

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

Project Instructions

Date Submitted:

Platform:

Cruise Number:

Project Title:

Cruise Dates: -

Prepared by: Field Party Chief Date:

Approved by: Lab Director Date:

Approved by: Director, SEFSC Date:

Approved by: Commanding Officer
Marine Operations Center - Atlantic Date:

INTRODUCTION

The NOAA Ship *Pisces* departed from Morehead City, NC, on 25 June 2018 for a Southeast Fishery-Independent Survey (SEFIS) research cruise in continental shelf and shelf-break waters off North and South Carolina. SEFIS was created by the National Marine Fisheries Service in 2010 and operates out of the NOAA-Beaufort Laboratory. This survey was created 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 hardbottom habitats from Cape Hatteras, North Carolina, to Daytona Beach, Florida. A total of 494 stations were sampled with camera-trap arrays over 28 sea days between 17 and 114 m depths.

OBJECTIVES

1. Fishery-independent sampling of randomly selected stations from North Carolina to Florida. Baited chevron traps, with two mounted high-definition video cameras, were 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).
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. Map bottom habitats using multibeam sonar to improve survey design and to expand knowledge of hardbottom habitats in the southeast US (leg 1 only).
4. Use a CTD instrument package to collect environmental data (temperature, salinity, dissolved oxygen, turbidity) at camera-trap sampling locations, and XBTs to sample water temperature during multibeam mapping operations.

METHODS

Camera-Trap Sampling

Camera-trap gear consisted of two high definition video cameras mounted to a chevron fish trap. Chevron traps were composed of plastic-coated wire mesh. GoPro cameras (model HD Hero[®] H4) were attached above the mouth and 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 m apart on suspected or known hardbottom habitats, and soak time was targeted for approximately 90 min. Camera-traps were most often deployed in sets of six. A CTD cast (see environmental data collection) was conducted while traps were soaking. Fish catches were processed after trap retrieval. All fish were enumerated, weighed, and measured to the nearest millimeter. Individuals of many 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 digital media storage devices. Biological samples and video files were brought to the Beaufort Laboratory for further processing and analysis.

Environmental Data Collection

Environmental data were collected with Seabird “Conductivity, Temperature, and Depth” instrument package (CTD; model SBE 9) and Scientific Computer System (SCS) software. CTD casts were conducted near the middle of the camera-trap soak period; instruments were lowered to within 2 m of the bottom. Numerous water

profile measurements were taken, including temperature (°C), salinity, dissolved oxygen (mg/L), average sound velocity (m/s), fluorescence (mg/m³), and beam transmission (%). CTD data were archived for further processing at the Beaufort Laboratory. SCS software 4.0 was used to collect specific information for each fishing and CTD event, including soak time/cast duration as well as start and end latitude, longitude, and depth (m). We also deployed expendable bathythermographs (XBTs) during the mapping shift of leg 1 to collect water column temperature data while the ship was underway, so that no time was lost during mapping to conduct CTD casts.

Acoustic Data Collection

We used the *Pisces* ME-70 multibeam sonar unit approximately 12 hours each night on leg 1 only to create hydrographic maps for improving our understanding of the distribution of hardbottom in the Southeast. Mapping information in the region is critically important for (1) expanding fishery-independent sampling of reef fish, (2) improving our understanding of marine protected areas, (3) quantifying the relationship between the trap catch or video counts of reef fish and their habitat, (4) trying to scale up relative abundance information to true abundance of reef fish, which would benefit stock assessment greatly.

SURVEY RESULTS

Camera-Trap Sampling

Four hundred and ninety three stations were sampled with camera-trap gear (Table 1). From these traps, fish were collected and worked up for length frequency data. Various reef fish species were further processed for otolith, gonad, and DNA tissues. One trap was lost during the cruise due when the line between a trap and buoy was mysteriously severed during deployment.

Environmental Data Collection

Eighty seven CTD casts (Table 1) were conducted during the cruise. CTD data will be processed with Seabird SBE Data Processing software (version 7.2), and archived in a database at the NMFS-Beaufort Laboratory for future analysis.

Multibeam Acoustics Data Collection

We mapped an area of about 131 km² during leg 1 of PC-18-04. Some of these areas were relatively deep (> 100 m) areas that were mapped to learn more about blueline tilefish and snowy grouper habitats, while others were places where sampling points existed but maps were lacking.

Hook-and-line Sampling

Hook-and-line sampling occurred during one evening in an attempt to catch additional fish for diet, reproductive, and age sampling. One mutton snapper was caught and processed during these efforts.

Time Lost

No time was lost due to ship repairs or weather.

Table 1. Summary of station coordinates, depth (m), date, and time for each fishing event (camera-trap, Gear=324; hook and line, Gear=014) and CTD cast (Gear=298) conducted on the PC-18-04 survey. Times were recorded in Coordinated Universal Time (UTC).

Collection	Gear	Date	Time (UTC)	Latitude	Longitude	Depth (m)
183532	324	6/26/2018	11:23	34.59407	-76.3208	28
183533	324	6/26/2018	11:28	34.59487	-76.3144	28
183534	324	6/26/2018	11:35	34.58831	-76.3134	28
183535	324	6/26/2018	11:39	34.5859	-76.3092	28
183536	324	6/26/2018	11:45	34.58377	-76.3153	27
183537	324	6/26/2018	11:50	34.58773	-76.3176	28
183538	298	6/26/2018	12:00	34.59211	-76.3252	28
183539	324	6/26/2018	14:31	34.54571	-76.342	25
183540	324	6/26/2018	14:35	34.55147	-76.3396	27
183541	324	6/26/2018	14:40	34.55709	-76.3382	25
183542	324	6/26/2018	14:47	34.55351	-76.332	28
183543	324	6/26/2018	14:58	34.56567	-76.3358	28
183544	324	6/26/2018	15:04	34.56525	-76.332	29
183545	298	6/26/2018	15:38	34.54558	-76.3475	27
183546	324	6/26/2018	17:49	34.51448	-76.3503	23
183547	324	6/26/2018	17:56	34.52048	-76.3536	23
183548	324	6/26/2018	17:59	34.52269	-76.3491	24
183549	324	6/26/2018	18:05	34.52655	-76.3539	24
183550	324	6/26/2018	18:14	34.52978	-76.3465	24
183551	324	6/26/2018	18:17	34.53384	-76.346	23
183552	298	6/26/2018	18:33	34.52497	-76.3428	25
183553	324	6/26/2018	20:55	34.54322	-76.4011	22
183554	324	6/26/2018	20:57	34.54042	-76.402	22
183555	324	6/26/2018	21:00	34.5386	-76.4014	20
183556	324	6/26/2018	21:05	34.53718	-76.4036	21
183557	324	6/26/2018	21:13	34.52943	-76.4044	21
183558	324	6/26/2018	21:23	34.53394	-76.4031	20
183559	298	6/26/2018	21:43	34.54444	-76.4026	23
183560	324	6/27/2018	11:20	34.33348	-76.3791	27
183561	324	6/27/2018	11:23	34.33798	-76.3798	23
183562	324	6/27/2018	11:26	34.34143	-76.3799	26
183563	324	6/27/2018	11:30	34.34737	-76.3806	23
183564	324	6/27/2018	11:34	34.35182	-76.3781	23
183565	324	6/27/2018	11:40	34.359	-76.3773	24
183566	298	6/27/2018	12:15	34.32979	-76.379	35
183567	324	6/27/2018	14:16	34.23973	-76.3944	34
183568	324	6/27/2018	14:21	34.23387	-76.397	31

183569	324	6/27/2018	14:25	34.23254	-76.4007	30
183570	324	6/27/2018	14:27	34.23396	-76.403	32
183571	324	6/27/2018	14:32	34.23065	-76.4051	34
183572	324	6/27/2018	14:41	34.23574	-76.4072	31
183573	298	6/27/2018	14:46	34.23923	-76.407	33
183574	324	6/27/2018	19:25	34.2406	-76.5914	27
183575	324	6/27/2018	19:31	34.248	-76.5951	31
183576	324	6/27/2018	19:35	34.25204	-76.5975	31
183577	324	6/27/2018	19:39	34.25641	-76.6019	33
183578	324	6/27/2018	19:42	34.25887	-76.6066	30
183579	324	6/27/2018	19:51	34.2685	-76.6142	30
183580	298	6/27/2018	19:57	34.27365	-76.6157	33
183581	324	6/28/2018	11:05	34.10022	-76.8246	36
183582	324	6/28/2018	11:09	34.10281	-76.8284	35
183583	324	6/28/2018	11:13	34.10076	-76.8314	35
183584	324	6/28/2018	11:16	34.09734	-76.8318	35
183585	324	6/28/2018	11:18	34.09499	-76.8307	36
183586	324	6/28/2018	11:23	34.09011	-76.8324	36
183587	298	6/28/2018	11:30	34.08492	-76.8354	38
183588	324	6/28/2018	14:01	34.14222	-76.8124	33
183589	324	6/28/2018	14:03	34.14033	-76.8094	33
183590	324	6/28/2018	14:09	34.1349	-76.8098	33
183591	324	6/28/2018	14:12	34.13149	-76.8102	34
183592	324	6/28/2018	14:24	34.13303	-76.8215	36
183593	324	6/28/2018	14:31	34.14078	-76.8254	34
183594	298	6/28/2018	14:36	34.14225	-76.8274	34
183595	324	6/28/2018	17:40	34.17686	-76.9475	29
183596	324	6/28/2018	17:53	34.17442	-76.9378	32
183597	324	6/28/2018	17:55	34.17732	-76.9391	31
183598	324	6/28/2018	17:59	34.18166	-76.9379	31
183599	324	6/28/2018	18:08	34.18723	-76.9494	31
183600	324	6/28/2018	18:10	34.1898	-76.9509	31
183601	298	6/28/2018	18:21	34.19337	-76.9559	32
183602	324	6/28/2018	20:55	34.19063	-76.9284	32
183603	324	6/28/2018	20:59	34.19076	-76.9345	31
183604	324	6/28/2018	21:06	34.19608	-76.9442	33
183605	324	6/28/2018	21:10	34.20141	-76.9411	30
183606	298	6/28/2018	21:17	34.20437	-76.9376	31
183607	324	6/29/2018	12:59	34.4502	-76.6257	24
183608	324	6/29/2018	13:02	34.44761	-76.6243	22
183609	324	6/29/2018	13:06	34.44308	-76.6221	20
183610	324	6/29/2018	13:13	34.43129	-76.6114	21
183611	324	6/29/2018	13:19	34.42525	-76.6076	24

183612	324	6/29/2018	13:25	34.41813	-76.606	21
183613	298	6/29/2018	13:35	34.41189	-76.6042	25
183614	324	6/29/2018	16:20	34.38934	-76.566	23
183615	324	6/29/2018	16:22	34.3882	-76.5696	22
183616	324	6/29/2018	16:26	34.38821	-76.576	20
183617	324	6/29/2018	16:28	34.38833	-76.5798	24
183618	324	6/29/2018	16:31	34.3868	-76.583	20
183619	324	6/29/2018	16:36	34.38816	-76.5926	23
183620	298	6/29/2018	16:44	34.38943	-76.5968	26
183621	324	6/29/2018	19:14	34.40843	-76.7016	26
183622	324	6/29/2018	19:17	34.40549	-76.7038	26
183623	324	6/29/2018	19:23	34.41106	-76.7076	27
183624	324	6/29/2018	19:30	34.41765	-76.7132	27
183625	324	6/29/2018	19:32	34.42056	-76.712	28
183626	324	6/29/2018	19:34	34.42363	-76.7101	26
183627	298	6/29/2018	19:42	34.42986	-76.7074	25
183628	324	6/30/2018	11:15	34.16529	-76.1672	58
183629	324	6/30/2018	11:18	34.16293	-76.1726	58
183630	324	6/30/2018	11:21	34.16081	-76.1765	59
183631	324	6/30/2018	11:24	34.15799	-76.1802	59
183632	324	6/30/2018	11:26	34.15556	-76.1834	58
183633	324	6/30/2018	11:30	34.15385	-76.1883	54
183634	298	6/30/2018	11:40	34.15112	-76.1972	55
183635	324	6/30/2018	14:26	34.17392	-76.1449	60
183636	324	6/30/2018	14:31	34.17574	-76.1382	74
183637	324	6/30/2018	14:40	34.1855	-76.1338	70
183638	324	6/30/2018	14:46	34.18902	-76.1282	71
183639	324	6/30/2018	14:54	34.19619	-76.1173	75
183640	324	6/30/2018	14:58	34.19897	-76.1138	77
183641	298	6/30/2018	15:05	34.19545	-76.1082	104
183642	324	6/30/2018	17:54	34.14967	-76.164	103
183643	324	6/30/2018	17:58	34.15091	-76.1574	110
183644	324	6/30/2018	18:03	34.15423	-76.1516	114
183645	324	6/30/2018	18:11	34.15997	-76.1526	96
183646	324	6/30/2018	18:18	34.16462	-76.1478	103
183647	324	6/30/2018	18:20	34.16692	-76.1459	101
183648	298	6/30/2018	18:36	34.16369	-76.1397	124
183649	324	6/30/2018	20:56	34.14075	-76.2094	55
183650	324	6/30/2018	21:00	34.14467	-76.2038	53
183651	324	6/30/2018	21:04	34.14828	-76.1994	54
183652	298	6/30/2018	21:09	34.14881	-76.1972	52
183653	324	7/1/2018	11:04	34.4949	-76.0154	48
183654	324	7/1/2018	11:10	34.49651	-76.0234	47

183655	324	7/1/2018	11:21	34.50055	-76.0368	45
183656	324	7/1/2018	11:22	34.50163	-76.0341	45
183657	324	7/1/2018	11:29	34.50853	-76.0285	44
183658	324	7/1/2018	11:34	34.51113	-76.0225	46
183659	298	7/1/2018	11:42	34.51184	-76.015	46
183660	324	7/1/2018	14:22	34.4552	-75.9184	73
183661	324	7/1/2018	14:28	34.46008	-75.9164	72
183662	324	7/1/2018	14:30	34.46074	-75.9125	73
183663	324	7/1/2018	14:40	34.46354	-75.8963	80
183664	324	7/1/2018	14:45	34.46841	-75.8924	82
183665	324	7/1/2018	14:49	34.47076	-75.8882	81
183666	298	7/1/2018	14:56	34.47095	-75.8818	90
183667	324	7/1/2018	17:00	34.47437	-75.8835	82
183668	324	7/1/2018	17:04	34.47615	-75.8787	84
183669	324	7/1/2018	17:08	34.47992	-75.8743	88
183670	324	7/1/2018	17:14	34.48171	-75.8785	79
183671	324	7/1/2018	17:23	34.4843	-75.8732	83
183672	324	7/1/2018	17:29	34.48848	-75.8675	89
183673	298	7/1/2018	17:34	34.49192	-75.8645	87
183674	324	7/1/2018	20:26	34.47373	-75.8986	74
183675	324	7/1/2018	20:28	34.47712	-75.8967	73
183676	324	7/1/2018	20:32	34.47996	-75.8932	74
183677	324	7/1/2018	20:36	34.4833	-75.8905	73
183678	324	7/1/2018	20:43	34.48281	-75.8853	75
183679	324	7/1/2018	20:50	34.48789	-75.8834	73
183680	298	7/1/2018	20:56	34.49259	-75.8836	73
183681	324	7/2/2018	11:02	34.9775	-75.4611	54
183682	324	7/2/2018	11:06	34.98203	-75.4634	52
183683	324	7/2/2018	11:10	34.98652	-75.4627	52
183684	324	7/2/2018	11:16	34.99389	-75.4609	51
183685	324	7/2/2018	11:22	34.99752	-75.4665	51
183686	324	7/2/2018	11:29	35.00094	-75.4638	50
183687	298	7/2/2018	11:40	35.00471	-75.4572	52
183688	324	7/2/2018	14:16	34.92897	-75.4599	67
183689	324	7/2/2018	14:18	34.93147	-75.4609	62
183690	324	7/2/2018	14:25	34.93318	-75.4622	63
183691	324	7/2/2018	14:28	34.93573	-75.4585	64
183692	324	7/2/2018	14:33	34.93414	-75.4536	66
183693	324	7/2/2018	14:40	34.93673	-75.4542	65
183694	298	7/2/2018	14:48	34.93909	-75.4627	67
183695	324	7/2/2018	16:59	34.92234	-75.4712	64
183696	324	7/2/2018	17:01	34.92498	-75.4699	63
183697	324	7/2/2018	17:05	34.9237	-75.4675	62

183698	324	7/2/2018	17:10	34.9216	-75.466	66
183699	324	7/2/2018	17:13	34.92477	-75.4633	65
183700	324	7/2/2018	17:17	34.92739	-75.466	63
183701	298	7/2/2018	17:23	34.9291	-75.4696	63
183702	324	7/2/2018	20:14	34.90151	-75.5213	57
183703	324	7/2/2018	20:17	34.90545	-75.5174	56
183704	324	7/2/2018	20:21	34.9095	-75.5136	58
183705	324	7/2/2018	20:30	34.92199	-75.5067	55
183706	298	7/2/2018	20:36	34.92697	-75.5039	57
183707	324	7/3/2018	11:00	34.92022	-75.5306	52
183708	324	7/3/2018	11:05	34.92386	-75.5287	52
183709	324	7/3/2018	11:14	34.91838	-75.5262	54
183710	324	7/3/2018	11:20	34.92005	-75.5213	54
183711	324	7/3/2018	11:25	34.92673	-75.517	54
183712	324	7/3/2018	11:30	34.92666	-75.5125	55
183713	298	7/3/2018	11:39	34.92672	-75.5089	55
183714	324	7/3/2018	14:13	34.85989	-75.52	59
183715	324	7/3/2018	14:21	34.86827	-75.5204	61
183716	324	7/3/2018	14:28	34.86859	-75.5171	60
183717	324	7/3/2018	14:33	34.86555	-75.5149	56
183718	324	7/3/2018	14:39	34.87151	-75.5113	59
183719	324	7/3/2018	14:43	34.87199	-75.5072	59
183720	298	7/3/2018	14:49	34.87439	-75.502	65
183721	324	7/3/2018	17:32	34.86564	-75.5259	58
183722	324	7/3/2018	17:34	34.86486	-75.5294	57
183723	324	7/3/2018	17:38	34.86317	-75.5355	63
183724	324	7/3/2018	17:44	34.86059	-75.5323	62
183725	324	7/3/2018	17:47	34.8582	-75.5295	59
183726	324	7/3/2018	17:50	34.85518	-75.5264	58
183727	298	7/3/2018	17:55	34.85432	-75.5215	69
183728	324	7/4/2018	11:17	34.71149	-75.8439	40
183729	324	7/4/2018	11:25	34.70276	-75.8483	41
183730	324	7/4/2018	11:29	34.69976	-75.8436	40
183731	324	7/4/2018	11:32	34.69728	-75.8385	40
183732	324	7/4/2018	11:38	34.69934	-75.8314	40
183733	324	7/4/2018	11:41	34.70279	-75.829	41
183734	298	7/4/2018	11:49	34.70651	-75.8246	41
183735	324	7/4/2018	14:23	34.66792	-75.7382	58
183736	324	7/4/2018	14:26	34.66716	-75.7418	58
183737	324	7/4/2018	14:35	34.65927	-75.7366	62
183738	324	7/4/2018	14:46	34.64895	-75.7416	61
183739	324	7/4/2018	14:53	34.65366	-75.7493	59
183740	324	7/4/2018	14:56	34.65156	-75.7517	60

183741	298	7/4/2018	15:03	34.64602	-75.753	62
183742	324	7/4/2018	17:39	34.58326	-75.7835	69
183743	324	7/4/2018	17:49	34.58146	-75.8049	63
183744	324	7/4/2018	17:53	34.57968	-75.8093	63
183745	324	7/4/2018	18:02	34.57167	-75.8234	63
183746	324	7/4/2018	18:08	34.57653	-75.8277	63
183747	324	7/4/2018	18:20	34.57153	-75.8405	62
183748	298	7/4/2018	18:27	34.56835	-75.8403	61
183749	324	7/4/2018	20:55	34.61356	-75.7972	60
183750	324	7/4/2018	20:57	34.61106	-75.7973	59
183751	324	7/4/2018	21:00	34.60862	-75.7994	60
183752	298	7/4/2018	21:06	34.60871	-75.8021	60
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183755	324	7/5/2018	11:08	34.60604	-76.1474	39
183756	324	7/5/2018	11:11	34.60589	-76.1436	40
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183758	324	7/5/2018	11:19	34.60363	-76.1362	39
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183764	324	7/5/2018	14:36	34.60327	-76.1786	39
183765	324	7/5/2018	14:41	34.60411	-76.1714	39
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183768	324	7/5/2018	17:50	34.60481	-76.1952	38
183769	324	7/5/2018	17:56	34.60474	-76.1999	38
183770	324	7/5/2018	18:02	34.602	-76.2001	38
183771	324	7/5/2018	18:05	34.59937	-76.1962	38
183772	324	7/5/2018	18:13	34.59183	-76.2041	37
183773	298	7/5/2018	18:19	34.58866	-76.2072	37
183774	324	7/5/2018	20:14	34.56667	-76.214	38
183775	324	7/5/2018	20:18	34.56145	-76.2131	38
183776	324	7/5/2018	20:22	34.55755	-76.2161	39
183777	324	7/5/2018	20:31	34.55856	-76.206	39
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183790	324	7/6/2018	14:23	34.55662	-76.2407	36
183791	324	7/6/2018	14:29	34.55439	-76.2343	37
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183805	324	7/6/2018	20:30	34.53438	-76.2114	40
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183807	324	7/6/2018	20:45	34.52338	-76.2141	40
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183841	324	7/11/2018	11:18	34.31025	-77.0602	25
183842	324	7/11/2018	11:21	34.31293	-77.0605	27
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183844	324	7/11/2018	14:15	34.29232	-77.1532	25
183845	324	7/11/2018	14:18	34.29463	-77.1567	25
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183854	324	7/11/2018	17:37	34.33702	-77.1964	23
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183856	324	7/11/2018	17:44	34.34228	-77.2027	23
183857	298	7/11/2018	17:53	34.34015	-77.2036	22
183858	324	7/11/2018	20:53	34.27542	-77.3228	18
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183862	324	7/12/2018	11:09	33.56615	-77.1489	41
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183864	324	7/12/2018	11:23	33.56481	-77.1703	42
183865	324	7/12/2018	11:25	33.56665	-77.1722	42
183866	324	7/12/2018	11:30	33.56504	-77.1759	40
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183879	324	7/12/2018	17:31	33.64663	-77.1881	36
183880	324	7/12/2018	17:37	33.64439	-77.1958	34
183881	298	7/12/2018	17:42	33.64112	-77.1985	36
183882	324	7/12/2018	20:16	33.63608	-77.212	36
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183884	324	7/12/2018	20:22	33.63559	-77.2216	36
183885	324	7/12/2018	20:27	33.63919	-77.2247	36
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183890	324	7/13/2018	11:04	33.48239	-76.9732	71
183891	324	7/13/2018	11:10	33.47818	-76.9823	73
183892	324	7/13/2018	11:12	33.47836	-76.9862	64
183893	324	7/13/2018	11:26	33.47173	-76.9651	98
183894	324	7/13/2018	11:33	33.46976	-76.9693	97
183895	298	7/13/2018	11:43	33.47116	-76.9768	83
183896	324	7/13/2018	14:14	33.45126	-76.9989	98
183897	324	7/13/2018	14:20	33.44875	-77.0056	86
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183900	324	7/13/2018	14:44	33.45824	-77.0175	64
183901	324	7/13/2018	14:48	33.45724	-77.0236	62
183902	298	7/13/2018	14:57	33.46194	-77.028	56
183903	324	7/13/2018	17:16	33.43052	-77.0434	78
183904	324	7/13/2018	17:19	33.42822	-77.0484	79
183905	324	7/13/2018	17:23	33.42587	-77.0527	86
183906	324	7/13/2018	17:25	33.42464	-77.0563	83
183907	324	7/13/2018	17:28	33.42283	-77.0595	85
183908	324	7/13/2018	17:31	33.421	-77.0632	92
183909	298	7/13/2018	17:39	33.42325	-77.0662	68
183910	324	7/13/2018	20:24	33.46803	-77.0978	42
183911	324	7/13/2018	20:28	33.47112	-77.0937	45
183912	324	7/13/2018	20:33	33.46757	-77.0897	44

183913	324	7/13/2018	20:38	33.46928	-77.0882	43
183914	324	7/13/2018	20:41	33.47383	-77.0882	42
183915	324	7/13/2018	20:47	33.4738	-77.084	43
183916	298	7/13/2018	20:58	33.47586	-77.0792	43
183917	324	7/14/2018	11:01	33.39459	-77.2701	43
183918	324	7/14/2018	11:04	33.39764	-77.2654	42
183919	324	7/14/2018	11:11	33.40279	-77.2538	38
183920	324	7/14/2018	11:18	33.40599	-77.2439	41
183921	324	7/14/2018	11:20	33.40691	-77.2407	41
183922	324	7/14/2018	11:27	33.40512	-77.233	45
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183940	324	7/14/2018	20:40	33.53676	-77.4204	29
183941	324	7/14/2018	20:46	33.53393	-77.4129	29
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183945	324	7/15/2018	11:09	32.78326	-78.6498	36
183946	324	7/15/2018	11:16	32.78081	-78.6398	35
183947	324	7/15/2018	11:22	32.78685	-78.6368	37
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183949	298	7/15/2018	11:32	32.79222	-78.6294	38
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183953	324	7/15/2018	14:30	32.79491	-78.7839	35
183954	324	7/15/2018	14:36	32.79703	-78.7866	34
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183960	324	7/15/2018	17:32	32.83894	-78.9233	31
183961	324	7/15/2018	17:39	32.83978	-78.927	30
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183965	324	7/16/2018	11:02	30.75856	-80.2183	44
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183967	324	7/16/2018	11:14	30.75179	-80.2174	45
183968	324	7/16/2018	11:22	30.74043	-80.2205	44
183969	324	7/16/2018	11:24	30.73767	-80.2215	44
183970	298	7/16/2018	11:36	30.73375	-80.2246	44
183971	324	7/16/2018	14:14	30.64673	-80.2091	45
183972	324	7/16/2018	14:21	30.64344	-80.2125	46
183973	324	7/16/2018	14:24	30.64213	-80.2092	45
183974	324	7/16/2018	14:30	30.63785	-80.2115	47
183975	324	7/16/2018	14:34	30.63379	-80.2132	45
183976	324	7/16/2018	14:37	30.63074	-80.2128	49
183977	298	7/16/2018	14:46	30.62617	-80.2121	48
183978	324	7/16/2018	18:17	30.50855	-80.2596	47
183979	324	7/16/2018	18:19	30.50641	-80.2597	49
183980	324	7/16/2018	18:21	30.50409	-80.2598	46
183981	324	7/16/2018	18:25	30.50175	-80.2556	49
183982	324	7/16/2018	18:33	30.50006	-80.2597	47
183983	324	7/16/2018	18:38	30.49648	-80.2595	47
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183985	324	7/17/2018	11:05	30.0215	-80.5313	40
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183987	324	7/17/2018	11:24	30.00628	-80.5621	42
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183993	324	7/17/2018	14:27	29.94039	-80.493	44
183994	324	7/17/2018	14:33	29.94447	-80.4948	45
183995	324	7/17/2018	14:39	29.94464	-80.499	45
183996	324	7/17/2018	14:41	29.9473	-80.499	44
183997	324	7/17/2018	14:43	29.95021	-80.4993	43
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184010	324	7/17/2018	20:35	29.85155	-80.5286	38
184011	324	7/17/2018	20:41	29.84728	-80.5285	38
184012	298	7/17/2018	20:49	29.84352	-80.5312	37
184013	324	7/18/2018	11:00	29.36832	-80.4658	29
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184015	324	7/18/2018	11:08	29.36137	-80.465	28
184016	324	7/18/2018	11:11	29.35767	-80.4615	29
184017	324	7/18/2018	11:15	29.3546	-80.4641	29
184018	324	7/18/2018	13:13	29.35116	-80.4615	29
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184023	324	7/18/2018	14:34	29.30271	-80.3878	35
184024	324	7/18/2018	14:37	29.30064	-80.3859	31
184025	324	7/18/2018	14:40	29.29909	-80.3847	34
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184027	324	7/18/2018	17:03	29.29594	-80.4322	27
184028	324	7/18/2018	17:08	29.29011	-80.4302	33
184029	324	7/18/2018	17:20	29.27244	-80.4209	33
184030	324	7/18/2018	17:25	29.26624	-80.4181	31
184031	324	7/18/2018	17:38	29.26946	-80.441	31
184032	324	7/18/2018	17:41	29.26763	-80.4447	32
184033	298	7/18/2018	17:49	29.26307	-80.4466	33
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184035	324	7/18/2018	20:19	29.24413	-80.4355	30
184036	324	7/18/2018	20:20	29.24212	-80.4358	29
184037	324	7/18/2018	20:25	29.2415	-80.4319	30
184038	324	7/18/2018	20:33	29.23804	-80.4353	28
184039	324	7/18/2018	20:37	29.23497	-80.4362	30
184040	298	7/18/2018	20:44	29.22994	-80.4349	32
184041	324	7/19/2018	11:00	29.13929	-80.5085	23

184042	324	7/19/2018	11:04	29.13567	-80.5047	24
184043	324	7/19/2018	11:08	29.13236	-80.5017	26
184044	324	7/19/2018	11:11	29.12928	-80.4996	24
184045	324	7/19/2018	11:14	29.12683	-80.4972	24
184046	324	7/19/2018	11:17	29.12266	-80.4969	27
184047	298	7/19/2018	11:25	29.11839	-80.4977	26
184048	324	7/19/2018	14:13	29.21043	-80.5275	27
184049	324	7/19/2018	14:21	29.19753	-80.5243	27
184050	324	7/19/2018	14:32	29.18129	-80.52	26
184051	324	7/19/2018	16:15	29.17755	-80.5188	27
184052	324	7/19/2018	14:38	29.1747	-80.5182	26
184053	324	7/19/2018	14:43	29.16934	-80.5162	25
184054	298	7/19/2018	14:52	29.1639	-80.5142	28
184055	324	7/19/2018	17:00	29.16332	-80.5407	28
184056	324	7/19/2018	17:04	29.16315	-80.5458	29
184057	324	7/19/2018	17:10	29.16504	-80.5554	27
184058	324	7/19/2018	17:12	29.16675	-80.5592	27
184059	324	7/19/2018	17:18	29.16665	-80.5678	30
184060	324	7/19/2018	17:20	29.16706	-80.5707	28
184061	298	7/19/2018	17:29	29.16602	-80.5738	29
184062	324	7/19/2018	20:51	29.17567	-80.5782	26
184063	324	7/19/2018	20:54	29.17575	-80.5823	27
184064	324	7/19/2018	20:57	29.1736	-80.5828	26
184065	324	7/19/2018	21:03	29.17204	-80.5871	28
184066	298	7/19/2018	21:10	29.17053	-80.5898	28
184067	324	7/20/2018	10:59	29.12657	-80.4131	32
184068	324	7/20/2018	11:02	29.12278	-80.4112	31
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184070	324	7/20/2018	11:15	29.10561	-80.4108	31
184071	324	7/20/2018	11:29	29.12538	-80.4262	30
184072	324	7/20/2018	11:37	29.11917	-80.426	31
184073	298	7/20/2018	11:49	29.11436	-80.4255	31
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184075	324	7/20/2018	14:29	29.17484	-80.3094	44
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184080	324	7/20/2018	18:34	29.21649	-80.3945	32
184081	324	7/20/2018	18:39	29.21454	-80.3982	30
184082	324	7/20/2018	18:41	29.21159	-80.4007	31
184083	298	7/20/2018	18:50	29.20758	-80.4024	34
184084	324	7/20/2018	21:03	29.25056	-80.3413	38

184085	324	7/20/2018	21:07	29.25446	-80.3418	38
184086	298	7/20/2018	21:11	29.25674	-80.3452	37
184087	324	7/21/2018	10:59	30.58159	-80.7806	35
184088	324	7/21/2018	11:06	30.57777	-80.7885	32
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184091	298	7/21/2018	11:17	30.56833	-80.7935	33
184092	324	7/21/2018	14:14	30.5553	-80.716	35
184093	324	7/21/2018	14:19	30.55862	-80.7184	35
184094	324	7/21/2018	14:21	30.56101	-80.718	35
184095	324	7/21/2018	14:33	30.56129	-80.7381	33
184096	324	7/21/2018	14:35	30.55884	-80.7398	35
184097	324	7/21/2018	14:39	30.55955	-80.7425	35
184098	298	7/21/2018	14:49	30.56083	-80.7476	34
184099	324	7/21/2018	17:28	30.50508	-80.6062	38
184100	324	7/21/2018	17:32	30.50445	-80.6013	36
184101	324	7/21/2018	17:39	30.49653	-80.5933	37
184102	324	7/21/2018	17:44	30.49693	-80.5891	40
184103	324	7/21/2018	17:51	30.50382	-80.5769	39
184104	324	7/21/2018	17:57	30.50657	-80.5797	38
184105	298	7/21/2018	18:02	30.50551	-80.586	37
184106	324	7/21/2018	20:29	30.49198	-80.512	38
184107	324	7/21/2018	20:34	30.49474	-80.5195	38
184108	324	7/21/2018	20:40	30.48945	-80.5207	39
184109	324	7/21/2018	20:46	30.4902	-80.5262	41
184110	324	7/21/2018	20:48	30.49156	-80.5285	39
184111	324	7/21/2018	20:56	30.49286	-80.5408	39
184112	298	7/21/2018	21:05	30.49335	-80.5456	38
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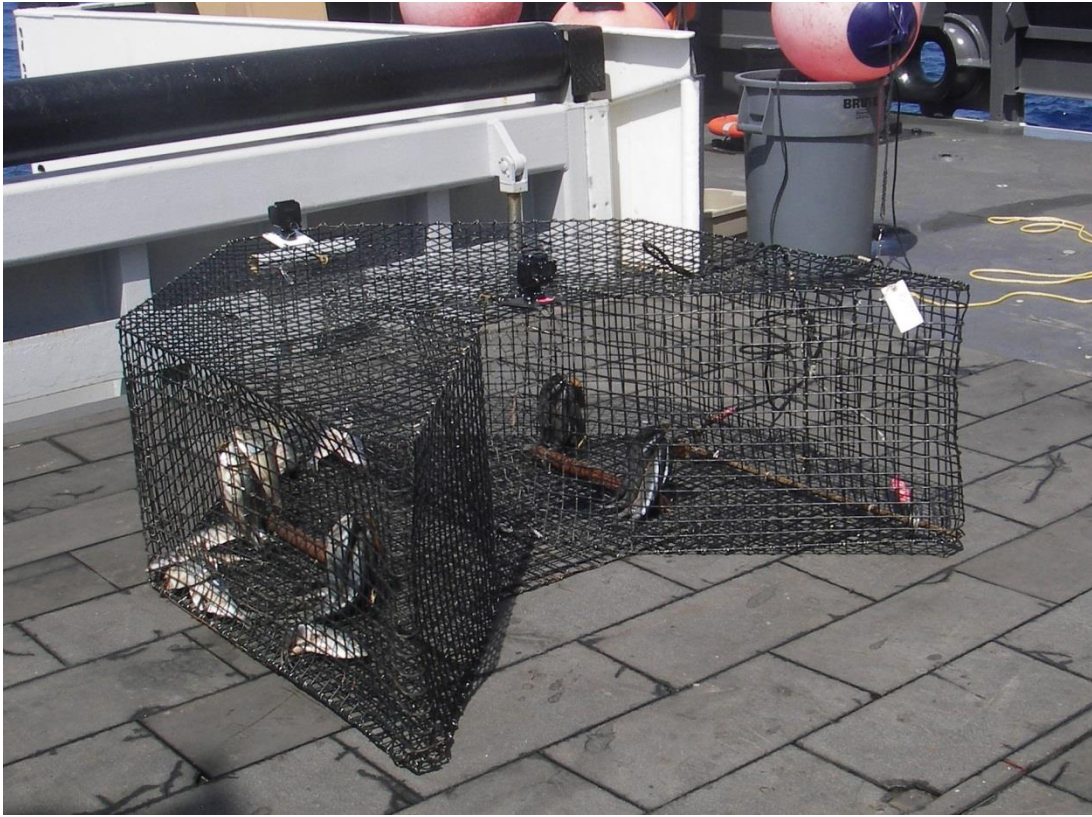


Figure 1. Chevron trap with video cameras used to sample reef fish on the PC-18-04 survey.

CRUISE PARTICIPANTS

Name / Title / Organization

Leg 1

Zeb Schobernd / Chief Scientist / NMFS-Beaufort
Lauren Bacharach / Scientist-Video Watch / Riverside
Zach Gillum / Scientist-Deck Watch / SEFIS Riverside
Kevan Gregalis / Scientist-Video Watch / NMFS-Beaufort
Stacey Harter / Scientist-Video Watch / NMFS-Panama City
David Hoke / Scientist-Deck Watch / NMFS-Manteo, NC
Todd Kellison / Scientist-Deck Watch / NMFS-Beaufort
Angelina Ponella / Scientist-Mapping Watch / College of Charleston
Julia Reynolds / Scientist-Deck Watch / SCDNR-MARMAP
Claire Rosemond / Scientist-Deck Watch / Riverside
Joey Salisbury / Scientist-Mapping Watch / Riverside

Leg 2

Nate Bacheler / Chief Scientist / NMFS-Beaufort
John Brusher / Scientist-Deck Watch / NMFS-Panama City
Rob Cheshire / Scientist-Deck Watch / NMFS-Beaufort
Zach Gillum / Scientist-Deck Watch / SEFIS Riverside
David Hoke / Scientist-Deck Watch / NMFS-Manteo, NC
David Knight / Teacher-at-sea / State of California
Anne Markwith / Scientist-Deck Watch / NCDMF
Julia Reynolds / Scientist-Deck Watch / SCDNR-MARMAP
Christina Schobernd / Video Watch / NMFS-Beaufort
Brad Teer / Scientist-Deck Watch / SEFIS Riverside



Cruise Report Prepared by: Nate Bacheler and Christina Schobernd

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