CRUISE RESULTS

NOAA Ship Henry B. Bigelow (R-225)

Cruise No. HB 13-01 (Parts I -IV)

Spring Bottom Trawl Survey

Submitted to: NOAA, NEFSC

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UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
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CRUISE PERIOD AND AREA

The HB 13-01 Bottom Trawl Survey was conducted in four parts from 4 March to 9 May 2013: part I was from 4 – 5 March and 14 – 26 March; part II, 26 March – 5 April; part III, 9 – 26 April; part IV, 30 April – 9 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 and relative abundance 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) opportunistically test trawl gear, methods, or survey related equipment that may benefit the trawl survey in the future; (4) collect oceanographic data, including CTD casts and bongo tows at select stations; (5) collect acoustic data along cruise tracks, as well as test and conduct preliminary survey operations with acoustic systems, including the EK-60 and ME-70.

METHODS

Operations and gear used during HB 13-01 parts I-IV conformed with the Cruise Instructions for the Spring Bottom Trawl Survey dated 5 February 2013, Addendum I dated 12 March 2013, Addendum II dated 13 March 2013, Addendum III dated 2 April 2013, and Addendum IV dated 18 April 2013. Exceptions to the Cruise Instructions were that part I was interrupted due to mechanical issues with the vessel and, therefore, extended to the beginning of part II; part IV also arrived two days earlier due to completion of the survey.

All survey tows were completed using the standard NEFSC bottom trawl survey protocol for NOAA Ship *Henry B. Bigelow*. 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 standard scope ratio table. Sampling was conducted using a NEFSC standardized 4-seam, 3 bridle survey trawl rigged with a rockhopper sweep. The trawl was fished using 2.2 meter^2, 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, as well as the ME-70 system.

After each tow, the catch was sorted by species and weighed using motion compensated digital scales. Representative length frequencies were collected for all caught species. All catch and biological data were recorded using the newest version of the shipboard automated data entry system, Fisheries Scientific Computing System (FSCS). This system implements basket tracking techniques and uses digital scales, electronic measuring boards, touch screen displays, and barcode scanners to record data on deck; FSCS also 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 centimeters 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. 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.

RESULTS

The HB 13-01 survey sampled at 377 stations with 104, 90, 116, and 67 stations completed on parts I-IV, respectively.

Standard plankton tows were made at 104 stations. Bottom temperatures were collected at 347 stations using the CTD system. Bottom water samples for CTD calibration were taken at 45 stations.

A total of 6,205 feeding ecology and 16,261 age and growth samples were collected from 53 species (Table 1). A total of 9,938 samples were collected to support 22 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

Peter Chase, Chief Scientist[2]
John Galbraith[3], Chief Scientist[1]
Jakub Kircun[1,2], Chief Scientist[3]
Robert Alexander[1]
TK Arbusto[2,4]
Larry Brady[1,3]
David Chevrier[1,3,4]
Kiersten Curti[2]
Joshua Dayton[1,2]
William Duffy[1,3]
Jonathan Duquette[2]
Charles Keith[3]
Nathan Keith[2]
Aubrey Justin Kirkpatrick[2]
Paul Kostovick[1]
Scott Large[2]
Heidi Marotta[4]
Matthew McPherson[4]
Michael Palmer[4]
Nancy Peltier[3]
Adam Poquette[1,3,4]
Stacy Rowe[4]
Brian Smith[1]
Laurel Smith[2]
Anthony Wood[3]
Mark Wuenschel[2]

Contractors

Heath Cook[1,3], Chief Scientist[4]	Integrated Statistics, Woods Hole, MA
Nicole Charriere[1,2,3]	Integrated Statistics, Woods Hole, MA
Samuel Chavez[2]	Integrated Statistics, Woods Hole, MA
Christine LaFleur[3]	Integrated Statistics, Woods Hole, MA
Charles Alexander Post[1]	Integrated Statistics, Woods Hole, MA
Geoffrey Shook[1,3,4]	Integrated Statistics, Woods Hole, MA
Tyler Staples[2]	Integrated Statistics, Woods Hole, MA

University of New England, Biddeford, ME
Joseph Kunkle[4]

University of North Carolina, Wilmington, NC
Nikolai Klibansky[2,4]

University of Vermont, Burlington, VT
Mitchell Jones[4]

Savannah State University, Savannah, GA
James McCullars[4]

Volunteers

Andrea Daly[3]	Oakland, CA
Robert Eckstein[1]	Rumson, NJ
Nicholas Fargnoli[1]	Wayland, MA
Edward Freyfogle[4]	Williamsburg, VA
Rowan Jacobsen[4]	East Calais, VA
Frank Nebenburgh[1]	Brick, NJ
Brian Schulman[1]	Woodstock, GA

[1] 4 – 5 March, 14 – 26 March
[2] 26 March – 5 April
[3] 9 – 26 April
[4] 30 April – 9 May

For further information contact Robert Johnston, National Marine Fisheries Service, Northeast Fisheries Science Center, Woods Hole, Massachusetts 02543-1097. Phone (508) 495-2061; FAX (508) 495-2115; Robert.Johnston@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 on NOAA Ship *Henry B. Bigelow*, Spring Bottom Trawl Survey, during 4 March to 9 May 2013.

Species	Feeding Ecology Observations	Age and Growth Samples
Acadian Redfish	58	874
American Plaice	146	831
American Shad	69	--
Atlantic Cod	149	700
Atlantic Croaker	8	108
Atlantic Halibut	14	21
Atlantic Herring	324	1729
Atlantic Mackerel	179	828
Atlantic Menhaden	10	--
Atlantic Wolffish	5	18
Barndoor Skate	154	--
Black Sea Bass	49	448
Blackbelly Rosefish	64	--
Blueback Herring	74	--
Bluefish	13	33
Buckler Dory	31	--
Butterfish	149	614
Clearnose Skate	77	--
Cunnner	47	--
Cusk	1	17
Fourspot Flounder	148	367
Goosefish	135	449
Haddock	319	1286
Little Skate	596	--
Longhorn Sculpin	260	--
Northern Kingfish	1	--
Northern Searobin	144	--
Ocean Pout	135	249
Offshore Hake	22	83
Pollock	34	165
Red Hake	230	915
Rosette Skate	70	--
Scup	47	184
Sea Raven	70	--
Silver Hake	514	1449
Smooth Dogfish	75	--
Smooth Skate	156	--
Spiny Dogfish	184	--
Spot	6	--
Spotted Hake	194	325

Table 1 (continued): Field observations and samples collected for age and growth on NOAA Ship *Henry B. Bigelow*, Spring Bottom Trawl Survey, during 4 March to 9 May 2013.

Species	**Feeding Ecology Observations**	**Age and Growth Samples**
Striped Bass	10	20
Striped Searobin	7	--
Summer Flounder	58	711
Tautog	2	--
Thorny Skate	70	--
Tilefish	2	6
Weakfish	3	61
White Hake	56	437
Windowpane	168	762
Winter Flounder	252	1157
Winter Skate	263	--
Witch Flounder	158	433
Yellowtail Flounder	195	981
TOTALS	6,205	16,261

Table 2: Miscellaneous scientific collections made on NOAA Ship *Henry B. Bigelow*, Spring Bottom Trawl Survey, during 4 March to 9 May 2013.

Investigator and Affiliation	**Samples Saved**	**Approximate Number**
Badger, Daniel New England Aquarium, Boston, MA	various species	37 indiv.
Barnhill, William NMFS, NERO, Gloucester, MA	loggerhead sea turtle	4 examined
Bemis, Katherine Cornell University, Freeville, NY	dragonets	8 indiv.
Bemis, William Cornell University, Freeville, NY	sand tiger shark	1 indiv.
Chase, Peter NMFS, NEFSC, Woods Hole, MA	unidentified invertebrates	951 samples
Di Santo, Valentina Boston University, Boston, MA	various skates	61 fin clips
Eyler, Sheila US Fish and Wildlife Service, Annapolis, MD	Atlantic sturgeon	2 examined
Galbraith, John NMFS, NEFSC, Woods Hole, MA	unidentified/various fish	4227 indiv.
Hilton, Eric Virginia Institute of Marine Science, Gloucester Point, VA	offshore hake silver hake	15 indiv. 119 indiv.
Jones, Mitchell University of Vermont, Burlington, VT	Atlantic herring	33 indiv.
Kliblansky, Nikolai University of North Carolina, Wilmington, NC	black sea bass	87 examined
Llopiz, Joel WHOI, Woods Hole, MA	various species	258 indiv.
McBride, Holly NMFS, NEFSC, Woods Hole, MA	various species	48 indiv.
Munroe, Thomas NMFS, National Systematics Laboratory, Washington DC	unidentified flatfish	731 indiv.
Niziniski, Martha NMFS, National Systematics Laboratory, Washington DC	galatheid crabs *Hippasteria* starfish	34 samples 8 indiv.
NOAA NMFS, NEFSC Woods Hole, MA	various species	8 indiv.
O'Brien, Loretta NMFS, NEFSC, Woods Hole, MA	Atlantic cod	271 indiv.
Richards, Anne NMFS, NEFSC, Woods Hole, MA	northern shirmp	151 samples
Rowe, Stacy, et al. NMFS, NEFSC, Woods Hole, MA	various species	1100 preserved 114 frozen
Sosebee, Kathy NMFS, NEFSC, Woods Hole, MA	spiny dogfish (female) rays various skates	170 examined 79 examined 1305 examined
Towle, Emily, et al. NMFS, NEFSC, Woods Hole, MA	winter flounder (males)	25 preserved
Wuenschel, Mark, et al. NMFS, NEFSC, Woods Hole, MA	Atlantic cod (female) haddock (female)	71 preserved 20 preserved

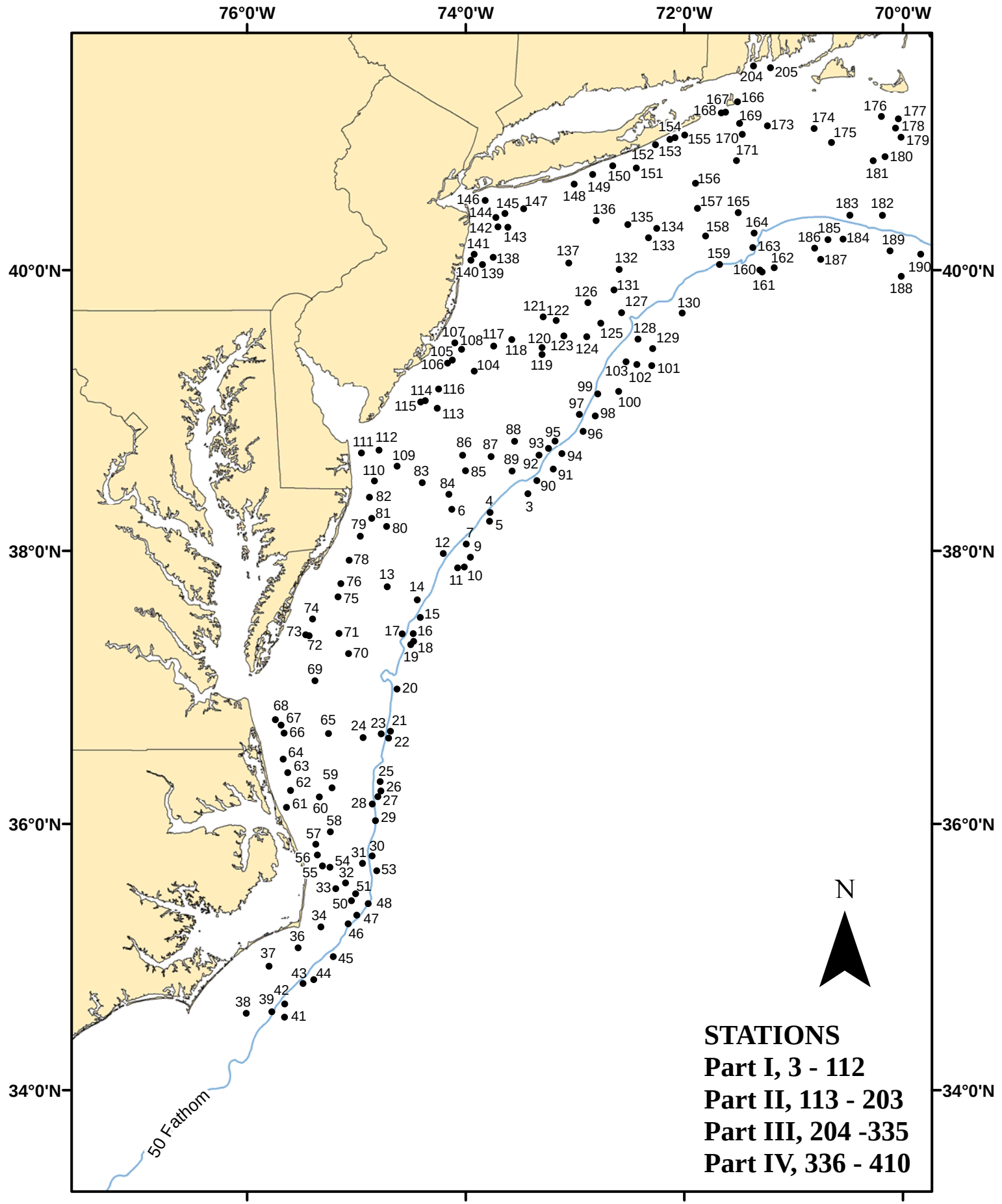

Figure 1. Trawl hauls made from NOAA Ship *Henry B. Bigelow* (13-01), during NOAA Fisheries Service, Northeast Fisheries Center Spring Bottom Trawl Survey, 4 March - 9 May 2013

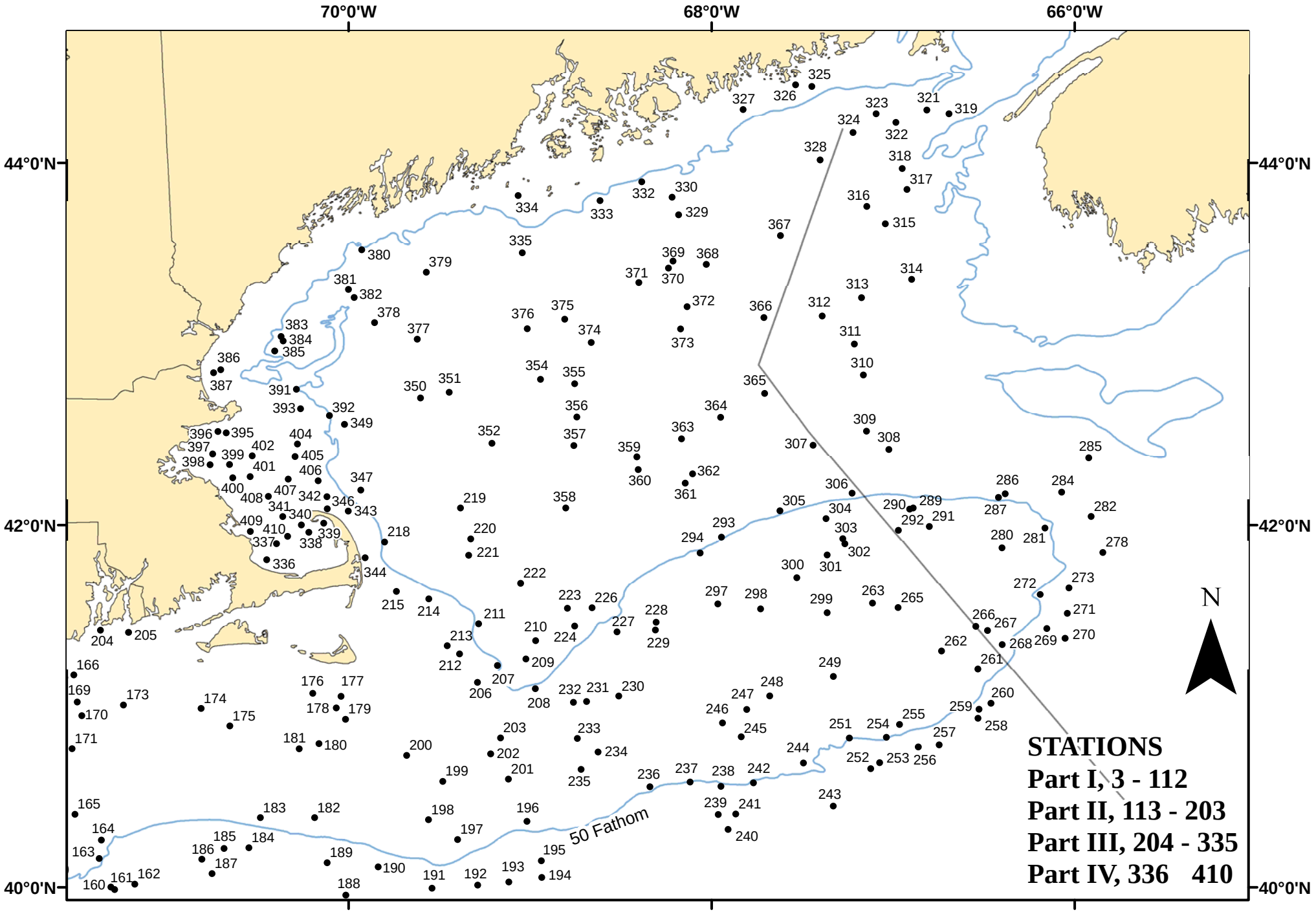

Figure 2. Trawl hauls made from NOAA Ship *Henry B. Bigelow* (13-01), during NOAA Fisheries Service, Northeast Fisheries Center Spring Bottom Trawl Survey, 4 March - 9 May 2013