.1	199	0.0	3	2.7939	01	01-Port Side

Gear Size	Gear Type	Mesh Size	Operation Code	Minutes Fished	Total Catch
40	ST	1.63		30.017	35.030

Watch Leader: Lee Saxon Field Party Chief: Kim Johnson

TAXONOMIC NAME	NUMBER CAUGHT	NUMBER MEASURED	ERROR STATUS	SAMPLE WEIGHT	TOTAL WEIGHT	SAMPLED /SELECT	EXPANSION FACTOR
1. LOLIGO PEALEII	61	20	OK	.978	1.852	SAMPLED	1.893414
2. PEPRILUS BURTI	98	20	OK	6.513	12.332	SAMPLED	1.893414
3. PRISTIPOMOIDES AQUILONARIS	6	6	OK	.623	1.180	SAMPLED	1.893414
4. SHRIMP-PENAEUS AZTECUS	7	7	OK	.292	.292	SELECT	1.000000
5. STENOTOMUS CAPRINUS	41	20	OK	2.299	4.353	SAMPLED	1.893414
6. SYNODUS FOETENS	2	2	OK	.266	.504	SAMPLED	1.893414
7. TRASH	1	0	OK	.026	.049	SAMPLED	1.893414
8. UPENEUS PARVUS	12	12	OK	.548	1.038	SAMPLED	1.893414
9. UROPHYCIS FLORIDANUS	5	5	OK	.356	.674	SAMPLED	1.893414
10. AMUSIUM PAPYRACEUM	63	20	OK	.595	1.127	SAMPLED	1.893414
11. ANCYLOPSETTA DILECTA	2	2	OK	.176	.333	SAMPLED	1.893414
12. PAGURUS BULLISI	1	1	OK	.002	.002	SELECT	1.000000
13. PRIONOTUS LONGISPINOSUS	1	1	OK	.039	.074	SAMPLED	1.893414
14. PRIONOTUS STEARNSI	2	2	OK	.020	.038	SAMPLED	1.893414
15. SAURIDA BRASILIENSIS	1	1	OK	.004	.008	SAMPLED	1.893414
16. SCONSIA STRIATA	1	1	OK	.015	.028	SAMPLED	1.893414
17. SERRANUS ATROBRANCHUS	7	7	OK	.129	.244	SAMPLED	1.893414
18. STENOCIONOPS FURCATA	1	1	OK	.007	.007	SELECT	1.000000

Vessel: 04 Cruise: 0308 Station: 171

TAXONOMIC NAME	NUMBER CAUGHT	NUMBER MEASURED	ERROR STATUS	SAMPLE WEIGHT	TOTAL WEIGHT	SAMPLED /SELECT	EXPANSION FACTOR
19. STEPHANOLEPIS HISPIDA	1	1	OK	.004	.008	SAMPLED	1.893414
20. SYNODUS POEYI	3	3	OK	.040	.076	SAMPLED	1.893414
21. TRACHURUS LATHAMI	125	20	OK	5.491	10.397	SAMPLED	1.893414
22. TRICHIURUS LEPTURUS	1	1	OK	.117	.222	SAMPLED	1.893414
23. TRICHOPSETTA VENTRALIS	5	5	OK	.103	.195	SAMPLED	1.893414
				18.643	35.030		

Date/Time: Sunday,July,06,2014 /08:33:00 Station Check Form, Station 187

12

Vessel	Pascagoula Station Number	Cruise	Time Zone	Start Date	Start Time	Start Latitude	Start Longitude	Start Depth
04	187	0308	GMT	07/02/2014	09:10:21	2902.06	09204.33	10.3

SEAMAP Number	End Date	End Time	End Latitude	End Longitude	End Depth
W1609	07/02/2014	09:40:25	2902.35	09205.88	10.3

Statistical Zone	Faunal Zone	Data Source	Temperature Sea Surface	Temperature Air
16	7	US	28.5	28.7

Barometric Pressure	Wind Speed	Wind Direction	Wave Height	Beaufort Sea State	Towing Speed	Tow Number	Net Code
1014.5	12.0	269	0.5	4	2.7853	01	02-Starboard Side

Gear Size	Gear Type	Mesh Size	Operation Code	Minutes Fished	Total Catch
40	ST	1.63		30.067	38.970

Watch Leader: Taniya Wallace Field Party Chief: Kim Johnson

TAXONOMIC NAME	NUMBER CAUGHT	NUMBER MEASURED	ERROR STATUS	SAMPLE WEIGHT	TOTAL WEIGHT	SAMPLED /SELECT	EXPANSION FACTOR
1. CALLINECTES SAPIDUS	1	1	OK	.101	.101	SELECT	1.000000
2. CALLINECTES SIMILIS	119	20	OK	.971	2.548	SAMPLED	2.624513
3. CHRYSAORA QUINQUECIRRHA	1	1	OK	.016	.042	SAMPLED	2.624513
4. CYNOSCION	1	0	OK	.001	.003	SAMPLED	2.624513
5. CYNOSCION ARENARIUS [Large]	2	2	OK	.138	.362	SAMPLED	2.624513
6. CYNOSCION ARENARIUS [Small]	1	1	OK	.009	.024	SAMPLED	2.624513
7. CYNOSCION NOTHUS	2	2	OK	.121	.318	SAMPLED	2.624513
8. LARIMUS FASCIATUS	4	4	OK	.190	.499	SAMPLED	2.624513
9. LEIOSTOMUS XANTHURUS	25	20	OK	1.376	3.611	SAMPLED	2.624513
10. LOLIGO PLEII	1	1	OK	.027	.027	SELECT	1.000000
11. LOLLIGUNCULA BREVIS	1	1	OK	.024	.024	SELECT	1.000000
12. MICROPOGONIAS UNDULATUS	350	20	OK	7.645	20.064	SAMPLED	2.624513
13. OPHIDION WELSHI	1	1	OK	.016	.042	SAMPLED	2.624513
14. PEPRILUS BURTI	3	3	OK	.065	.171	SAMPLED	2.624513
15. PORTUNUS GIBBESII	12	12	OK	.037	.097	SAMPLED	2.624513
16. PRIONOTUS LONGISPINOSUS	338	20	OK	2.425	6.364	SAMPLED	2.624513
17. PRIONOTUS TRIBULUS	1	1	OK	.012	.031	SAMPLED	2.624513
18. SPHOEROIDES PARVUS	1	1	OK	.002	.005	SAMPLED	2.624513

Vessel: 04 Cruise: 0308 Station: 187

12

TAXONOMIC NAME	NUMBER CAUGHT	NUMBER MEASURED	ERROR STATUS	SAMPLE WEIGHT	TOTAL WEIGHT	SAMPLED /SELECT	EXPANSION FACTOR
19. TRACHYPENEUS SIMILIS	127	20	OK	.368	.966	SAMPLED	2.624513
20. TRASH	1	0	OK	.008	.021	SAMPLED	2.624513
21. TRICHIURUS LEPTURUS	2	2	OK	.004	.010	SAMPLED	2.624513
22. SHRIMP-PENAEUS AZTECUS	238	200	OK	2.416	2.416	SELECT	1.000000
23. SQUILLA EMPUSA	50	20	OK	.466	1.223	SAMPLED	2.624513
				16.438	38.970		

Date/Time: Sunday,July,06,2014 /08:33:30 Station Check Form, Station 198

13

Vessel	Pascagoula Station Number	Cruise	Time Zone	Start Date	Start Time	Start Latitude	Start Longitude	Start Depth
04	198	0308	GMT	07/03/2014	05:44:28	2815.79	09048.55	35.9

SEAMAP Number	End Date	End Time	End Latitude	End Longitude	End Depth
W1415	07/03/2014	06:14:31	2816.56	09047.40	34.1

Statistical Zone	Faunal Zone	Data Source	Temperature: Sea Surface	Temperature: Air
14	7	US	29.0	30.3

Barometric Pressure	Wind Speed	Wind Direction	Wave Height	Beaufort Sea State	Towing Speed	Tow Number	Net Code
1015.6	9.3	1	1.0	3	2.5569	01	01-Port Side

Gear Size	Gear Type	Mesh Size	Operation Code	Minutes Fished	Total Catch
40	ST	1.63		30.050	112.570

Watch Leader: Taniya Wallace Field Party Chief: Kim Johnson

TAXONOMIC NAME	NUMBER CAUGHT	NUMBER MEASURED	ERROR STATUS	SAMPLE WEIGHT	TOTAL WEIGHT	SAMPLED /SELECT	EXPANSION FACTOR
1. AMUSIUM PAPYRACEUM	86	20	OK	.818	4.439	SAMPLED	5.426488
2. ANASIMUS LATUS	4	4	OK	.031	.168	SAMPLED	5.426488
3. ANTENNARIUS RADIOSUS	3	3	OK	.022	.022	SELECT	1.000000
4. BROTULA BARBATUM	2	2	OK	.239	.239	SELECT	1.000000
5. CALLINECTES SAPIDUS	1	1	OK	.289	.289	SELECT	1.000000
6. CHLOROSCOMBRUS CHRYSURUS	1	1	OK	.055	.298	SAMPLED	5.426488
7. CYNOSCION ARENARIUS	1	1	OK	.154	.154	SELECT	1.000000
8. CYNOSCION NOTHUS	3	3	OK	.293	.293	SELECT	1.000000
9. GYMNACHIRUS TEXAE	1	1	OK	.013	.013	SELECT	1.000000
10. LEIOLAMBRUS NITIDUS	1	1	OK	.004	.004	SELECT	1.000000
11. LEIOSTOMUS XANTHURUS	2	2	OK	.194	1.053	SAMPLED	5.426488
12. LEPOPHIDIUM BREVIBARBE	4	4	OK	.188	1.020	SAMPLED	5.426488
13. MICROPOGONIAS UNDULATUS	406	20	OK	17.237	93.536	SAMPLED	5.426488
14. PRISTIPOMOIDES AQUILONARIS	1	1	OK	.023	.125	SAMPLED	5.426488
15. RANINOIDES LOUISIANENSIS	1	1	OK	.010	.010	SELECT	1.000000
16. SERRANUS ATROBRANCHUS	3	3	OK	.072	.391	SAMPLED	5.426488
17. SOLENOCERA VIOSCAI	6	6	OK	.031	.168	SAMPLED	5.426488
18. SQUILLA EMPUSA	1	1	OK	.002	.011	SAMPLED	5.426488

Vessel: 04 Cruise: 0308 Station: 198

13

TAXONOMIC NAME	NUMBER CAUGHT	NUMBER MEASURED	ERROR STATUS	SAMPLE WEIGHT	TOTAL WEIGHT	SAMPLED /SELECT	EXPANSION FACTOR
19. STENORHYNCHUS SETICORNIS	1	1	OK	.002	.011	SAMPLED	5.426488
20. STENOTOMUS CAPRINUS	9	9	OK	.332	1.802	SAMPLED	5.426488
21. TRASH	1	0	OK	.635	3.446	SAMPLED	5.426488
22. TRICHIURUS LEPTURUS	2	2	OK	.447	.447	SELECT	1.000000
23. TRICHOPSETTA VENTRALIS	3	3	OK	.074	.402	SAMPLED	5.426488
24. PARALICHTHYS SQUAMILENTUS	11	11	OK	.990	.990	SELECT	1.000000
25. ASTROPECTEN CINGULATUS	3	3	OK	.030	.163	SAMPLED	5.426488
26. CALLINECTES SIMILIS	2	2	OK	.006	.006	SELECT	1.000000
27. CENTROPRISTIS PHILADELPHICUS	1	1	OK	.033	.179	SAMPLED	5.426488
28. KATHETOSTOMA ALBIGUTTA	2	2	OK	.067	.067	SELECT	1.000000
29. LARIMUS FASCIATUS	1	1	OK	.085	.085	SELECT	1.000000
30. PITAR CORDATUS	2	2	OK	.011	.060	SAMPLED	5.426488
31. PORTUNUS GIBBESII	4	4	OK	.007	.038	SAMPLED	5.426488
32. PORTUNUS SPINICARPUS	2	2	OK	.008	.043	SAMPLED	5.426488
33. PRIONOTUS LONGISPINOSUS	2	2	OK	.067	.364	SAMPLED	5.426488
34. SELENE SETAPINNIS	1	1	OK	.038	.206	SAMPLED	5.426488
35. SHRIMP-PENAEUS AZTECUS	36	36	OK	1.541	1.541	SELECT	1.000000
36. SQUILLA CHYDAEA	2	2	OK	.015	.015	SELECT	1.000000
37. SYMPHURUS DIOMEDIANUS	1	1	OK	.018	.018	SELECT	1.000000
38. SYNODUS FOETENS	4	4	OK	.455	.455	SELECT	1.000000
				24.536	112.570		

Background Information

y

Department of Commerce
National Oceanic and Atmospheric Administration
National Marine Fisheries Service
Southeast Fisheries Science Center
Mississippi Laboratory

Resource Assessment Surveys
Cooperator Information

Resource Assessment Surveys
National Marine Fisheries Service
Southeast Fisheries Science Center
Mississippi Laboratory
Pascagoula, Mississippi

The locations and dates for survey legs and port calls may be adjusted within the confines of proposed survey dates pending changes to survey objectives or logistics (vessel problems or weather delays). Port calls are scheduled to restock provisions and exchange scientists. Cooperators should plan to arrive at the research ship at least an hour before the scheduled time of departure.

OBJECTIVES

1. Sample the northern Gulf of Mexico to determine abundance and distribution of benthic fauna between 5 and 60 fathoms (30 to 360 feet).
2. Obtain size composition data to determine population size structures.

3. Collect environmental data to determine relationships between abundance and distribution of organisms with environmental measurements.
4. Collect ichthyoplankton samples to map distribution of fish eggs and larvae.

INFORMATION FOR VISITING SCIENTISTS AND COOPERATORS

Meals aboard the vessel are provided three times each day; breakfast, lunch and dinner (including drinks). If you have special dietary requirements or requests, please notify the Chief Scientist prior to your arrival at the ship. Special snacks (candy or soft drinks) are not available so bring your own if you want them. You may also want to bring a water bottle or large cup with a lid. Alcoholic beverages are not permitted.

Scientists should bring personal bath items such as shampoo, tooth brushes, toothpaste, etc. The ship furnishes pillows, pillow cases, bed sheets, blankets, towels, and wash cloths. You may also want to bring shower slippers but these are to be worn to and from the shower only-all other areas require shoes that completely cover the feet. A clothes washer, dryer, detergent and bleach are provided.

There is a medical officer on board the ship in the form of an EMT (emergency medical technician). This individual has 24-hour access to a fully licensed general practitioner ashore. Scientists are required to complete a medical history form and provide this form to the Chief Scientist prior to departure. Scientists are responsible for providing their own prescription medications in ample supply to last the entire trip. If you are prone to motion sickness, you might want to see your family doctor; however, the vessel has a supply of over-the-counter seasick medication. Should you decide to take seasick medicine, please take your first pill an hour before departure.

The ship has 24-hr internet available to all scientists. While at sea, the ship does not allow any audio/video feeds (like YouTube), however all other access to the internet is available to you. There are several PCs on board but these are for general use. If you plan on doing extensive work on a PC please consider bringing your own (preferably a laptop). Please bring money or a credit card in case you need to leave the ship and travel in an emergency.

Bring old clothes, you **will** get dirty! Scientists usually wear shorts, blue jeans, t-shirts, tank tops, tennis shoes, etc. Conditions during Summer can be hot so bring cool clothing; sun block is recommended. The Fall survey can get quite cool at times so bring a few long sleeved shirts or sweatshirts. Shoes can get wet and fishy so consider bringing two pairs, one for work and one for enclosed areas of the ship. The ship does not allow sandals or shoes that do not completely protect the feet anywhere on board except to and from the showers. Operations are conducted 24 hours a day, often during inclement weather so bring foul weather gear if you'd like. We also ask that you be considerate of your shipmates and not wear weather gear or "fishy clothes" to the galley during meal times. Please also bring at least one long sleeved shirt, long pants and sun hat for emergency drills. These are for sun protection in the unlikely event that an abandon ship order is given.

Please be aware that you're required to work 12 hours a day. You'll be assigned to one of two watches which rotate as follows;

First Watch: 0000-1200 (midnight to noon)
Second Watch: 1200-0000 (noon to midnight)

Your watch leader will tell you what needs to be done during the watch but most activities include sorting, counting, weighing, and measuring the catch. You're free to do as you please during your off-watch hours (watch TV, videos, sleep, etc.) but please be considerate of your shipmates. Don't slam doors or yell down passageways as someone will likely be trying to sleep. The ship has several sources of entertainment for your use. There's a large selection of current movies supplied by the Naval Motion Picture Service, satellite TV, a small library, and some exercise equipment.

Unless NMFS has agreed to provide travel funds, cooperators are responsible for their travel costs to and from the ship. Since survey dates are subject to change due to unanticipated problems, please use caution when purchasing non-refundable tickets. We should also have adequate space for scientific sampling equipment you'd like to bring but if you have relatively large articles or hazardous materials, please inform the Chief Scientist.

If you have any further questions, please contact Kimberley Johnson, Andre Debose or Butch Pellegrin (228-762-4591).

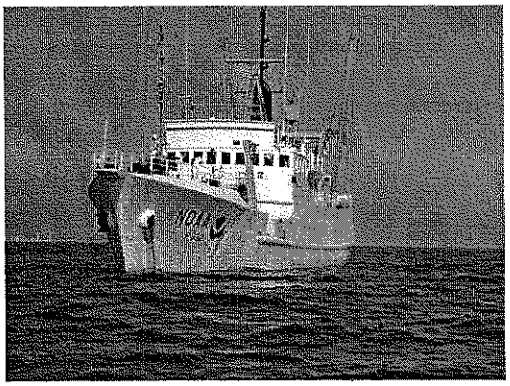
National Marine Fisheries Service

Southeast Fisheries Science Center

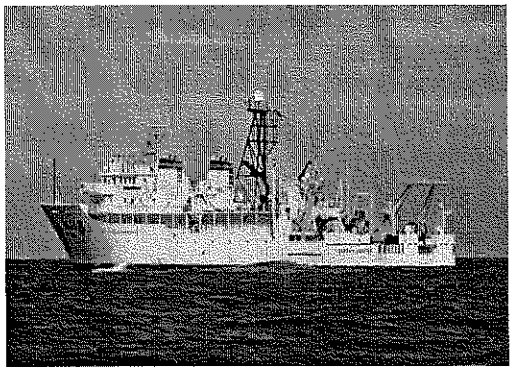
Mississippi Laboratory
Pascagoula and Stennis Space Center, Mississippi

The Mississippi Laboratory, consisting of two facilities, is responsible for managing the Latent Resource Program and for providing at-sea vessel support for other SEFSC programs. The laboratory also manages the Southeast Area Monitoring and Assessment Program (SEAMAP) which involves federal, state and university cooperation to collect, manage and distribute fishery independent data. At-sea sampling aboard research vessels is used to estimate distribution, abundance, and trends of fishery resources. SEAMAP is comprised of all southeastern states, the Gulf and Atlantic States Marine Fisheries Commissions, the Gulf and South Atlantic Fishery Management Councils, and NMFS.

The Laboratory's primary facility is at Pascagoula where two NOAA research ships are located.



Oregon II



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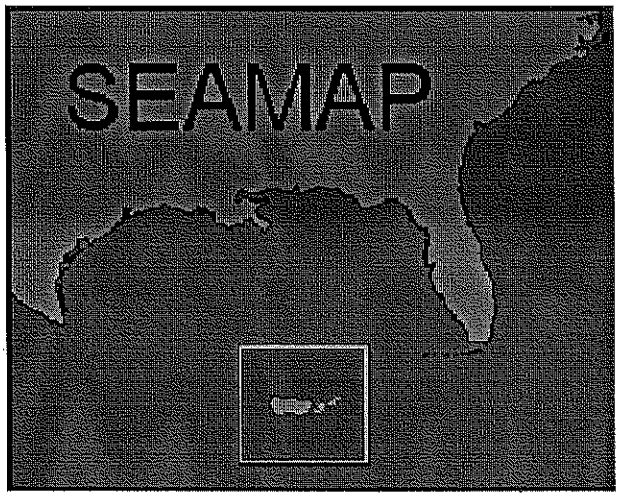


The Southeast Area Monitoring and Assessment Program (SEAMAP) is a State/Federal/university program for collection, management and dissemination of fishery-independent data and information in the southeastern United States. The organizational structure of the program presently includes three operational components, SEAMAP-Gulf of Mexico, which began in 1981, SEAMAP-South Atlantic, implemented in 1983 and SEAMAP-Caribbean, formed in 1988.

Each SEAMAP component operates independently, planning and conducting surveys and information dissemination in accordance with administrative policies and guidelines cooperatively established by the GSMFC and the National Marine Fisheries Service's Southeast Regional Office (SERO).

Federal programmatic funding for SEAMAP activities and administration was appropriated in Federal Fiscal Years 1985-2007. Funding allocations to participants for FY1985-FY2007 were administered through State/Federal cooperative agreements, managed by SERO and the Southeast Fisheries Science Center (SEFSC), National Marine Fisheries Service (NMFS).

Activities and operations of each SEAMAP component are wholly defined by the respective managing units: the SEAMAP-Gulf Subcommittee of the Gulf States Marine Fisheries Commission's Technical Coordinating Committee, the SEAMAP-South Atlantic Committee of the Atlantic States Marine Fisheries Commission's South Atlantic Board, and the SEAMAP-Caribbean Committee of the Puerto Rico Department of Natural and Environmental Resources. The Gulf and South Atlantic committees consist of designated representatives from each member state and NMFS/SEFSC and the Gulf of Mexico and South Atlantic Fishery Management Councils. In addition, the SEAMAP-
South Atlantic committee includes a representative from the Atlantic States Marine Fisheries Commission (ASMFC). The Caribbean component consists of members from Puerto Rico Department of Natural and Environmental Resources, Virgin Islands Division of Fish and Wildlife, Puerto Rico Sea Grant College Program, NMFS/SEFSC, U.S. Fish and Wildlife Service, and Caribbean Fishery Management Council. Each committee meets yearly to review operations, examine priorities, and plan future activities. Daily operations are carried out by the respective SEAMAP coordinators, assisted by staffs of the two Commissions and Puerto Rico Department of Natural and Environmental Resources and personnel associated with the SEAMAP Information System, SEAMAP Archiving Center and SEAMAP Invertebrate Plankton Archiving Center.

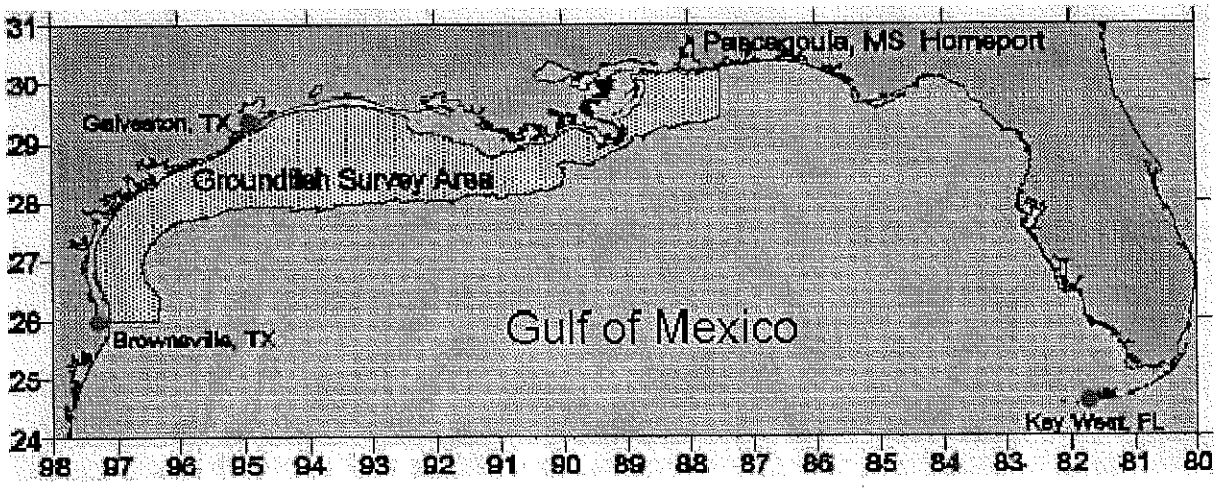
In FY2000, collection of resource survey information continued for the nineteenth consecutive year. Surveys by each program component reflect distinct regional needs and priorities; however, survey operations in one geographic area often provide information useful to researchers in all three regions. For instance, the South Atlantic program's Bottom Mapping will be useful in SEAMAP-Gulf gear calibration efforts, while plankton and environmental surveys in the Gulf program have set the standards for the entire region's much-needed long-term data base. In the Gulf of Mexico, SEAMAP resource surveys include the Fall Shrimp/Groundfish Survey, Spring Plankton Survey,

Reef Fish Survey, Summer Shrimp/Groundfish Survey, Fall Plankton Survey and plankton and environmental data surveys. In the South Atlantic region, surveys include Shallow Water Trawl Survey, Pamlico Sound Survey, Benthic Characterization, and Bottom Mapping Project. In the Caribbean, the Reef Resources Survey is conducted. In addition to the regularly-scheduled surveys, SEAMAP participates in a variety of other projects such as the Winter Trawling and Fish Tagging Cruise, a coordination role for developing finfish bycatch estimates. The SEAMAP provides guidance, personnel, and other contributions to these studies for enhancement and protection of the marine resources.

Information from the SEAMAP activities is provided to user groups through three complementary systems: the SEAMAP Information System, the SEAMAP Archiving Center and the SEAMAP Invertebrate Plankton Archiving Center. Products resulting from SEAMAP activities can be grouped into two major categories: data sets managed by the SEAMAP Information System, the SEAMAP Archiving Center and the SEAMAP Ichthyoplankton Archiving Center and program documents.

NOAA Ship OREGON II

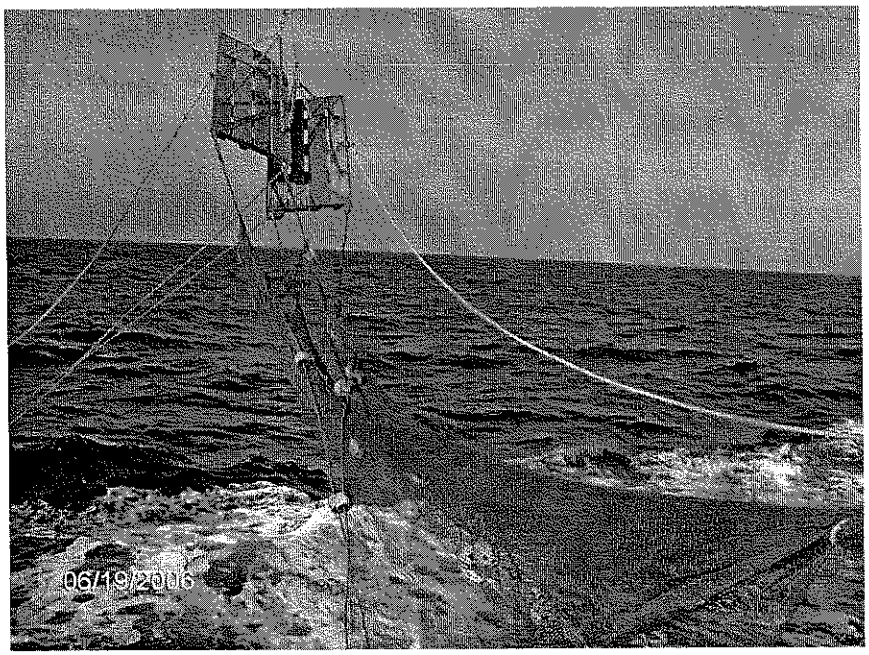
SEAMAP Ground Fish Survey



NOAA Ship Oregon II conducts a groundfish cruise in the summer and fall across the northern Gulf of Mexico from Alabama to the Mexican border in depths between 5 and 60 fathoms. CTD casts are completed at randomly chosen station locations, then Bottom Trawling is conducted with a 40 foot shrimp net to gather samples. The primary sampling objective in the summer is to determine the abundance and distribution of shrimp by depth. In the fall, the objective is to determine the abundance and distribution of bottom fish by depth. Other objectives include obtaining samples of shrimp, bottom fish, and crustaceans; collecting hydrographic and meteorological data; and comparing catch rates with cooperating NOAA and State research vessels. A secondary activity for the fall and summer projects is to acquire Plankton samples at stations in the groundfish survey area. The summer survey has been conducted aboard **NOAA Ship Oregon II** since 1982, while the fall survey has been completed since 1972.

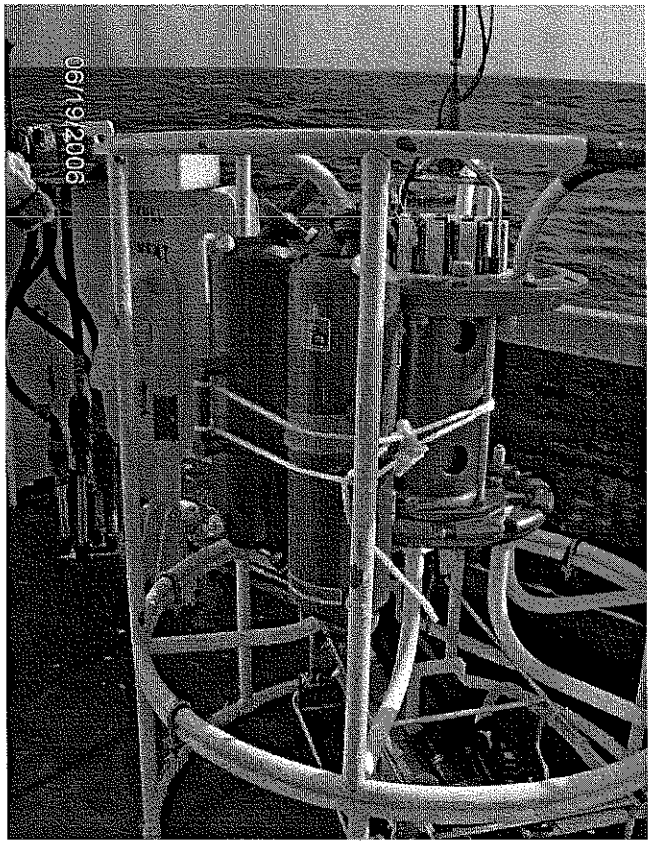
NOAA Ship OREGON II

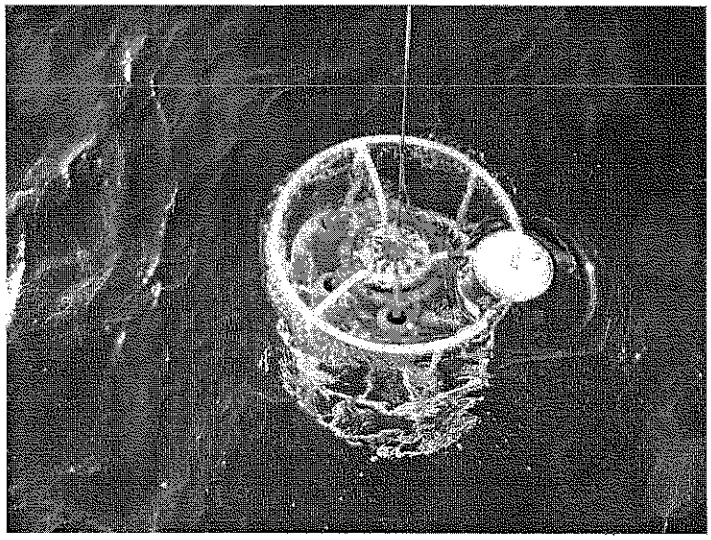
Bottom Trawls



On board **NOAA Ship Oregon II**, trawling operations are conducted from two outriggers. The photo above shows a net trailing from the starboard outrigger in preparation for a trawl. Typically, the ship is single-rigged (towing a net on one side only) with a 40 foot shrimp trawl for the Summer/Fall Groundfish Surveys. During these surveys, trawling operations are conducted at randomly selected stations. Each station includes a CTD cast followed by the deployment of a 40 foot shrimp trawl towed over a specified depth stratum. The trawl is towed for 30 minutes. The catch (shrimp and other bottom dwellers) is brought aboard, then sorted, identified, and measured by the scientific party.

CTD Deployment

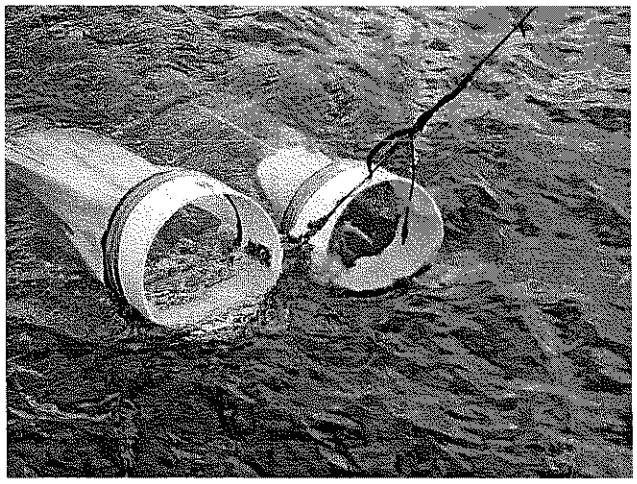




The above photos show a CTD cast off the J-frame on the port side of the forward deck of **NOAA Ship Oregon II** . CTD stands for Conductivity, Temperature, and Depth. It is an instrument package which is lowered through the water column and retrieves environmental data. Some of the data includes depth, temperature, conductivity (salinity), transmittance, oxygen content, and flourometry. CTDs are conducted on almost every cruise that **NOAA Ship Oregon II** performs. Besides general environmental data which are examined in conjuction with living resources data, sound profiles can be extracted from a CTD cast's temperature and salinity data. This sound profile can then be entered into acoustical equipment for enhanced bathymetry acquisition. The Niskin bottles attached to the CTD are used to collect water samples at varies depths. During the Summer Survey, the water sample is taken daily. This water sample is used for Winkler Titrations and results are compared to the dissolved oxygen recorded from the CTD. This is done to help monitor the hypoxic zone in the Gulf of Mexico.

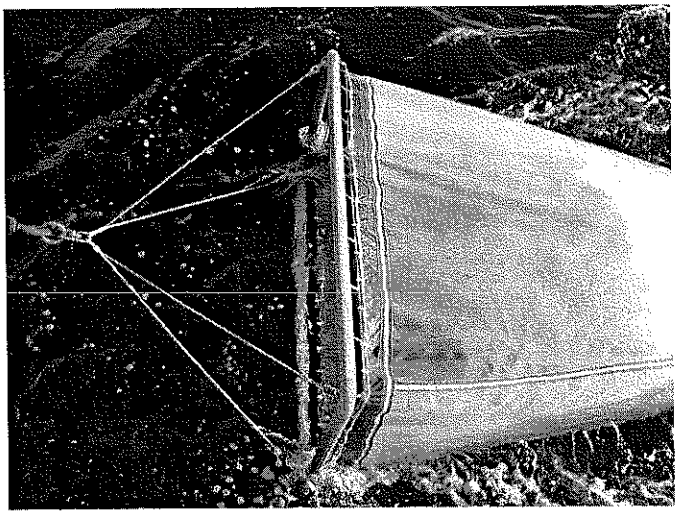
NOAA Ship OREGON II

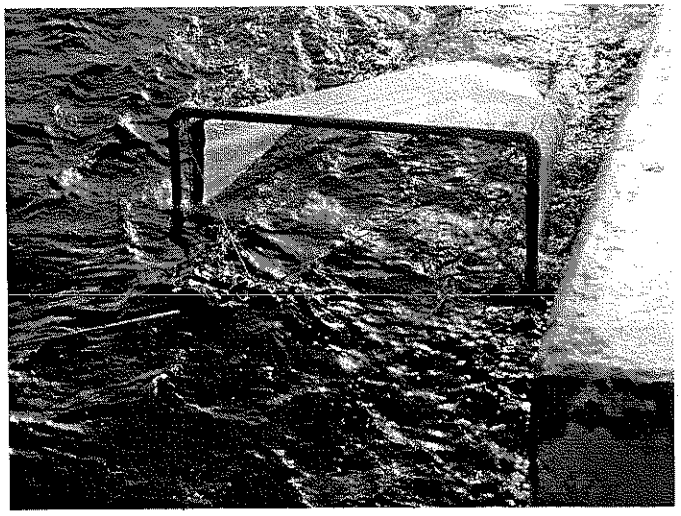
Bongo Tows



Plankton surveys are conducted to obtain samples for estimating the abundance and distribution of fish larvae, including those of Atlantic bluefin tuna. Plankton sampling is accomplished using bongo and neuston samplers. Bongo casts are done off the J-frame on the port side of the forward deck of **NOAA Ship Oregon II** . Bongo samplers are cone shaped nets of 0.333 micron mesh webbing attached to two circular 61 centimeter diameter frames. They're lowered through the water column while maintaining a 45 degree angle of towing warp, to a depth of 200 meters or within 2 meters of the bottom if the depth is shallower than 200 meters. Instrumentation is attached to the bongo frame which records temperature, salinity and depth.

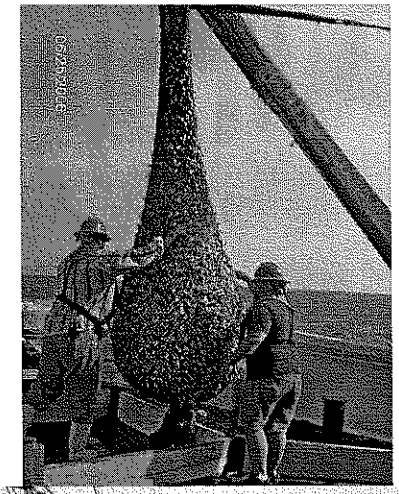
Neuston Tows

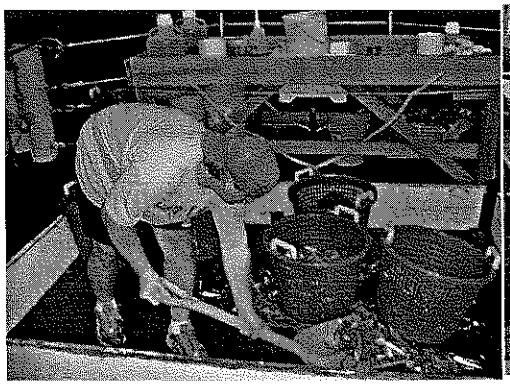


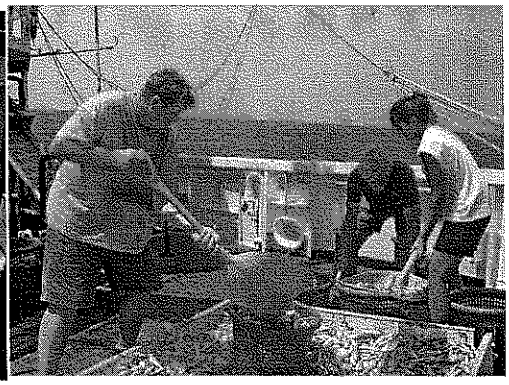


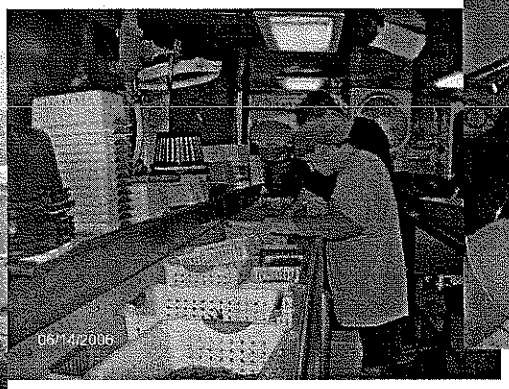
Neuston tows are designed to collect plankton at the surface. Their dimensions are 1x2 meters, and sometimes are placed together to make a double neuston. On **NOAA Ship Oregon II**, neuston nets are deployed off the starboard side of the forward deck with the forward crane which rests in a cradle during the tow. They are towed through the water so that half of the net is in the water and half is out of the water, at approximately two knots.

Life Onboard





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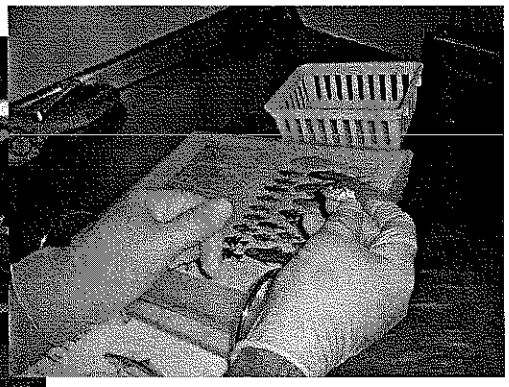

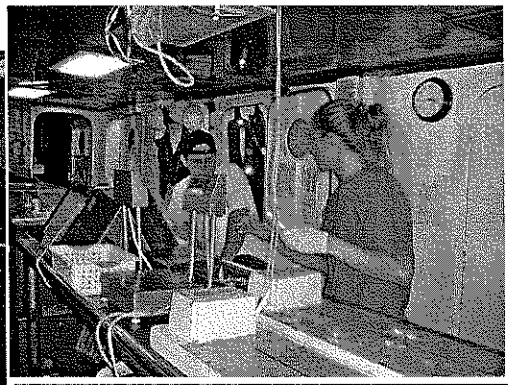

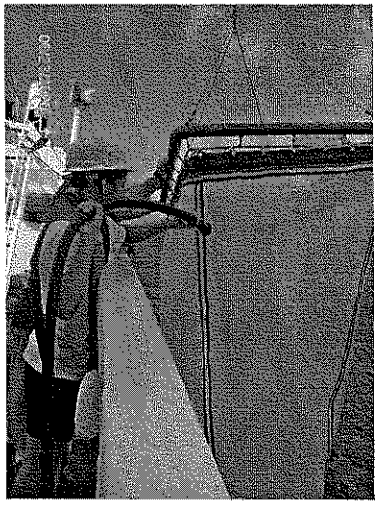

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