

CRUISE REPORT

Southeast Fishery-Independent Survey (SEFIS)

NOAA Ship *Nancy Foster* Cruise NF-10-15-Leg 1
14 – 25 September 2010
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

108 camera-trap deployments
31 CTD casts
15 areas mapped

INTRODUCTION

The NOAA Ship *Nancy Foster* departed Charleston, SC, on 14 September 2010 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 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 known hardbottom habitats between 30.34 °N and 31.63° N. A total of 108 stations were sampled with camera-trap gear over 10 sea days between 13 and 61 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, 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 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 a CTD instrument package to collect environmental data (temperature, salinity, dissolved oxygen) at camera-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 a chevron fish trap with a single high-definition GoPro video camera (model HD Hero[®]) attached above the mouth of the trap (Figure 1). Chevron traps were composed of plastic-coated wire mesh. 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. Camera-traps were most often 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 (e.g., 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 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 each camera-trap soak period; instruments 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 at the Beaufort laboratory. SCS software (version 4.2) was used to collect specific information for each fishing and CTD event, including soak time/cast duration as well as start latitude, longitude and depth (m).

Acoustic Data Collection

Multibeam acoustic data collection: The *Nancy Foster* multibeam unit (Kongsberg-Simrad EM 1002) was typically used to map benthic habitats during nighttime hours. Areas for mapping were selected based on the need for additional hardbottom sampling sites in an area, information from fishermen, and efficient use of vessel time. Raw multibeam data were processed by the ship’s survey technicians each morning, and these hardbottom habitat maps were used to select areas for sampling during the day.

Split-beam acoustic data collection: Two EK60 echosounders (38 and 120 KHz) were 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 in georeferenced graphic displays or by processing EK60 files (*.raw) within Echoview software (v4.90).

SURVEY RESULTS

Camera-Trap Sampling

108 stations were sampled with camera-trap gear (Figure 2). From these traps, individuals from 29 taxa were collected and worked up for length frequency data.

Environmental Data Collection

31 CTD casts were conducted during the cruise (Table 1, Figure 2). CTD data were processed with Seabird SBE Data Processing software (version 7.2), and archived in a database at the NMFS-Beaufort Laboratory for future analysis.

Acoustic Data Collection

Multibeam:

15 areas were mapped using multibeam acoustic gear (Figure 3). Multibeam data were processed with Caris software on board the *Nancy Foster*. Multibeam maps were useful in selecting camera-trap sampling sites, i.e., identifying hardbottom habitats. All multibeam acoustic data were archived on a server and compiled in an Arc GIS project at the NMFS-Beaufort Laboratory for future analysis and survey planning.

Split-beam:

The EK60 echosounders recorded water column information during all multibeam mapping efforts. GPS points extracted from EK60 data were often used in conjunction with the Simrad multibeam to determine probable trap/video sampling sites for the following day. All EK60 acoustic data were archived on a server at the NMFS-Beaufort Laboratory for future analysis.

Table 1. Summary of station coordinates, depth, date and time for each fishing event (camera-trap, Gear=324) and CTD cast (Gear=298) conducted on the NF-10-15-Leg 1 survey. Times were recorded in Coordinated Universal Time (UTC).

| Collection Number | Gear | Date | Start Time UTC | Latitude | Longitude | Depth (m) |
|-------------------|------|-----------|----------------|----------|-----------|-----------|
| 101001 | 324 | 9/15/2010 | 15:06:00 | 30.37 | -81.05 | 21 |
| 101002 | 324 | 9/15/2010 | 15:22:00 | 30.36 | -81.05 | 22 |
| 101003 | 324 | 9/15/2010 | 15:33:00 | 30.36 | -81.03 | 20 |
| 101004 | 324 | 9/15/2010 | 15:54:00 | 30.35 | -81.05 | 22 |
| 101005 | 324 | 9/15/2010 | 16:09:00 | 30.35 | -81.05 | 22 |
| 101006 | 324 | 9/15/2010 | 16:27:00 | 30.34 | -81.05 | 22 |
| 101007 | 324 | 9/15/2010 | 19:47:00 | 30.38 | -81.04 | 21 |
| 101008 | 324 | 9/15/2010 | 20:07:00 | 30.39 | -81.04 | 22 |
| 101009 | 324 | 9/15/2010 | 20:28:00 | 30.40 | -81.05 | 22 |
| 101010 | 298 | 9/15/2010 | 20:43:00 | 30.39 | -81.05 | 21 |
| 101011 | 298 | 9/16/2010 | 02:09:00 | 30.38 | -80.45 | 35 |
| 101012 | 324 | 9/16/2010 | 12:44:00 | 30.52 | -80.48 | 35 |
| 101013 | 324 | 9/16/2010 | 12:53:00 | 30.52 | -80.48 | 33 |
| 101014 | 324 | 9/16/2010 | 12:57:00 | 30.52 | -80.48 | 35 |
| 101015 | 324 | 9/16/2010 | 13:05:00 | 30.51 | -80.48 | 34 |
| 101016 | 324 | 9/16/2010 | 13:12:00 | 30.51 | -80.48 | 34 |
| 101017 | 324 | 9/16/2010 | 13:21:00 | 30.52 | -80.48 | 35 |
| 101018 | 298 | 9/16/2010 | 12:04:00 | 30.52 | -80.48 | 34 |
| 101019 | 324 | 9/17/2010 | 12:36:00 | 31.62 | -80.58 | 21 |
| 101020 | 324 | 9/17/2010 | 12:51:00 | 31.63 | -80.58 | 21 |
| 101021 | 324 | 9/17/2010 | 13:00:00 | 31.63 | -80.58 | 20 |
| 101022 | 324 | 9/17/2010 | 13:08:00 | 31.63 | -80.58 | 21 |
| 101023 | 324 | 9/17/2010 | 13:16:00 | 31.63 | -80.57 | 20 |
| 101024 | 324 | 9/17/2010 | 13:27:00 | 31.63 | -80.57 | 21 |
| 101025 | 298 | 9/17/2010 | 01:18:00 | 31.61 | -80.61 | 17 |
| 101026 | 298 | 9/17/2010 | 07:14:00 | 31.61 | -80.68 | 19 |
| 101027 | 298 | 9/17/2010 | 15:07:00 | 31.63 | -80.58 | 22 |
| 101028 | 324 | 9/17/2010 | 16:39:00 | 31.58 | -80.37 | 28 |
| 101029 | 324 | 9/17/2010 | 16:51:00 | 31.58 | -80.36 | 27 |
| 101030 | 324 | 9/17/2010 | 16:59:00 | 31.58 | -80.36 | 27 |
| 101031 | 324 | 9/17/2010 | 17:31:00 | 31.57 | -80.36 | 27 |
| 101032 | 324 | 9/17/2010 | 17:40:00 | 31.58 | -80.37 | 28 |
| 101033 | 324 | 9/17/2010 | 18:12:00 | 31.58 | -80.36 | 32 |
| 101034 | 298 | 9/17/2010 | 20:16:00 | 31.58 | -80.36 | 30 |
| 101035 | 298 | 9/18/2010 | 03:33:00 | 31.23 | -80.70 | 17 |
| 101036 | 324 | 9/18/2010 | 12:28:00 | 31.59 | -80.79 | 16 |
| 101037 | 324 | 9/18/2010 | 13:17:00 | 31.60 | -80.80 | 15 |
| 101038 | 324 | 9/18/2010 | 13:27:00 | 31.60 | -80.79 | 15 |

| Collection Number | Gear | Date | Start Time UTC | Latitude | Longitude | Depth (m) |
|-------------------|------|-----------|----------------|----------|-----------|-----------|
| 101039 | 324 | 9/18/2010 | 13:34:00 | 31.60 | -80.78 | 15 |
| 101040 | 298 | 9/18/2010 | 15:50:00 | 31.59 | -80.79 | 15 |
| 101041 | 324 | 9/18/2010 | 16:54:00 | 31.58 | -80.76 | 16 |
| 101042 | 324 | 9/18/2010 | 17:03:00 | 31.58 | -80.76 | 17 |
| 101043 | 324 | 9/18/2010 | 17:10:00 | 31.59 | -80.77 | 16 |
| 101044 | 324 | 9/18/2010 | 17:15:00 | 31.59 | -80.77 | 17 |
| 101045 | 324 | 9/18/2010 | 17:24:00 | 31.59 | -80.77 | 16 |
| 101046 | 324 | 9/18/2010 | 17:37:00 | 31.58 | -80.76 | 17 |
| 101047 | 298 | 9/18/2010 | 23:15:00 | 31.59 | -80.77 | 17 |
| 101050 | 298 | 9/19/2010 | 06:52:00 | 31.61 | -80.84 | 13 |
| 101051 | 324 | 9/19/2010 | 12:50:00 | 31.59 | -80.81 | 16 |
| 101052 | 324 | 9/19/2010 | 12:56:00 | 31.59 | -80.81 | 16 |
| 101053 | 324 | 9/19/2010 | 13:01:00 | 31.59 | -80.80 | 16 |
| 101054 | 324 | 9/19/2010 | 13:05:00 | 31.60 | -80.80 | 16 |
| 101055 | 324 | 9/19/2010 | 13:12:00 | 31.60 | -80.80 | 16 |
| 101056 | 324 | 9/19/2010 | 13:25:00 | 31.60 | -80.80 | 16 |
| 101057 | 298 | 9/19/2010 | 16:10:00 | 31.59 | -80.80 | 16 |
| 101058 | 298 | 9/19/2010 | 23:16:00 | 31.43 | -80.73 | 22 |
| 101059 | 298 | 9/20/2010 | 05:49:00 | 31.43 | -80.73 | 19 |
| 101060 | 324 | 9/20/2010 | 13:12:00 | 31.39 | -80.88 | 16 |
| 101061 | 324 | 9/20/2010 | 13:27:00 | 31.39 | -80.89 | 16 |
| 101062 | 324 | 9/20/2010 | 13:34:00 | 31.39 | -80.90 | 15 |
| 101063 | 324 | 9/20/2010 | 13:40:00 | 31.39 | -80.90 | 14 |
| 101064 | 324 | 9/20/2010 | 13:49:00 | 31.40 | -80.89 | 13 |
| 101065 | 324 | 9/20/2010 | 13:55:00 | 31.40 | -80.89 | 15 |
| 101066 | 298 | 9/20/2010 | 16:08:00 | 31.39 | -80.89 | 14 |
| 101067 | 324 | 9/20/2010 | 17:02:00 | 31.38 | -80.89 | 15 |
| 101068 | 324 | 9/20/2010 | 17:22:00 | 31.37 | -80.89 | 15 |
| 101069 | 324 | 9/20/2010 | 17:30:00 | 31.37 | -80.89 | 15 |
| 101070 | 324 | 9/20/2010 | 17:35:00 | 31.36 | -80.89 | 15 |
| 101071 | 324 | 9/20/2010 | 17:49:00 | 31.38 | -80.89 | 15 |
| 101072 | 324 | 9/20/2010 | 17:58:00 | 31.38 | -80.89 | 15 |
| 101073 | 298 | 9/20/2010 | 21:03:00 | 31.38 | -80.89 | 18 |
| 101074 | 324 | 9/20/2010 | 20:19:00 | 31.38 | -80.89 | 15 |
| 101075 | 324 | 9/20/2010 | 20:32:00 | 31.39 | -80.89 | 15 |
| 101076 | 298 | 9/21/2010 | 00:07:00 | 31.27 | -80.74 | 19 |
| 101077 | 298 | 9/21/2010 | 06:10:00 | 31.21 | -80.71 | 19 |
| 101078 | 324 | 9/21/2010 | 12:17:00 | 31.25 | -80.75 | 19 |
| 101079 | 324 | 9/21/2010 | 12:26:00 | 31.25 | -80.74 | 17 |
| 101080 | 324 | 9/21/2010 | 12:30:00 | 31.25 | -80.74 | 18 |
| 101081 | 324 | 9/21/2010 | 12:37:00 | 31.26 | -80.74 | 17 |
| 101082 | 324 | 9/21/2010 | 12:59:00 | 31.25 | -80.75 | 18 |

| Collection Number | Gear | Date | Start Time UTC | Latitude | Longitude | Depth (m) |
|-------------------|------|-----------|----------------|----------|-----------|-----------|
| 101083 | 324 | 9/21/2010 | 13:19:00 | 31.25 | -80.75 | 19 |
| 101084 | 298 | 9/21/2010 | 15:14:00 | 31.25 | -80.75 | 17 |
| 101085 | 324 | 9/21/2010 | 19:54:00 | 31.28 | -80.51 | 31 |
| 101086 | 324 | 9/21/2010 | 20:08:00 | 31.27 | -80.51 | 30 |
| 101087 | 324 | 9/21/2010 | 20:17:00 | 31.27 | -80.51 | 30 |
| 101088 | 324 | 9/21/2010 | 20:25:00 | 31.27 | -80.51 | 30 |
| 101089 | 324 | 9/21/2010 | 20:35:00 | 31.26 | -80.52 | 30 |
| 101090 | 324 | 9/21/2010 | 21:01:00 | 31.28 | -80.51 | 24 |
| 101091 | 298 | 9/21/2010 | 21:12:00 | 31.27 | -80.51 | 30 |
| 101092 | 298 | 9/22/2010 | 03:03:00 | 31.26 | -80.40 | 31 |
| 101094 | 298 | 9/22/2010 | 09:55:00 | 30.85 | -80.22 | 40 |
| 101095 | 324 | 9/22/2010 | 13:02:00 | 30.76 | -80.22 | 41 |
| 101096 | 324 | 9/22/2010 | 13:11:00 | 30.76 | -80.22 | 40 |
| 101097 | 324 | 9/22/2010 | 13:17:00 | 30.76 | -80.22 | 41 |
| 101098 | 324 | 9/22/2010 | 13:26:00 | 30.76 | -80.22 | 41 |
| 101099 | 324 | 9/22/2010 | 13:43:00 | 30.76 | -80.21 | 40 |
| 101100 | 324 | 9/22/2010 | 14:07:00 | 30.76 | -80.22 | 40 |
| 101101 | 298 | 9/22/2010 | 16:18:00 | 30.76 | -80.22 | 43 |
| 101102 | 324 | 9/22/2010 | 17:09:00 | 30.74 | -80.22 | 39 |
| 101103 | 324 | 9/22/2010 | 17:23:00 | 30.73 | -80.22 | 41 |
| 101104 | 324 | 9/22/2010 | 17:34:00 | 30.74 | -80.22 | 40 |
| 101105 | 324 | 9/22/2010 | 17:52:00 | 30.75 | -80.21 | 40 |
| 101106 | 324 | 9/22/2010 | 18:02:00 | 30.75 | -80.22 | 39 |
| 101107 | 324 | 9/22/2010 | 18:14:00 | 30.75 | -80.21 | 41 |
| 101108 | 298 | 9/22/2010 | 20:24:00 | 30.75 | -80.22 | 40 |
| 101109 | 298 | 9/23/2010 | 04:21:00 | 30.57 | -80.24 | 43 |
| 101110 | 324 | 9/23/2010 | 12:27:00 | 30.63 | -80.21 | 40 |
| 101111 | 324 | 9/23/2010 | 12:33:00 | 30.64 | -80.21 | 39 |
| 101112 | 324 | 9/23/2010 | 12:39:00 | 30.64 | -80.21 | 42 |
| 101113 | 324 | 9/23/2010 | 12:44:00 | 30.64 | -80.21 | 41 |
| 101114 | 324 | 9/23/2010 | 13:10:00 | 30.64 | -80.21 | 40 |
| 101115 | 324 | 9/23/2010 | 13:24:00 | 30.63 | -80.21 | 43 |
| 101116 | 324 | 9/23/2010 | 16:46:00 | 30.58 | -80.16 | 49 |
| 101117 | 324 | 9/23/2010 | 16:52:00 | 30.58 | -80.16 | 46 |
| 101118 | 324 | 9/23/2010 | 17:03:00 | 30.58 | -80.16 | 46 |
| 101119 | 324 | 9/23/2010 | 17:09:00 | 30.57 | -80.16 | 46 |
| 101120 | 324 | 9/23/2010 | 17:18:00 | 30.57 | -80.16 | 48 |
| 101121 | 324 | 9/23/2010 | 17:24:00 | 30.57 | -80.16 | 46 |
| 101122 | 298 | 9/23/2010 | 15:56:00 | 30.63 | -80.21 | 44 |
| 101123 | 324 | 9/23/2010 | 20:05:00 | 30.59 | -80.16 | 49 |
| 101124 | 324 | 9/23/2010 | 20:14:00 | 30.59 | -80.15 | 54 |
| 101125 | 324 | 9/23/2010 | 20:20:00 | 30.59 | -80.15 | 49 |

| Collection Number | Gear | Date | Start Time UTC | Latitude | Longitude | Depth (m) |
|-------------------|------|-----------|----------------|----------|-----------|-----------|
| 101126 | 298 | 9/23/2010 | 20:32:00 | 30.59 | -80.16 | 49 |
| 101127 | 298 | 9/24/2010 | 00:07:00 | 30.43 | -80.24 | 45 |
| 101128 | 298 | 9/24/2010 | 06:21:00 | 30.44 | -80.23 | 44 |
| 101129 | 324 | 9/24/2010 | 11:58:00 | 30.40 | -80.22 | 53 |
| 101130 | 324 | 9/24/2010 | 12:12:00 | 30.40 | -80.22 | 52 |
| 101131 | 324 | 9/24/2010 | 12:25:00 | 30.40 | -80.22 | 61 |
| 101132 | 324 | 9/24/2010 | 12:37:00 | 30.39 | -80.22 | 58 |
| 101133 | 324 | 9/24/2010 | 12:49:00 | 30.39 | -80.22 | 54 |
| 101134 | 324 | 9/24/2010 | 12:56:00 | 30.39 | -80.22 | 60 |
| 101135 | 298 | 9/24/2010 | 15:38:00 | 30.40 | -80.21 | 64 |
| 101136 | 324 | 9/24/2010 | 17:28:00 | 30.52 | -80.47 | 34 |
| 101137 | 324 | 9/24/2010 | 17:31:00 | 30.52 | -80.47 | 34 |
| 101138 | 324 | 9/24/2010 | 17:43:00 | 30.52 | -80.48 | 34 |
| 101139 | 324 | 9/24/2010 | 17:57:00 | 30.52 | -80.47 | 35 |
| 101140 | 324 | 9/24/2010 | 17:59:00 | 30.52 | -80.46 | 33 |
| 101141 | 324 | 9/24/2010 | 18:24:00 | 30.52 | -80.46 | 34 |
| 101142 | 298 | 9/24/2010 | 20:25:00 | 30.52 | -80.47 | 35 |



Figure 1. Chevron trap with video camera attached over the mouth position.

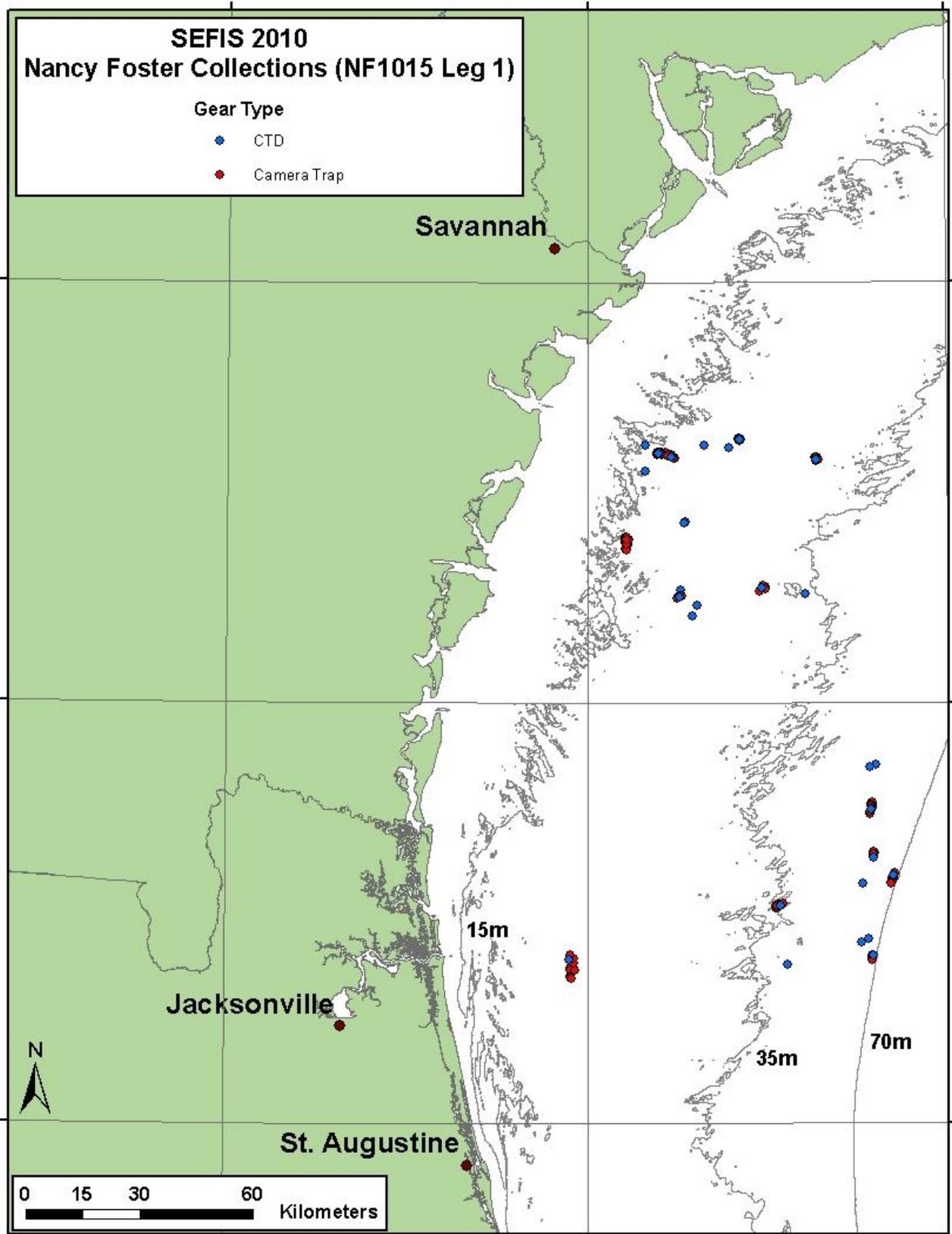


Figure 2. Locations of stations sampled with camera-trap and CTD gear on the NF-10-15-Leg 1 survey. Note that symbols overlap in many cases.

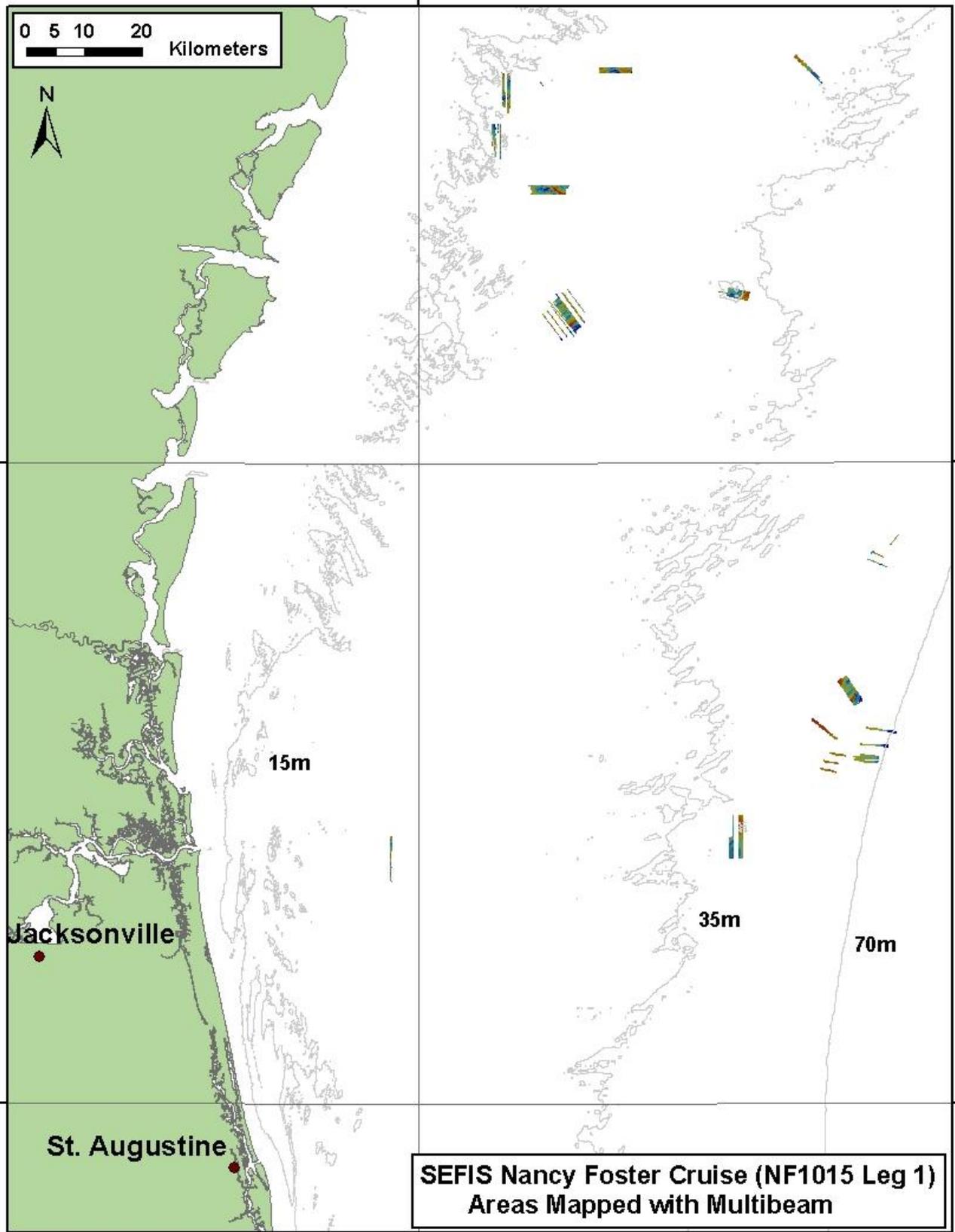


Figure 3. Locations mapped with multibeam acoustic gear on the NF-10-15-Leg 1 survey.

Leg 1 (14 – 25 September 2010)

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