



UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Northeast Fisheries Science Center
166 Water Street
Woods Hole, MA 02543-1026

November 28, 2011

CRUISE RESULTS

NOAA FSV *Henry B. Bigelow*
Cruise No. HB 11-02 (Parts I - V)
Spring Bottom Trawl Survey

CRUISE PERIOD AND AREA

The cruise period was from 1 March to 12 May 2011 and was conducted in 5 parts: part I was from 1-17 March; part II, 21-31 March; part III, 6-14 April; part IV, 19-29 April; and part V, 3-12 May. The area of operation was the continental shelf from Cape Lookout, NC, to the Nova Scotia Shelf, including Georges Bank and the Gulf of Maine. Station locations are shown in Figures 1 and 2.

OBJECTIVES

The objectives of the cruise were to: (1) determine the seasonal 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, 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) conduct a hydroacoustic survey between stations and (7) test FSCS 2.0 with basket tracking and other additional features.

METHODS

Operations and gear used during HB 11-02, parts I-V conformed with the Cruise Instructions for the Spring Bottom Trawl Survey dated 4 February 2011, Addendum I dated 23 February 2011, Addendum II dated 7 March 2011, Addendum III dated 23 March 2011, Addendum IV dated 5 April 2011, and Addendum V dated 20 April 2011. Exceptions to the Cruise Instructions were: part I did not begin to work on the bottom trawl survey stations (1 Mar) until after the calibration part of the cruise (28 Feb – 1 Mar) and Part III was delayed one day due to unfavorable weather conditions.

A 20-minute survey trawl haul was made at each pre-selected station. The standard towing speed was 3.0 knots, speed over ground. The scope ratio used varied with depth and was determined by the NEFSC Bottom Trawl Survey Protocol for NOAA FSV *Henry B Bigelow*. Sampling was conducted using a NEFSC standardized 400 x 12, 3 bridle survey trawl rigged with a rockhopper sweep. The trawl was fished using 2.2 meter², 550 kilogram (kg), Poly Ice Oval trawl doors and 36.6 meter (20 fathom) bridles. Net monitoring equipment was used to observe trawl

performance on all stations.

Throughout the cruise, a hydroacoustic survey was conducted during transit between bottom trawl stations using the Simrad EK-60 system.

After each tow, the catch was sorted by species and weighed using motion compensated digital scales. Representative length frequencies were collected for all species caught. All catch and biological data were recorded using the shipboard automated data entry system, Fisheries Scientific Computing System (FSCS). 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 kg and further sampled for age and growth studies. Bony fish were measured to the nearest centimeter (cm) to the end of the central caudal ray (fork length); 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. The remainder of the catch (miscellaneous invertebrates, shells, substrate, et cetera) was also recorded.

Surface temperatures were measured using the hull-mounted temperature sensor at a depth of three meters. Temperature and conductivity profiles were made at each survey trawl station using a conductivity, temperature, and depth (CTD) system. Bottom salinity samples were obtained 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 flowmeters were suspended within the mouths of the bongo frame to estimate water volume filtered. The net was towed at 2.8-3.8 kilometers/hour (1.5-2.0 knots). A CTD was deployed at each plankton station.

The goal of FSCS testing was to identify software bugs and work flow issues in a 'real-world' environment.

RESULTS

The HB 11-02 survey sampled at 372 stations with 134, 67, 55, 65, and 51 stations completed on parts I-V, respectively.

Standard plankton tows were made at 90 stations. Bottom temperatures were collected at 355 stations using the CTD system. Bottom water samples for CTD calibration were taken at 76 stations.

A total of 9,793 feeding ecology and 13,879 age and growth samples were collected from 54 species (Table 1). A total of 8,228 samples were collected to support 26 internal and external

investigations (Table 2).

DISPOSITION OF SAMPLES AND DATA

Age and growth samples, maturity data, trawl catch data, and hydrographic data will be analyzed at the NEFSC Woods Hole, MA 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

John Galbraith, Chief Scientist ^{1,4,5}	Chad Keith ⁵
Sean Lucey, Chief Scientist ³	Paul Kostovick ⁵
Kevin McIntosh, Chief Scientist ²	Kris Tholke ⁵
Robert Alexander ^{1,3}	Grace Thornton ^{2,4}
TK Arbusto ^{2,4}	Richard Raynes ⁵
Peter Chase ²	David Richardson ³
David Chevrier ^{1,4,5}	Stacy Rowe ^{2,5}
Linda Despres ³	Nancy Peltier ¹
Joshua Dayton ^{1,4}	Philip Politis ⁴
Bill Duffy ⁴	Mark Wuenschel ¹
Jonathan Duquette ^{1,5}	Brian Smith ^{2,4}
Sarah Emery ²	

National Marine Fisheries Service, NERO, Gloucester, MA

Nathan Hunt⁴
Lucille McDermott¹

Stony Brook University, Riverhead, NY

Skyler Sagarese³

University of Massachusetts, Amherst, MA

Joseph Kunkel³

University of New Hampshire, Durham, NH

Derek Sowers⁵

Contractors:

Michael Ball ³	ITS, Woods Hole, MA
Lauren Carroll ⁵	ITS, Woods Hole, MA
Nicole Charriere ^{1,2,3}	ITS, Woods Hole, MA
Ben Church ¹	ITS, Woods Hole, MA
Heath Cook ^{1,3,4,5}	ITS, Woods Hole, MA
Jakub Kircun ^{1,2,3}	ITS, Woods Hole, MA
Stephanie Palker ⁵	ITS, Woods Hole, MA
Yvonna Rowinski ²	ITS, Woods Hole, MA
Chris Sarro ³	ITS, Woods Hole, MA
Geoff Shook ^{1,2,3,4}	ITS, Woods Hole, MA
Tyler Staples ¹	ITS, Woods Hole, MA
Steve Sutton ¹	ITS, Woods Hole, MA
Emilee Towle ⁵	ITS, Woods Hole, MA

Volunteers:

Olivier Balliard ²	Pocasset, MA
Katelin Collings ⁴	Centerville, MA
Henry DeBey ⁴	Takoma Park, MD
Edward Freyfogle ³	Williamsburg, VA
Richard Groux ⁴	Belchertown, MA
Iona Hawken ⁴	Takoma Park, MD
Amanda Jensen ²	Fairlee, VT
Kevin Kelly ²	Baltimore, MD
Matthew Nuttall ³	Riverhead, NY
Neven Popovic ³	Edgewater, MD
David Shire ²	Cambridge, MA
Nathaniel Turner ⁵	Dallas, TX

¹ 1-17 Mar

² 21-31 Mar

³ 6-14 Apr

⁴ 19-29 Apr

⁵ 3-12 May

For further information contact Russell Brown, National Marine Fisheries Service, Northeast Fisheries Science Center, Woods Hole, MA 02543. Phone (508) 495-2380; FAX (508) 495-2115; Russell.Brown@noaa.gov. The Resource Survey Report for this survey and the cruise results can be viewed at: <http://www.nefsc.noaa.gov/esb/>.

Table 1: Field observations and samples collected for age and growth studies on NOAA FSV *Henry B. Bigelow*, Spring Bottom Trawl Survey, during 1 Mar – 12 May 2011.

Species	Feeding Ecology Observations	Age and Growth Samples
Acadian Redfish	223	817
American Plaice	282	767
American Shad	65	--
Atlantic Cod	253	510
Atlantic Croaker	3	7
Atlantic Halibut	10	9
Atlantic Herring	546	1880
Atlantic Mackerel	216	484
Atlantic Wolffish	10	6
Barndoor Skate	341	--
Black Sea Bass	49	147
Blackbelly Rosefish	101	--
Blueback Herring	100	--
Bluefish	16	19
Buckler Dory	6	--
Butterfish	106	450
Clearnose Skate	206	--
Cunner	14	--
Cusk	18	19
Fawn Cusk-Eel	33	--
Fourbeard Rockling	75	--
Fourspot Flounder	126	146
Goosefish	270	704
Gulf Stream Flounder	56	--
Haddock	481	874
Little Skate	844	--
Longhorn Sculpin	285	--
Moustache Sculpin	1	--
Northern Kingfish	1	--
Northern Searobin	71	--
Ocean Pout	126	114
Offshore Hake	170	177
Pollock	57	164
Red Hake	266	246
Rosette Skate	48	--
Scup	55	151
Sea Raven	114	--
Silver Hake	929	1174
Smooth Dogfish	96	--
Smooth Skate	212	--
Spiny Dogfish	373	325
Spot	5	--
Spotted Hake	82	106
Striped Bass	38	66
Striped Searobin	12	--

Table 1 (continued): Field observations and samples collected for age and growth studies on NOAA FSV *Henry B. Bigelow*, Spring Bottom Trawl Survey, during 1 Mar – 12 May 2011.

Species	Feeding Ecology Observations	Age and Growth Samples
Summer Flounder	234	885
Thorny Skate	135	--
Weakfish	9	13
White Hake	248	727
Windowpane	263	513
Winter Flounder	383	931
Winter Skate	454	--
Witch Flounder	367	769
Yellowtail Flounder	309	679
TOTALS	9,793	13,879

Table 2: Miscellaneous scientific collections made on NOAA FSV *Henry B. Bigelow*, Spring Bottom Trawl Survey, during 1 Mar – 12 May 2011.

Investigator and Affiliation	Samples Saved	Approximate Number
Badger, Danny New England Aquarium, Boston, MA	various species	63 indiv
Baumann, Hannes Stony Brook University, Stony Brook, NY	haddock	279 scale samples
Bemis, William Cornell University, Ithaca, NY	various species	42 indiv
Breton, Jonathan UMASS, Dartmouth, MA	yellowtail flounder	16 examined 103 fin clips 20 preserved
Chase, Peter NMFS, NEFSC, Woods Hole, MA	unknown invertebrates	850 indiv
Galbraith, John NMFS, NEFSC, Woods Hole, MA	unidentified/various fish	1210 indiv
Guest	various species	20 indiv
Juanes, Francis UMASS, Amherst, MA	silver hake offshore hake	28 preserved 6 preserved
Keith, Chad NMFS, NEFSC, Woods Hole, MA	Atlantic wolffish	4 examined 3 indiv 4 preserved 4 photographed
Kohler, Nancy NMFS, NEFSC, Narragansett, RI	various sharks	22 tagged
Lichti, Deborah Lake Michigan Biological Station, IL	alewife	361 indiv
Mangold, Michael US Fish and Wildlife Service, Annapolis, MD	Atlantic sturgeon	2 examined 2 tissue samples
McBride, Holly NMFS, NEFSC, Woods Hole, MA	various species	103 indiv
McBride, Richard NMFS, NEFSC, Woods Hole, MA	summer flounder winter flounder	7 examined 7 preserved 29 examined 27 preserved
Mello, Joseph NMFS, NEFSC, Woods Hole, MA	Atlantic angel shark	19 tagged
Munroe, Thomas NMFS, National Systematics Laboratory, Washington D.C.	smallmouth flounder	158 indiv
O'Brien, Loretta NMFS, NEFSC, Woods Hole, MA	Atlantic cod	162 examined
Palkovacs, Eric Duke University, Durham, NC	alewife blueback herring	1836 indiv 164 indiv
Redman, Rebecca Lake Michigan Biological Station, IL	alewife	568 indiv
Richards, Anne NMFS, NEFSC, Woods Hole, MA	blackfin monkfish	11 indiv
Smith, Brian NMFS, NEFSC, Woods Hole, MA	various species	259 preserved

Table 2 (continued): Miscellaneous scientific collections made on NOAA FSV *Henry B. Bigelow*, Spring Bottom Trawl Survey, during 1 Mar – 12 May 2011.

Investigator and Affiliation	Samples Saved	Approximate Number
Sosebee, Kathy NMFS, NEFSC, Woods Hole, MA	spiny female dogfish	97 examined
	smooth dogfish	2 examined
	rays	47 examined
	skates: little and winter	710 examined
	skates: all, except winter and little	612 examined
Sulikowski, James University of New England, Biddeford, ME	barndoor skate	13 indiv
Wigley, Susan NMFS, NEFSC, Woods Hole, MA	witch flounder	1 indiv
Wuenschel, Mark NMFS, NEFSC, Woods Hole, MA	Atlantic cod	3 examined 75 preserved
	black sea bass	20 examined 36 preserved
	haddock	91 examined 75 preserved
	white hake	1 preserved
TOTALS		8,228 samples

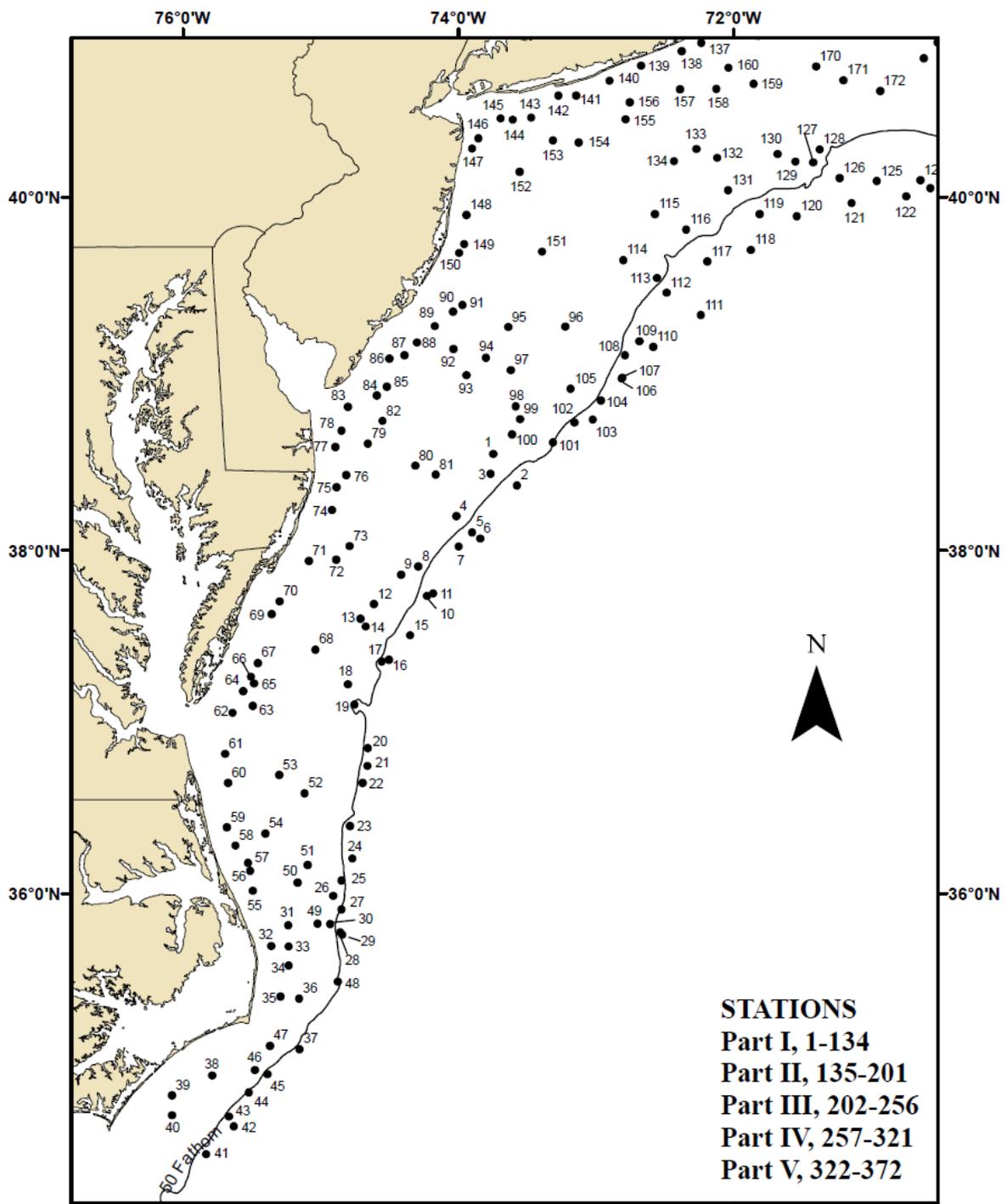


Figure 1. Trawl hauls made from NOAA FSV Henry B. Bigelow (11-02), during NOAA Fisheries Service, Northeast Fisheries Science Center spring bottom trawl survey, 1 March - 12 May 2011.

Map 1 of 2

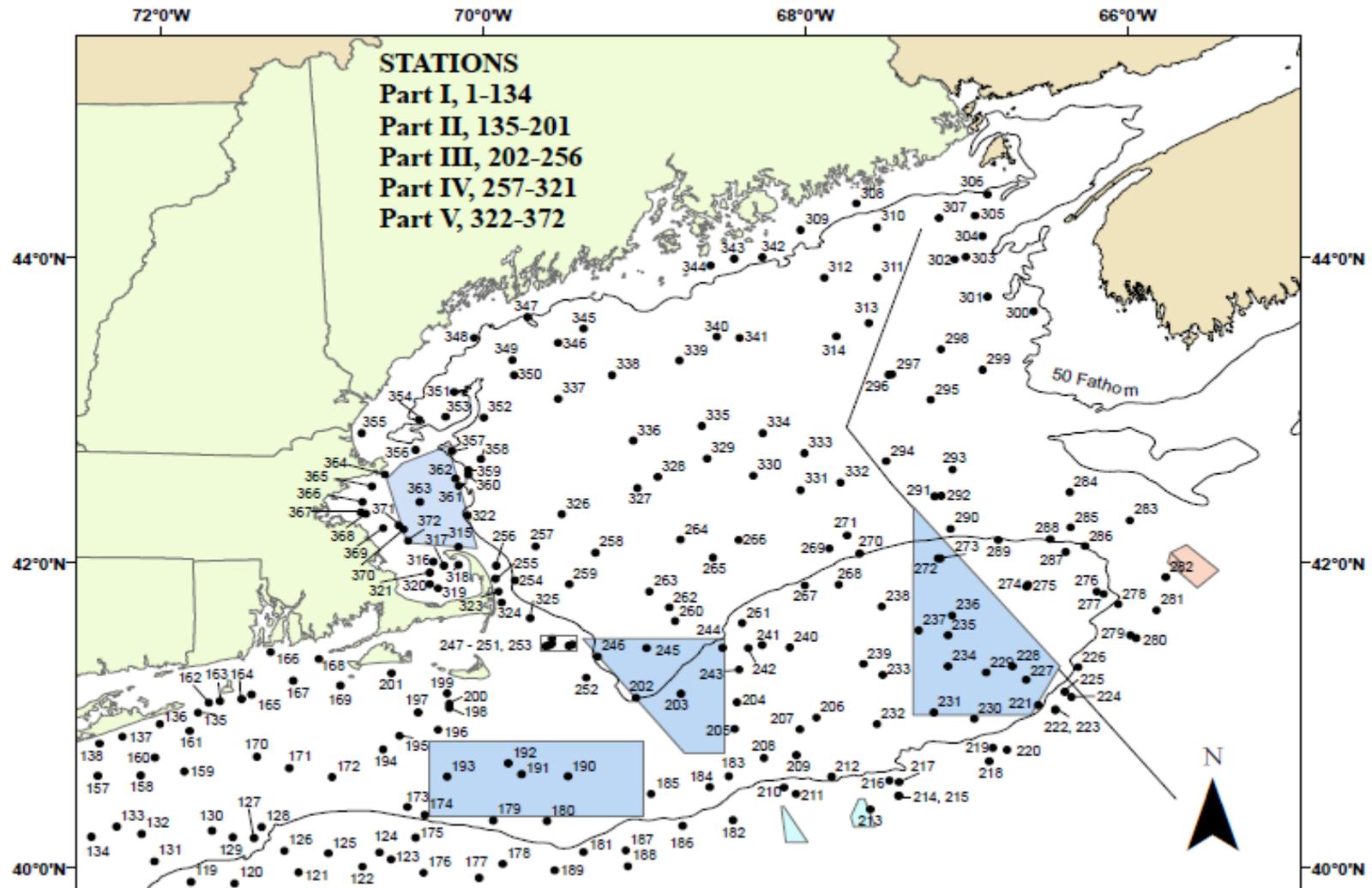


Figure 2. Trawl hauls made from NOAA FSV Henry B. Bigelow (11-02), during NOAA Fisheries Service, Northeast Fisheries Science Center fall bottom trawl survey, 1 March - 12 May 2011.