

28 May 2003

CRUISE RESULTS

NOAA FRV DELAWARE II
Cruise No. DE 03-02 (Parts I-II)
Winter Bottom Trawl Survey

CRUISE PERIOD AND AREA

The cruise period was from 4 February-1 March 2003. The cruise was conducted in two parts: Part I was during 4-14 February and Part II was during 19 February-1 March. The area of operations was from Cape Hatteras to Georges Bank. Station locations are shown in (Figure 1).

OBJECTIVES

The objectives of the cruise were to: (1) determine the winter distribution, relative abundance, and biodiversity of fish and invertebrate species found on the continental shelf; (2) collect biological samples for age determinations and growth studies, fecundity, maturity, and feeding ecology; (3) collect hydrographic and meteorological data; (4) collect samples of ichthyoplankton and zooplankton for relative abundance and distribution studies; (5) collect data and samples for cooperative researchers and programs; (6) test a new acoustic trawl mensuration package.

METHODS

Operations and gear used during Parts I-II conformed with the Cruise Instructions for the winter bottom trawl survey dated 31 December 2002, ADDENDUM NUMBER 1 dated 3 February, 2003; and ADDENDUM NUMBER 2 dated 19 February with the following exceptions: Part I left one day later than originally scheduled due to mechanical problems; Part II left one day later than scheduled due to inclement weather; On 21 February, two scientists were disembarked via US Coast Guard (Cape May, NJ; one scientist was injured); On 26 February, an ill scientist was disembarked and transported to Woods Hole, MA, by the US Coast Guard (Menemsha, MA).

A 30-minute tow was made at each station with a Northeast Fisheries Science Center (NEFSC) standard 36 Yankee net ("flatfish" net) that was

rigged with a rubber disc-covered chain sweep, 13 floats and 55 meter ground cables. Standard NEFSC polyvalent trawl doors were used. The trawl was fished at a scope of 4:1 in waters between 18 and 27 meters (m), 3:1 in depths between 28 and 183 m, and 2.5:1 in depths of 184 m and greater. Towing speed was primarily determined using DGPS instrumentation. Direction of the tow was generally toward the next station.

During Part II of the survey, a new acoustic trawl mensuration system was tested. The system consisted of three sensors (including trawl door sensors and a symmetry sensor that was mounted on the headrope) that were deployed to test sensor performance and collect qualitative data on gear performance.

After each tow, the catch was sorted by species and weighed (nearest 0.001 kg) using motion compensated digital scales. Representative length frequencies were collected for all species caught. All catch and biological data were recorded using shipboard automated data entry systems. The Fisheries Scientific Computing System (FSCS) was used to record all biological data. This system uses digital scales, electronic measuring boards, touch screen displays and barcode scanners to record data on deck and archives the data on the ship's computer network.

Sampled fish were assigned individual identification numbers, measured, weighed to the nearest 0.001 kilogram (kg) and further sampled for age and growth and feeding ecology studies. Bony fish were measured to the nearest centimeter (cm) to the end of the central caudal ray; biological samples were collected concurrently with measuring operations (Table 1). Sharks and skates were measured to the end of the caudal fin (total length). Disk width was measured for rays. Lobsters were measured in millimeters (mm) from the posterior edge of the eye socket to the end of the carapace; the presence or absence of a V-notch was also noted. Crabs were measured across the carapace width (cm). Shell height was measured in (cm) for selected bivalves. Additional collections were obtained for various scientists (Table 2). The remainder of the catch (miscellaneous invertebrates, shells, substrate, et cetera) was described by volume.

Surface temperatures were measured using the hull-mounted temperature sensor at a depth of three meters. Temperature and conductivity profiles were made using a conductivity, temperature, depth instrument (CTD) system. A bottom salinity sample was obtained twice each day to calibrate the CTD. Water samples were also taken for fluorometer calibrations.

Samples of fish eggs and larvae were collected at selected stations. Plankton sampling gear consisted of a 61 cm bongo frame fitted with 0.333 mm mesh nets. Digital flow meters were suspended within the mouths of the bongo frame to estimate water volume filtered. The net was towed at 2.8-3.7 kilometers/hour (1.5-2.0 knots). A CTD was deployed at each plankton station.

CRUISE RESULTS

During the survey, 107 stations were occupied with 49 and 58 stations completed on Parts I and II respectively. Net mensuration data was recorded on 54 stations. Standard NEFSC plankton tows were made at 39 stations. Bottom temperatures were collected at 107 stations using the CTD system. Bottom water samples for CTD calibration were taken on 20 stations.

Tables 1 and 2 list the major samples collected for various studies.

DISPOSITION OF SAMPLES AND DATA

Age and growth samples, feeding ecology data, samples, maturity data, trawl catch data, and hydrographic data will be analyzed at the NEFSC Woods Hole, Massachusetts Laboratory. The various collections were forwarded to the individuals listed in Table 2.

Resulting data will be audited, edited, and loaded into the NEFSC trawl survey database.

SCIENTIFIC PERSONNEL

National Marine Fisheries Service, NEFSC, Woods Hole, MA

Nancy McHugh, Chief Scientist¹
 Wendy Gabriel, Chief Scientist²
 Laurence Brady²
 Peter Chase¹
 John Galbraith¹
 Paul Kostovick¹
 David Mountain¹
 Victor Nordahl²
 Chris Pickett² (2/19-21)
 Stacy Rowe²
 Katherine Sosebee¹
 Mark Terceiro¹
 Amy VanAtten²

National Marine Fisheries Service, NWFSC, Newport, OR

Erica Fruh¹

National Marine Fisheries Service, NWFSC, Seattle, WA

Victor Simon¹

National Marine Fisheries Service, NERO, New Bedford, MA
Steve Kelly² (2/19-26)

Virginia Institute of Marine Science, Gloucester Point, VA
Roy Pemberton¹

Stony Brook University, Stony Brook, NY
Mary Hunsicker¹

SCANMAR Inc., Asgardstrand, Norway
Bjarni Sveinsson²

Teacher-at Sea
Janna Greenhalgh¹ Westerly, RI

Contractors
Laurel Col² Woods Hole, MA
Ellen Johnson^{1,2} Robbinston, ME
Sean Lucey² Hyannis, MA
Brian Smith² Woods Hole, MA

Volunteers
Forrest Kennedy¹ Nantucket, MA
Mike Petipas² Gilford, NH
Laurence Van Atten² Shrewsbury, MA

¹ = 4-14 February
² = 19 February-1 March

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Table 1. Field observations and samples collected for feeding ecology, and age and growth studies on FRV DELAWARE II, Cruise 03-02 (I-II), Winter Bottom Trawl Survey, during 4 February-1 March 2003.

Species	Feeding Ecology Observations	Age and Growth Samples
American shad	21	-
Atlantic cod	6	7
Atlantic herring	63	195
Atlantic mackerel	61	159
Bank sea bass	-	1
Barndoor skate	29	-
Blackbelly rosefish	20	-
Black sea bass	159	502
Blueback herring	15	-
Bluefish	4	-
Butterfish	75	4
Clearnose skate	2	-
Fawn cusk-eel	23	-
Fourspot flounder	201	-
Goosefish	250	424
Haddock	4	4
Little skate	154	-
Longhorn sculpin		30
Ocean pout	43	-
Offshore hake	49	128
Red hake	45	43
Rockfish	-	12
Rosette skate	55	-
Scup	49	101
Sea raven	12	-
Silver hake	95	3
Smooth dogfish	118	-
Spiny dogfish	330	-
Spotted hake	163	10
Striped bass	3	3
Summer flounder	410	1,064
Weakfish	4	6
White hake	5	-
Windowpane	108	252
Winter flounder	31	50
Winter skate	101	-
Witch flounder	95	7
Yellowtail flounder	60	98
TOTALS	2,893	3,034

Table 2. Miscellaneous scientific collections made on FRV
 DELAWARE II, Cruise 03-02 (I-II), Winter Bottom Trawl
 Survey, during 4 February- 1 March 2003.

Investigator & Affiliation	Samples Saved	Approximate Number
Aquarium, NMFS, NEFSC, Woods Hole, MA.	Atl. herring	12 bags
John Burnett, NMFS, NEFSC, Woods Hole, MA	Winter flounder	3 indiv.
Peter Chase, NMFS, NEFSC, Woods Hole, MA	Various species for maturity workshop	83 indiv.
Bruce Collette, NMFS Nat'l Systematics Lab Washington, DC	Various species	12 indiv.
John Galbraith, NMFS, NEFSC, Woods Hole, MA	Misc. species	421 indiv.
Devora Hart, NMFS, NEFSC, Woods Hole, MA	Brown rock shrimp Butterfish Summer fldr.	1 bag 1 indiv. 1 indiv.
Josef Idoine, NMFS, NEFSC, Woods Hole, MA	Shrimp American lobster	1 bag 2 indiv.
Charles Keith, NMFS, NEFSC Woods Hole, MA	Atlantic hagfish	21 indiv.
Nancy McHugh, NMFS, NEFSC, Woods Hole, MA	Various species	34 indiv.
Loretta O'Brien, NMFS, NEFSC, Woods Hole, MA	Atlantic cod	6 indiv.
Roy Pemberton, Virginia Institute of Marine Science Gloucester Point, VA	Black sea bass	5 indiv.
Katherine Sosebee, NMFS, NEFSC, Woods Hole, MA	Various skates Vertebrae	892 exam. 747 indiv.

Table 2. (continued).

Investigator & Affiliation	Samples Saved	Approximate Number
Michael Tork, NMFS, NEFSC, Woods Hole, MA	Various species	210 indiv.
Susan Wigley, NMFS, NEFSC, Woods Hole, MA	Witch flounder	28 indiv.
John Ziskowski, NMFS, NEFSC, Milford, CT	Summer Flounder	6 indiv.

Figure 1. Station locations on FRV DELAWARE II, Cruise 03-02 (I-II), Winter Bottom Trawl Survey, during 4 February-1 March 2003.