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

101 Pivers Island Road
Beaufort, NC 28516

Cruise Report

Date Submitted: 05/04/2023

Platform: NOAA Ship PISCES

Cruise Number: PC-11-02

Project Title: Southeast Fishery-Independent Survey (SEFIS)

Cruise Dates: 05/17/2011 - 05/28/2011

Submitted by: BACHELER.NATHAN.MITCHELL.1398604489 Digitally signed by BACHELER.NATHAN.MITCHELL.1398604489 Date: 2023.05.04 06:49:38 -04'00' Date: 05/04/2023
Field Party Chief

Approved by: Digitally signed by KELLISON.GREGORY.TODD.1365849206 Date: 2023.05.05 13:06:11 -04'00' Date: 05/05/2023
Division Director

Approved by: DESFOSSE.LISA.LYNN.1365834519 Digitally signed by DESFOSSE.LISA.LYNN.1365834519 Date: 2023.05.08 14:41:42 -05'00' Date: 05/08/2023
Director, SEFSC

doi: 0.25923/pq6g-qs18
https://doi.org/10.25923/pq6g-qs18

CRUISE REPORT

Southeast Fishery-Independent Survey (SEFIS)

NOAA Ship *Pisces* Cruise PC-11-02
17 – 28 May 2011
Total Number of Days At-Sea - 12

U.S. Department of Commerce
National Oceanic and Atmospheric Administration
National Marine Fisheries Service
Southeast Fisheries Science Center
Beaufort Laboratory
101 Pivers Island Rd.
Beaufort, NC 28516

22 CTDs
130 trap/video samples
19 red snapper collected

INTRODUCTION

The NOAA Ship *Pisces* departed Mayport Naval Station, FL, on 17 May 2011 at 1530 to initiate the Southeast Fishery-Independent Survey (SEFIS) in continental shelf and shelf-break waters off the southeastern US. SEFIS was created by the National Marine Fisheries Service in 2010 and operates out of the Beaufort Laboratory. This survey was originated to conduct applied fishery-independent sampling and related research focusing on the assessment of spatial variability in distribution and abundance of red snapper and other reef species within the snapper-grouper complex, via data collected from fish traps, video cameras, and acoustics. During this survey, chevron trap catches and associated underwater video recordings were collected from known hardbottom habitats between 29.94235 °N and 27.38068 °N. A total of 130 stations were sampled over 12 sea days between 18.86 and 62.08 m depths.

OBJECTIVES

1. Increase the spatial footprint and sample size of fishery-independent sampling in US southeast waters. Baited chevron traps, with one or more mounted high-definition video cameras, are utilized for (a) hardbottom reef fish community assessments, (b) collection of reef fish for biological samples (i.e., otoliths and gonads), and (c) comparative gear sampling (cameras versus traps versus split-beam sonar).

2. Use video cameras on chevron traps to address trap selectivity issues, locate and describe hardbottom habitats, and provide an additional index of abundance for stock assessments.

3. Use CTD gear to collect information on water quality parameters (temperature, salinity, dissolved oxygen, and turbidity) at chevron trap sampling locations.

4. Map bottom habitats using multibeam sonar to improve survey design and to expand knowledge of hardbottom habitats in the southeast US.

5. Use fisheries acoustic gear (split-beam sonar) to assess its use as a fishery-independent survey tool.

METHODS

Camera-Trap Sampling

Camera-trap gear consisted of two high definition video cameras mounted to a chevron fish trap. Chevron traps were constructed out of plastic-coated wire mesh. A Canon camera (model HS F200) was attached above the mouth of the trap, and a GoPro camera (model HD Hero) was attached above the nose of the trap (Figure 1). Traps were baited with Atlantic menhaden, *Brevoortia tyrannus*, and video cameras were set to record before deployment. Camera-traps

were deployed at least 200 meters apart on suspected or known hardbottom habitats, and left to soak for approximately 90 minutes. Usually, camera-traps were deployed in sets of six. A CTD cast (see environmental data collection) was conducted during the 90-minute soak time for each trap set. Fish catches were processed after trap retrieval. All fish were enumerated, weighed, and measured to the nearest millimeter. Individuals of select species (mostly species found in the snapper-grouper complex) were further processed for additional lengths and biological samples (otoliths, gonads, and DNA). Video files were downloaded and backed up on media storage devices. Biological samples and video files were brought back to the lab for further processing and analysis.

Environmental Data Collection
Environmental data were collected with Seabird CTD model SBE 9 and Scientific Computer System (SCS) software. CTD casts were conducted near the first camera-trap of each set and were lowered to within 2 meters of the bottom. Numerous water profile parameters were collected, including temperature (◦C), salinity, and dissolved oxygen (mg/L). CTD data were archived for further processing back at the lab. SCS software 4.0 was used to collected specific information for each fishing and CTD event, including soak time/cast duration as well as start and end latitude, longitude and depth (m).

Acoustic Data Collection
Multibeam acoustic data collection: The Pisces ME70 multibeam unit was used to map benthic habitats during nighttime hours. Areas for mapping were selected based on: (1) how badly an area needed additional known hardbottom sampling sites; (2) predicted hardbottom habitat from Dunn & Halpin (2009); and (3) efficient use of vessel time. Raw ME70 data was run through George "Randy" Cutter's software. His software outputs bizAB.txt files that were read with fledermaus (x, y, z format). The goal was to create a 3D surface in Fledermaus and use "GeoPicking" to select trap sites.

Split-beam acoustic data collection: EK60 was used to collect water column information, as well as document bottom features indicative of hardbottom habitat. Interesting bottom features were logged using ER60 acquisition software, and GPS coordinates were extracted by mousing over specific features of the ocean bottom.

SURVEY RESULTS

Camera-Trap Sampling
130 stations were sampled with camera-trap gear (Table 1, Figure 1). From these traps, all fish collected were worked up for length frequency data. Priority fish were further processed for otolith, gonad, and DNA tissues. No traps or video cameras were lost. A total of 19 red snapper were caught.

Environmental Data Collection
22 CTD profiles were collected during the cruise (Table 1). CTD data were further processed back at the lab using Seabird SBE Data Processing software (version 7.2). Near bottom (<5m

depth) comparisons (min, max, and mean) of temperature (º C), salinity, and dissolved oxygen (mg/L) are presented in Table 3. All CTD data were archived in a Microsoft Access database at the NMFS, Beaufort Laboratory for future analysis.

Acoustic Data Collection

Multibeam:

Twenty-two areas were mapped using multibeam acoustic gear. Multibeam data were processed using ArcGIS 9.3.2 to produce bathymetry rasters and slope files. General coordinates and total area covered were determined for each area mapped and compiled in a Microsoft Access database for future survey planning. All multibeam data were also compiled and archived in an ArcGIS project for future analysis and survey planning. Multibeam maps were useful in selecting trap/video sampling sites, i.e., identifying hardbottom habitats.

Split-beam:

The EK60 echosounder recorded water column information during all nighttime mapping efforts with the ME70. GPS points from the EK60 were often used in conjunction with the ME70 to determine probable trap/video sampling sites for the following day.

Table 1. Summary of station coordinates, depth, and date for each fishing event (camera-trap) and CTD cast conducted on the PC-11-02 survey. Gear 324 = chevron trap with attached video camera(s); 298 = CTD cast.

Collection number	Date	Gear	Latitude	Longitude	Depth (m)
113001	5/19/2011	324	27.39995	-80.05670	29
113002	5/19/2011	324	27.39701	-80.05460	30
113003	5/19/2011	324	27.39010	-80.05490	30
113004	5/19/2011	324	27.38641	-80.05667	31
113005	5/19/2011	324	27.38378	-80.05561	31
113006	5/19/2011	324	27.38034	-80.06022	28
113007	5/19/2011	298	27.40447	-80.05787	28
113008	5/19/2011	324	27.46334	-80.07262	25
113009	5/19/2011	324	27.45387	-80.07124	26
113010	5/19/2011	324	27.44931	-80.07030	27
113011	5/19/2011	324	27.44530	-80.06578	28
113012	5/19/2011	324	27.44054	-80.06800	25
113013	5/19/2011	324	27.43489	-80.06633	26
113014	5/19/2011	298	27.44697	-80.06987	26
113015	5/20/2011	324	27.74850	-80.13021	29
113016	5/20/2011	324	27.74707	-80.13709	28
113017	5/20/2011	324	27.74691	-80.14205	25
113018	5/20/2011	324	27.74324	-80.13718	27
113019	5/20/2011	324	27.74343	-80.12779	28
113020	5/20/2011	324	27.73907	-80.12712	30
113021	5/20/2011	298	27.75165	-80.13082	28
113022	5/20/2011	324	27.87897	-80.15776	29
113023	5/20/2011	324	27.87283	-80.15514	30
113024	5/20/2011	324	27.86791	-80.15322	30
113025	5/20/2011	324	27.86570	-80.15527	29
113026	5/20/2011	324	27.86221	-80.15393	28
113027	5/20/2011	324	27.85789	-80.15603	28
113028	5/20/2011	298	27.88641	-80.15659	30
113029	5/21/2011	324	28.89402	-80.26544	42
113030	5/21/2011	324	28.89099	-80.26813	42
113031	5/21/2011	324	28.88844	-80.27312	40
113032	5/21/2011	324	28.88576	-80.27456	41
113033	5/21/2011	324	28.88272	-80.27330	40
113034	5/21/2011	324	28.88082	-80.27149	41

113035	5/21/2011	298	28.89595	-80.26651	43
113036	5/21/2011	324	28.89511	-80.17661	54
113037	5/21/2011	324	28.89296	-80.17660	54
113038	5/21/2011	324	28.88957	-80.17466	62
113039	5/21/2011	324	28.88752	-80.17608	53
113040	5/21/2011	324	28.88506	-80.17453	54
113041	5/21/2011	324	28.88223	-80.17534	54
113042	5/21/2011	298	28.90049	-80.18055	55
113043	5/21/2011	324	28.87895	-80.17407	53
113044	5/21/2011	324	28.87589	-80.17255	58
113045	5/21/2011	324	28.87286	-80.17271	53
113046	5/21/2011	324	28.86851	-80.17126	54
113047	5/21/2011	324	28.86493	-80.17089	53
113048	5/21/2011	324	29.94719	-80.30022	58
113049	5/21/2011	298	28.88533	-80.17360	58
113050	5/22/2011	324	29.09418	-80.58679	24
113051	5/22/2011	324	29.09564	-80.58422	20
113052	5/22/2011	324	29.10061	-80.57948	23
113053	5/22/2011	324	29.09511	-80.58007	24
113054	5/22/2011	324	29.09447	-80.58026	22
113055	5/22/2011	324	29.09547	-80.57154	25
113056	5/22/2011	298	29.09211	-80.58760	24
113057	5/22/2011	324	29.07054	-80.54491	25
113058	5/22/2011	324	29.07016	-80.54063	21
113059	5/22/2011	324	29.06827	-80.53585	26
113060	5/22/2011	324	29.06712	-80.53004	22
113061	5/22/2011	324	29.06930	-80.52928	22
113062	5/22/2011	324	29.07116	-80.53209	22
113063	5/22/2011	298	29.07220	-80.54840	21
113064	5/22/2011	324	29.17660	-80.60924	26
113065	5/22/2011	324	29.17524	-80.60104	27
113066	5/22/2011	324	29.17399	-80.59636	25
113067	5/22/2011	324	29.17223	-80.59267	26
113068	5/22/2011	324	29.17274	-80.58623	25
113069	5/22/2011	324	29.17333	-80.58262	27
113070	5/22/2011	298	29.17783	-80.60884	26
113071	5/23/2011	324	29.14339	-80.51243	31
113072	5/23/2011	324	29.13883	-80.50842	29
113073	5/23/2011	324	29.13220	-80.50167	31

113074	5/23/2011	324	29.12948	-80.49991	31
113075	5/23/2011	324	29.12621	-80.49698	31
113076	5/23/2011	324	29.12225	-80.49701	31
113077	5/23/2011	298	29.14211	-80.51478	33
113078	5/23/2011	324	29.16239	-80.53831	29
113079	5/23/2011	324	29.16404	-80.54281	32
113080	5/23/2011	324	29.16334	-80.54702	29
113081	5/23/2011	324	29.16036	-80.55196	29
113082	5/23/2011	324	29.16531	-80.55581	30
113083	5/23/2011	324	29.16628	-80.55945	32
113084	5/23/2011	298	29.16393	-80.54102	29
113085	5/24/2011	324	29.45431	-80.78205	28
113086	5/24/2011	324	29.45620	-80.78522	24
113087	5/24/2011	324	29.45901	-80.78808	23
113088	5/24/2011	324	29.45571	-80.78811	26
113089	5/24/2011	324	29.45913	-80.79131	21
113090	5/24/2011	324	29.45538	-80.79426	27
113091	5/24/2011	298	29.45525	-80.78045	23
113092	5/24/2011	324	29.49892	-80.81450	20
113093	5/24/2011	324	29.50279	-80.81694	21
113094	5/24/2011	324	29.49767	-80.81925	22
113095	5/24/2011	324	29.49294	-80.82391	19
113096	5/24/2011	324	29.49689	-80.82622	21
113097	5/24/2011	324	29.49584	-80.83068	19
113098	5/24/2011	298	29.50087	-80.81248	19
113099	5/25/2011	324	29.30734	-80.39115	31
113100	5/25/2011	324	29.30542	-80.39071	34
113101	5/25/2011	324	29.30496	-80.38821	31
113102	5/25/2011	324	29.30308	-80.38842	34
113103	5/25/2011	324	29.30167	-80.38626	31
113104	5/25/2011	324	29.29965	-80.38530	33
113105	5/25/2011	298	29.30793	-80.39015	32
113106	5/25/2011	324	29.31938	-80.40102	31
113107	5/25/2011	324	29.32049	-80.40256	33
113108	5/25/2011	324	29.32210	-80.40390	32
113109	5/25/2011	324	29.32326	-80.40553	33
113110	5/25/2011	324	29.32489	-80.40625	31
113111	5/25/2011	324	29.32617	-80.40699	31
113112	5/25/2011	298	29.31747	-80.40568	32

113113	5/25/2011	324	29.32527	-80.51186	32
113114	5/25/2011	324	29.32318	-80.51244	34
113115	5/25/2011	324	29.32229	-80.51015	31
113116	5/25/2011	324	29.32066	-80.50966	34
113117	5/25/2011	298	29.32950	-80.51650	33
113118	5/26/2011	324	29.53123	-80.41922	39
113119	5/26/2011	324	29.53316	-80.42089	40
113120	5/26/2011	324	29.53480	-80.42140	38
113121	5/26/2011	324	29.53616	-80.42295	40
113122	5/26/2011	324	29.53802	-80.42337	38
113123	5/26/2011	324	29.53804	-80.42711	38
113124	5/26/2011	298	29.52943	-80.41635	39
113125	5/26/2011	324	29.53713	-80.38490	43
113126	5/26/2011	324	29.53945	-80.38606	42
113127	5/26/2011	324	29.54242	-80.38581	43
113128	5/26/2011	324	29.54469	-80.38619	42
113129	5/26/2011	324	29.54684	-80.38504	45
113130	5/26/2011	324	29.54853	-80.38617	43
113131	5/26/2011	298	29.53489	-80.38444	44
113132	5/26/2011	324	29.56639	-80.39467	42
113133	5/26/2011	324	29.56413	-80.39238	38
113134	5/26/2011	324	29.56146	-80.39197	44
113135	5/26/2011	324	29.55799	-80.39021	42
113136	5/26/2011	324	29.55502	-80.39021	42
113137	5/26/2011	324	29.55170	-80.38868	43
113138	5/26/2011	298	29.57051	-80.39760	42
113139	5/27/2011	324	29.94177	-80.29509	54
113140	5/27/2011	324	29.93668	-80.29840	55
113141	5/27/2011	324	29.93548	-80.29588	54
113142	5/27/2011	324	29.93344	-80.29515	58
113143	5/27/2011	324	29.93100	-80.29654	54
113144	5/27/2011	324	29.92849	-80.29474	54
113145	5/27/2011	298	29.94221	-80.29268	55
113146	5/27/2011	324	29.94756	-80.29526	54
113147	5/27/2011	324	29.95047	-80.29892	53
113148	5/27/2011	324	29.94762	-80.30067	52
113149	5/27/2011	324	29.94652	-80.29799	54
113150	5/27/2011	324	29.94356	-80.30836	54
113151	5/27/2011	324	29.93933	-80.30784	55

113152	5/27/2011	298	29.94684	-80.28947	56


Figure 1. Chevron trap with video cameras attached over the nose and mouth positions.

CRUISE PARTICIPANTS
Leg 1 (17 – 28 May, 2011)

Name / Title / Organization
Nate Bacheler / Chief Scientist / NMFS, Beaufort, NC
Christina Schobernd / Camera Gear / JHT, Inc.
David Berrane / Deck Watch / JHT, Inc.
Warren Mitchell / Acoustics Watch / JHT, Inc.
Zeb Schobernd / Camera Gear / JHT, Inc.
Todd Kellison / Scientist / NMFS, Beaufort, NC
David Hoke / Scientist / NMFS, Manteo, NC
Richard Hall / Scientist / NMFS, Wilmington, NC
Dave Meyer / Scientist / NMFS, Beaufort, NC
Stacey Harter / Scientist / NMFS, Panama City, FL
Jennifer Weaver / Scientist / NC State University
Margaret Stephens / Scientist / Community College of Philadelphia, PA