
Cruise Report

FE-02-09-MA (part)
05 - 06 April, 2002

and

FE-02-10-BL-Leg 1
12 - 17 April, 2002



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Submitted to:
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Introduction

In April 2000, the National Centers for Coastal Ocean Science (NCCOS) initiated a new project funded by the National Marine Sanctuary Program: Support of Monitoring Activities and Site Characterization at Gray's Reef National Marine Sanctuary (GRNMS). Three NCCOS Centers are involved in the work: the Center for Coastal Fisheries and Habitat Research (CCFHR), the Center for Coastal Environmental Health and Biomolecular Research (CCEHBR) and the Center for Coastal Monitoring and Assessment (CCMA).

The overall project has eight goals.

- 1) Participate in GRNMS fish monitoring activities including work in adjacent deeper areas.
- 2) Analyze fish monitoring data for changes in abundance and species composition over time (1995-1999).
- 3) Assess adequacy of fish monitoring sampling design for detecting changes in abundance and composition of fishes over time.
- 4) Determine the importance of non-reef habitats to juvenile stages of reef fishes and evaluate the linkages between non-reef and reef habitats.
- 5) Provide an assessment of the condition of macroinfaunal assemblages, concentrations of chemical contaminants in sediments, and contaminant body-burdens in target benthic species of the GRNMS.
- 6) Provide customized satellite-derived sea surface temperature products to assist research and management activities within GRNMS.
- 7) Determine the species of fish that spawn in the vicinity of GRNMS.
- 8) Evaluate larval transport to and dispersal from GRNMS to surrounding areas.
- 9) Provide an assessment of GRNMS to serve as a Marine Protected Area.

Since initiation of the project, two other research objectives have been pursued:

- 10) Conduct preliminary biomarker research of corals in GRNMS.
- 11) Define trophic relations between juvenile fish fauna and macroinfauna assemblages

The research conducted during FE-02-09-MA and FE-02-10-BL-Leg 1 contributed to goals 4 and 11. In addition, preliminary mapping of benthic habitats in GRNMS was conducted.

Scientific Objectives

The scientific objectives of the cruise follow the scientific goals of the project overall.

- 1) Collect beam trawl samples over non-reef habitats to quantify juvenile fish habitat utilization.
- 2) Collect beam trawl samples over non-reef habitats in combination with macroinfauna sampling to provide samples for gut content analysis.
- 3) Evaluate two gear types for collecting pelagic juvenile fish in support of proposed work under the NCCOS-NMS collaboration during FY03-06.
- 4) Conduct preliminary survey of distribution of benthic habitats within GRNMS.

During FE-02-09-MA, CCFHR staff piggybacked on a CCMA cruise to collect juvenile fish in combination with macroinfauna samples. At each station, three 2 m beam trawl collections were made and a CTD cast was made. Samples were preserved in 5% formalin for gut content analysis.



Palespotted eel, *Ophichthus ocellatus*

CCFHR work was planned for nighttime only. The weather during this cruise limited the number of stations sampled with the beam trawl ($n=5$) (Figure 1).

During FE-02-10-BL-Leg 1, nighttime operations were devoted to beam trawl sampling and daytime operations evaluated two gear types and mapped bottom habitats within GRNMS. Beam trawl operations were as described above with the exception that samples were preserved in both 5% formalin for gut content analysis and 95% ethanol for otolith analyses.

The two gears evaluated were a 5m² Methot trawl and a 6.6' Issacs Kidd midwater trawl. Several deployments of each gear were made and their deployment and catch were compared.

Figure 1. Map showing sampling locations and sample types during FE-02-09-MA and FE-02-10 Leg 1.

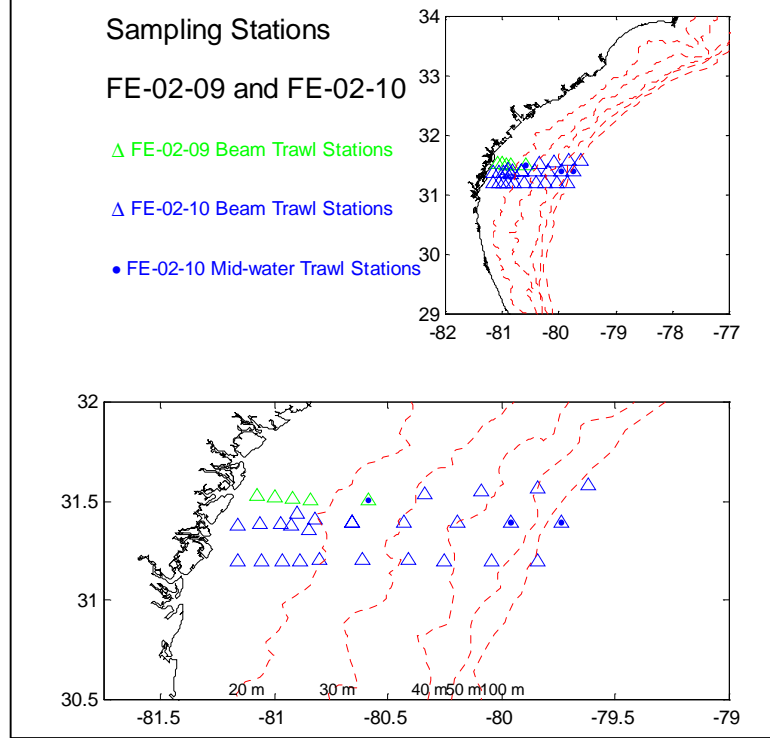


Figure 2. Seaview camera mounted on sled. Umbilical is in the foreground.

Bottom habitats were mapped using a Seaview black and white camera attached to a stainless sled (Figure 2). Several towing options were evaluated.

Cruise participants were Brian Degan (CCFHR) and Frank Hernandez (CCFHR) on FE-02-09-MA, and Jon Hare (CCFHR), Harvey Walsh (CCFHR), Katrin Marancik (CCFHR) and Greg McFall (GRNMS) on FE-02-10-BL-Leg 1.

Accomplishments

Sampling was conducted along three transects: one north of GRNMS, one through GRNMS and one south of GRNMS. (Figure 1). Sampling extended from the coast to the shelf edge. Stations sampled along the northern and central transect were also sampled for macroinfauna during FE-02-09-MA and following the cruise from small boat (CCEHBR - Jeff Hyland).

Beam Trawl - A total of 96 beam trawl tows were made at 32 sites. Sixty-six of these samples were preserved in 5% formalin for gut content work and the remaining 30 were preserved in 95% ethanol for otolith analyses. This cruise represents a completion of the fieldwork for project goal 4 and an excellent data set for addressing project goal 11. A summary of beam trawl sampling is provided in Table 1 at the end of this report.

Mid-water trawl - Two gears were evaluated for the proposed FY03-06 GRNMS project. One aspect of this proposed project is to examine juvenile habitat utilization in the water column in the vicinity of GRNMS. The concepts are similar to the examination of open sand habitat. 2 Methot trawl samples were taken and 8 Issacs Kidd midwater trawl samples were taken (Figure 3). Neither gear was satisfactory and a new gear was designed that would be appropriate if funding were available.

CTD Casts - At each station sampled a CTD cast was made. These data were processed using the SeaBird SEASOFT software and

cross-shelf profiles were developed (Figure 4). These data add to the CTD data collected for the area and will be analyzed in combination with the beam trawl samples to lead to a better understanding of juvenile fish habitat utilization on the Georgia shelf.

Habitat Mapping - Eight hundred and seventy one minutely observations were made over three days. Seven habitat types were defined. In all, 62% of the observations were



Figure 3. Deployment of the Issacs Kidd midwater trawl.

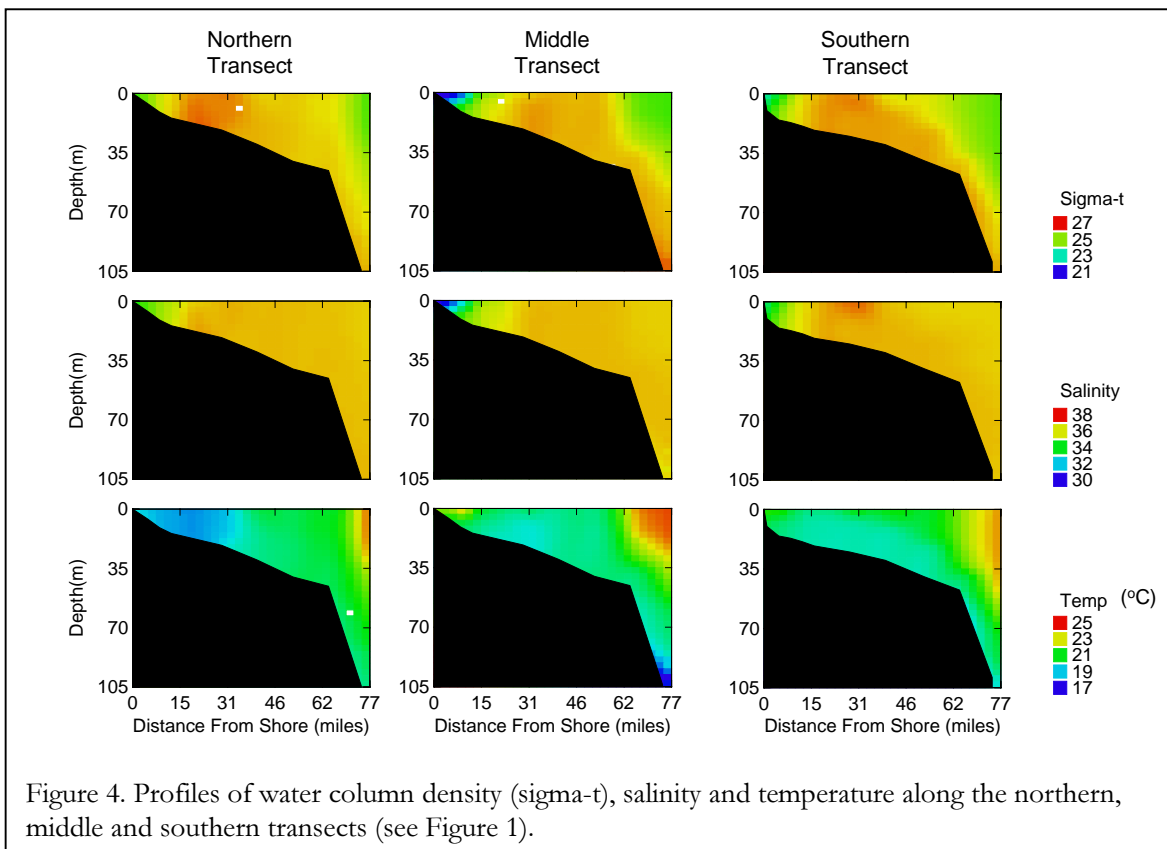
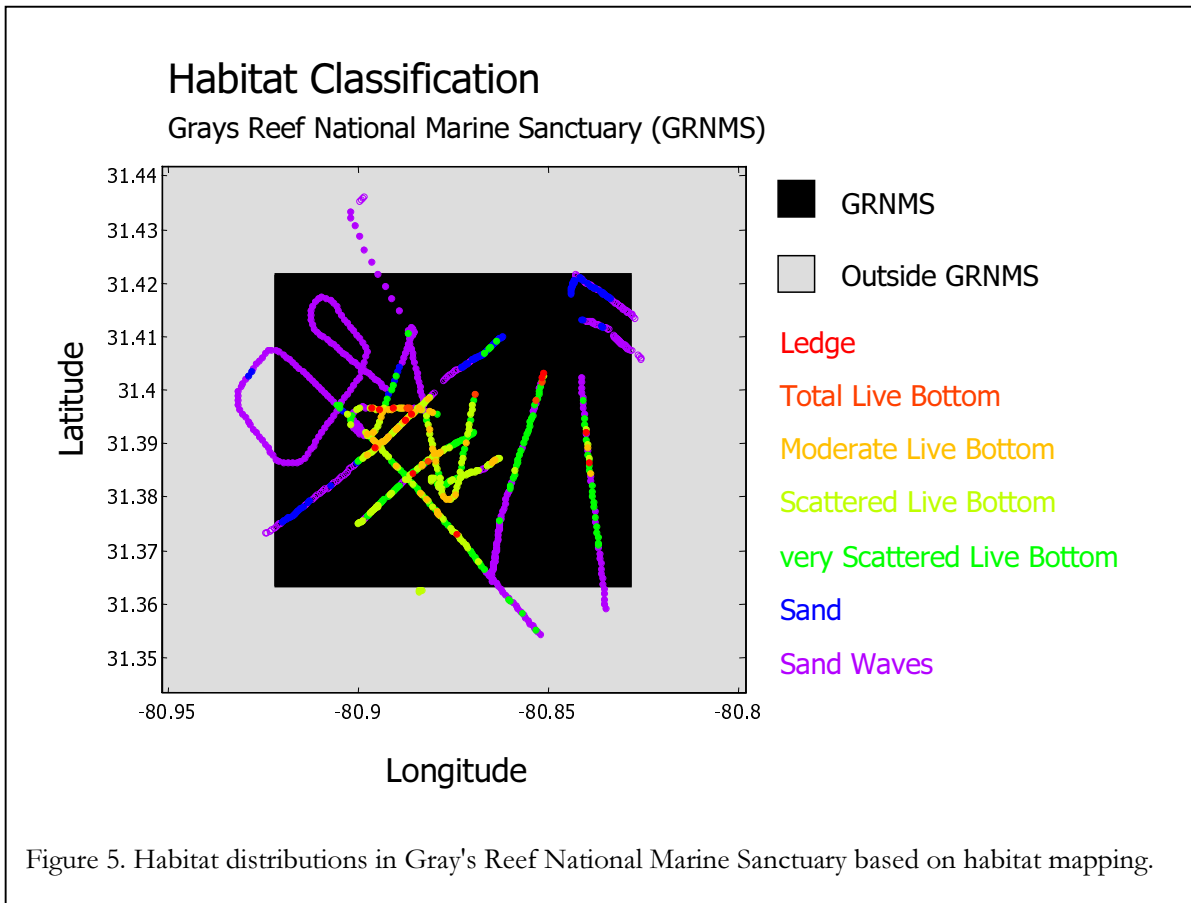


Figure 4. Profiles of water column density (sigma-t), salinity and temperature along the northern, middle and southern transects (see Figure 1).

of sand or sand waves. Very sparse and sparse live bottom accounted for another ~34% of observations and moderate live bottom, total live bottom and ledge accounted for ~4% of the observations.

Habitat observations were geo-referenced using the ship's GPS. The resulting habitat map shows the northeast and northwest corners to be largely sand (Figure 5). Ledge habitat was found in the center of GRNMS and to a lesser extent in the eastern central portion. Live bottom habitat was defined in the southern central region.



Acknowledgements

We are grateful to the officers and crew of the NOAA Ship FERREL. Jeff Hyland of the CEHBR allowed us shiptime on FE-02-09-MA. Mark Fonseca and Don Field of the Applied Spatial Ecology and Habitat Characterization Team of CCFHR loaned us the camera sled for habitat mapping. Jason Rogers of Cape Fear Community College loaned use the Issaccs Kidd midwater trawl for evaluation. All pictures were taken by Greg McFall of GRNMS.

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Table 1. List of stations sampled and gear used.

Cruise	Station	Rep	Day	Month	Year	Gear	CTD	Pres.
FE-02-09-MA	22	1	6	4	2002	2M Beam trawl	yes	5%Form
FE-02-09-MA	22	2	6	4	2002	2M Beam trawl		5%Form
FE-02-09-MA	22	3	6	4	2002	2M Beam trawl		5%Form
FE-02-09-MA	23	1	6	4	2002	2M Beam trawl	yes	5%Form
FE-02-09-MA	23	2	6	4	2002	2M Beam trawl		5%Form
FE-02-09-MA	23	3	6	4	2002	2M Beam trawl		5%Form
FE-02-09-MA	24	1	6	4	2002	2M Beam trawl	yes	5%Form
FE-02-09-MA	24	2	6	4	2002	2M Beam trawl		5%Form
FE-02-09-MA	24	3	6	4	2002	2M Beam trawl		5%Form
FE-02-09-MA	25	1	5	4	2002	2M Beam trawl	yes	5%Form
FE-02-09-MA	25	2	5	4	2002	2M Beam trawl		5%Form
FE-02-09-MA	25	3	5	4	2002	2M Beam trawl		5%Form
FE-02-09-MA	35	1	5	4	2002	2M Beam trawl	yes	5%Form
FE-02-09-MA	35	2	5	4	2002	2M Beam trawl		5%Form
FE-02-09-MA	35	3	5	4	2002	2M Beam trawl		5%Form
FE-02-10-BL-Leg1	35	1	12	4	2002	5M Methot	no	5%Form
FE-02-10-BL-Leg1	35	2	12	4	2002	5M Methot	no	5%Form
FE-02-10-BL-Leg1	35	1	12	4	2002	Issacs-Kidd	no	5%Form
FE-02-10-BL-Leg1	35	2	12	4	2002	Issacs-Kidd	no	5%Form
FE-02-10-BL-Leg1	36	1	12	4	2002	2M Beam trawl	yes	5%Form
FE-02-10-BL-Leg1	36	2	12	4	2002	2M Beam trawl		5%Form
FE-02-10-BL-Leg1	36	3	12	4	2002	2M Beam trawl		5%Form
FE-02-10-BL-Leg1	37	1	12	4	2002	2M Beam trawl	yes	5%Form
FE-02-10-BL-Leg1	37	2	12	4	2002	2M Beam trawl		5%Form
FE-02-10-BL-Leg1	37	3	12	4	2002	2M Beam trawl		5%Form
FE-02-10-BL-Leg1	38	1	13	4	2002	2M Beam trawl	yes	5%Form
FE-02-10-BL-Leg1	38	2	13	4	2002	2M Beam trawl		5%Form
FE-02-10-BL-Leg1	38	3	13	4	2002	2M Beam trawl		5%Form
FE-02-10-BL-Leg1	39	1	13	4	2002	2M Beam trawl	yes	5%Form
FE-02-10-BL-Leg1	39	2	13	4	2002	2M Beam trawl		5%Form
FE-02-10-BL-Leg1	39	3	13	4	2002	2M Beam trawl		5%Form
FE-02-10-BL-Leg1	43	1	13	4	2002	2M Beam trawl	yes	5%Form
FE-02-10-BL-Leg1	43	2	13	4	2002	2M Beam trawl		5%Form
FE-02-10-BL-Leg1	43	3	13	4	2002	2M Beam trawl		5%Form
FE-02-10-BL-Leg1	43	1	13	4	2002	Issacs-Kidd	no	5%Form
FE-02-10-BL-Leg1	43	2	13	4	2002	Issacs-Kidd	no	5%Form
FE-02-10-BL-Leg1	43	3	13	4	2002	Issacs-Kidd	no	5%Form
FE-02-10-BL-Leg1	44	1	13	4	2002	2M Beam trawl	yes	5%Form
FE-02-10-BL-Leg1	44	2	13	4	2002	2M Beam trawl		5%Form
FE-02-10-BL-Leg1	44	3	13	4	2002	2M Beam trawl		5%Form
FE-02-10-BL-Leg1	44	1	13	4	2002	Issacs-Kidd	no	5%Form
FE-02-10-BL-Leg1	44	2	13	4	2002	Issacs-Kidd	no	5%Form
FE-02-10-BL-Leg1	44	3	13	4	2002	Issacs-Kidd	no	5%Form
FE-02-10-BL-Leg1	40	1	14	4	2002	2M Beam trawl	yes	5%Form
FE-02-10-BL-Leg1	40	2	14	4	2002	2M Beam trawl		5%Form
FE-02-10-BL-Leg1	40	3	14	4	2002	2M Beam trawl		5%Form
FE-02-10-BL-Leg1	41	1	14	4	2002	2M Beam trawl	yes	5%Form
FE-02-10-BL-Leg1	41	2	14	4	2002	2M Beam trawl		5%Form
FE-02-10-BL-Leg1	41	3	14	4	2002	2M Beam trawl		5%Form
FE-02-10-BL-Leg1	42	1	14	4	2002	2M Beam trawl	yes	5%Form
FE-02-10-BL-Leg1	42	2	14	4	2002	2M Beam trawl		5%Form
FE-02-10-BL-Leg1	42	3	14	4	2002	2M Beam trawl		5%Form
FE-02-10-BL-Leg1	56	1	14	4	2002	2M Beam trawl	yes	EtOH
FE-02-10-BL-Leg1	56	2	14	4	2002	2M Beam trawl		EtOH
FE-02-10-BL-Leg1	56	3	14	4	2002	2M Beam trawl		EtOH
FE-02-10-BL-Leg1	57	1	14	4	2002	2M Beam trawl	yes	EtOH
FE-02-10-BL-Leg1	57	2	14	4	2002	2M Beam trawl		EtOH
FE-02-10-BL-Leg1	57	3	14	4	2002	2M Beam trawl		EtOH
FE-02-10-BL-Leg1	53	3	15	4	2002	2M Beam trawl		EtOH
FE-02-10-BL-Leg1	53	1	15	4	2002	2M Beam trawl	yes	EtOH
FE-02-10-BL-Leg1	53	2	15	4	2002	2M Beam trawl		EtOH
FE-02-10-BL-Leg1	54	1	15	4	2002	2M Beam trawl	yes	EtOH
FE-02-10-BL-Leg1	54	2	15	4	2002	2M Beam trawl		EtOH

Cruise	Station	Rep	Day	Month	Year	Gear	CTD	Pres.
FE-02-10-BL-Leg1	55	1	15	4	2002	2M Beam trawl	yes	EtOH
FE-02-10-BL-Leg1	55	2	15	4	2002	2M Beam trawl		EtOH
FE-02-10-BL-Leg1	55	3	15	4	2002	2M Beam trawl		EtOH
FE-02-10-BL-Leg1	58	1	15	4	2002	2M Beam trawl	yes	EtOH
FE-02-10-BL-Leg1	58	2	15	4	2002	2M Beam trawl		EtOH
FE-02-10-BL-Leg1	58	3	15	4	2002	2M Beam trawl		EtOH
FE-02-10-BL-Leg1	59	1	15	4	2002	2M Beam trawl	yes	EtOH
FE-02-10-BL-Leg1	59	2	15	4	2002	2M Beam trawl		EtOH
FE-02-10-BL-Leg1	59	3	15	4	2002	2M Beam trawl		EtOH
FE-02-10-BL-Leg1	59	4	15	4	2002	2M Beam trawl		EtOH
FE-02-10-BL-Leg1	2.1	3	16	4	2002	2M Beam trawl		5%Form
FE-02-10-BL-Leg1	2.1	1	16	4	2002	2M Beam trawl	yes	5%Form
FE-02-10-BL-Leg1	2.1	2	16	4	2002	2M Beam trawl		5%Form
FE-02-10-BL-Leg1	2.3	1	16	4	2002	2M Beam trawl	yes	5%Form
FE-02-10-BL-Leg1	2.3	2	16	4	2002	2M Beam trawl		5%Form
FE-02-10-BL-Leg1	2.3	3	16	4	2002	2M Beam trawl		5%Form
FE-02-10-BL-Leg1	27	1	16	4	2002	2M Beam trawl	yes	5%Form
FE-02-10-BL-Leg1	27	2	16	4	2002	2M Beam trawl		5%Form
FE-02-10-BL-Leg1	27	3	16	4	2002	2M Beam trawl		5%Form
FE-02-10-BL-Leg1	40	1	16	4	2002	2M Beam trawl	yes	5%Form
FE-02-10-BL-Leg1	40	2	16	4	2002	2M Beam trawl		5%Form
FE-02-10-BL-Leg1	40	3	16	4	2002	2M Beam trawl		5%Form
FE-02-10-BL-Leg1	50	1	16	4	2002	2M Beam trawl	yes	EtOH
FE-02-10-BL-Leg1	50	2	16	4	2002	2M Beam trawl		EtOH
FE-02-10-BL-Leg1	50	3	16	4	2002	2M Beam trawl		EtOH
FE-02-10-BL-Leg1	51	1	16	4	2002	2M Beam trawl	yes	EtOH
FE-02-10-BL-Leg1	51	2	16	4	2002	2M Beam trawl		EtOH
FE-02-10-BL-Leg1	51	3	16	4	2002	2M Beam trawl		EtOH
FE-02-10-BL-Leg1	52	1	16	4	2002	2M Beam trawl	yes	EtOH
FE-02-10-BL-Leg1	52	2	16	4	2002	2M Beam trawl		EtOH
FE-02-10-BL-Leg1	52	3	16	4	2002	2M Beam trawl		EtOH
FE-02-10-BL-Leg1	2.2	1	17	4	2002	2M Beam trawl	yes	5%Form
FE-02-10-BL-Leg1	2.2	2	17	4	2002	2M Beam trawl		5%Form
FE-02-10-BL-Leg1	2.2	3	17	4	2002	2M Beam trawl		5%Form
FE-02-10-BL-Leg1	2.4	1	17	4	2002	2M Beam trawl	yes	5%Form
FE-02-10-BL-Leg1	2.4	2	17	4	2002	2M Beam trawl		5%Form
FE-02-10-BL-Leg1	2.4	3	17	4	2002	2M Beam trawl		5%Form
FE-02-10-BL-Leg1	28	1	17	4	2002	2M Beam trawl	yes	5%Form
FE-02-10-BL-Leg1	28	2	17	4	2002	2M Beam trawl		5%Form
FE-02-10-BL-Leg1	28	3	17	4	2002	2M Beam trawl		5%Form
FE-02-10-BL-Leg1	29	1	17	4	2002	2M Beam trawl	yes	5%Form
FE-02-10-BL-Leg1	29	2	17	4	2002	2M Beam trawl		5%Form
FE-02-10-BL-Leg1	29	3	17	4	2002	2M Beam trawl		5%Form