CRUISE RESULTS

NOAA FSV Henry B. Bigelow
Cruise No. HB 10-05 (Parts I - VI)
Autumn 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
Northeast Fisheries Science Center
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CRUISE PERIOD AND AREA

The HB 10-05 bottom trawl survey was conducted in 6 parts from 8 September 2010 to 3 December 2010: part I was from 8 – 23 September; part II, 27 – 30 September and 2 – 7 October; part III, 12 – 15 October and 17 – 22 October; part IV, 26 October – 5 November; part V, 12 – 19 November; and part VI, 30 November – 3 December. 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; and (6) conduct a hydroacoustic survey between stations.

METHODS

Operations and gear used during HB 10-05 parts I-VI conformed with the Cruise Instructions for the Autumn Bottom Trawl Survey dated 3 August 2010, Addendum I dated 1 September 2010, Addendum II dated 15 September 2010, Addendum III dated 1 October 2010, Addendum IV dated 25 October 2010, Addendum V dated 29 October 2010, and Addendum VI dated 29 November 2010. Exceptions to the Cruise Instructions were: part II was interrupted, as vessel was in port on 1 October 2010 due to poor weather conditions; part III was also interrupted, as vessel was in port on 16 October 2010 due to poor weather conditions; part V was delayed three days, due to mechanical problems with the vessel, and extended one day; and part VI was added to complete the survey and to compensate for missed days at sea.

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 new 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 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.

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.

RESULTS

The HB 10-05 survey sampled at 374 stations with 137, 44, 58, 77, 42, and 16 stations completed on parts I-VI, respectively.

Standard plankton tows were made at 108 stations. Bottom temperatures were collected at 373 stations using the CTD system. Bottom water samples for CTD calibration were taken at 75 stations.

A total of 9,286 feeding ecology and 14,593 age and growth samples were collected from 58 species (Table 1). A total of 11,629 samples and approximately 80 kg of shrimp 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[3],Chief Scientist[1, 5, 6]
Philip Politis[5], Chief Scientist[3]
Stacy Rowe[5], Chief Scientist[2]
Robert Alexander[2, 3]
Takashi Arbusto[2, 6]
Larry Brady[1, 3, 5, 6]
Russell Brown[6]
Peter Chase[2]
David Chevrier[1, 4, 5]
Joshua Dayton[1]
Jonathan Deroba[2]
Linda Despres[5]
Sarah Emery[4]
Robert Johnston[6]
Paul Kostovick[6]
Christopher Legault[4]
Sean Lucey[3]
Kevin McIntosh[3, 5]
Victor Nordahl[5]
Michael Palmer[4]
Nancy Peltier[3]
Brian Smith[2]
Kris Tholke[5]
Grace Thornton[2]
Mark Wuenschel

National Fisheries Research & Development Institute, Korea
Dr. Jung Hwa Choi[2]

National Marine Fisheries Service, RACE, Seattle, WA
Ken Weinberg[2]

National Marine Fisheries Service, NERO, Gloucester, MA
Jillian Newman[3]

Teacher At Sea, Anderson, SC
Barbara Koch[2]

University of Massachusetts, Amherst, MA
Joseph Kunkle[3]

Volunteers

Erin Bohaboy[6]	East Falmouth, MA
Philip Cornelison[1]	Tuscaloosa, AL
Anne DeMartino[6]	Bayonne, NJ
Christopher DuBois[3]	Westbrook, ME
Kathleen Flaherty[6]	Dracut, MA
Abigail Franklin[1]	Washington, DC
Brandy Geiger[4]	Sandusky, OH
Todd Gray[4]	Seattle, WA
Liza Hernandez-Cordero[5]	Baltimore, MD
Katja Huemer[3]	Linz, Austria
Mananjo Jonahson[3]	Woods Hole, MA
Rae Miller[5]	Welches, OR
David Nielsen[5]	Pensacola, FL
Skyler Sagarese[3]	Riverhead, NY

Contractors

Heath Cook[1, 2, 5], Chief Scientist[4]	ITS, Woods Hole, MA
Nicholas Buchan[2]	ITS, Woods Hole, MA
Nicole Charriere[1]	ITS, Woods Hole, MA
Sarah Cierpich[3]	ITS, Woods Hole, MA
Ian Conboy[6]	ITS, Woods Hole, MA
Corrin Flora[1]	ITS, Woods Hole, MA
Bill Greer[1]	ITS, Woods Hole, MA
Kevin Jackson[4]	ITS, Woods Hole, MA
Amanda Kardas[5]	ITS, Woods Hole, MA
Loren Kellogg[6]	ITS, Woods Hole, MA
Jakub Kircun[1, 2, 4, 5, 6]	ITS, Woods Hole, MA
Christine LaFleur[1, 4]	ITS, Woods Hole, MA
Sandra Mataronas[2]	ITS, Woods Hole, MA
Maxwell Morgan[6]	ITS, Woods Hole, MA
Stephanie Palker[1]	ITS, Woods Hole, MA
Christopher Sarro[4]	ITS, Woods Hole, MA
Geoff Shook[1, 2, 4, 6]	ITS, Woods Hole, MA
Francine Stroman[4]	ITS, Woods Hole, MA
Stephen Sutton[4]	ITS, Woods Hole, MA

[1] 8 – 23 September
[2] 27 – 30 September, 2-7 October
[3] 12 – 15 October, 17 – 22 October
[4] 26 October – 5 November
[5] 12 – 19 November
[6] 30 November – 3 December

For further information contact Russell Brown, National Marine Fisheries Service, Northeast Fisheries Science Center, Woods Hole, Massachusetts 02543-1097. 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*, Autumn Bottom Trawl Survey, during 8 September to 3 December 2010

Species	Feeding Ecology Observations	Age and Growth Samples
Acadian Redfish	224	892
Alewife	1	---
American Plaice	227	711
American Shad	33	---
Atlantic Cod	132	544
Atlantic Croaker	111	299
Atlantic Halibut	28	26
Atlantic Herring	214	917
Atlantic Mackerel	83	200
Atlantic Sharpnose Shark	1	---
Atlantic Wolffish	3	8
Barndoor Skate	288	---
Black Sea Bass	117	314
Blackbelly Rosefish	109	---
Blueback Herring	36	---
Bluefish	134	261
Buckler Dory	53	---
Butterfish	308	1366
Clearnose Skate	238	---
Cunner	5	---
Cusk	17	18
Fawn Cusk-Eel	126	---
Fourbeard Rockling	49	---
Fourspot Flounder	223	212
Goosefish	283	638
Gulf Stream Flounder	63	---
Haddock	626	1277
Little Skate	803	---
Longhorn Sculpin	112	---
Moustache Sculpin	1	---
Northern Kingfish	23	---
Northern Searobin	226	---
Ocean Pout	56	53
Offshore Hake	160	185
Pollock	46	120
Red Hake	239	252
Rosette Skate	126	---
Scup	232	710
Sea Raven	82	---
Silver Hake	744	1019
Smooth Dogfish	118	---
Smooth Skate	243	---
Spiny Dogfish	200	168
Spot	55	---
Spotted Hake	189	149

Table 1 (continued): Field observations and samples collected for age and growth studies on NOAA FSV *Henry B. Bigelow*, Autumn Bottom Trawl Survey, during 8 September to 3 December 2010.

Species	Feeding Ecology Observations	Age and Growth Samples
Striped Bass	12	38
Striped Searobin	74	---
Summer Flounder	186	604
Tautog	1	---
Thorny Skate	158	---
Tilefish	3	3
Weakfish	60	176
White Hake	310	996
Windowpane	206	556
Winter Flounder	254	706
Winter Skate	266	---
Witch Flounder	211	442
Yellowtail Flounder	158	733
TOTALS	9,286	14,593

Table 2: Miscellaneous scientific collections made on NOAA FSV *Henry B. Bigelow*, Autumn Bottom Trawl Survey, during 8 September to 3 December 2010.

Investigator and Affiliation	**Samples Saved**	**Approximate Number**
Breton, Jonathan UMASS, Dartmouth, MA	yellowtail flounder	42 examined 71 fin clips 48 preserved
Canavin, Pete NMFS, NEFSC, Woods Hole, MA	various species	532 indiv
Chase, Peter NMFS, NEFSC, Woods Hole, MA	unknown invertebrates various species	958 indiv 312 indiv
Galbraith, John NMFS, NEFSC, Woods Hole, MA	unidentified/various fish	4,435 indiv
Guest	various species	15 indiv
Hendrickson, Lisa NMFS, NEFSC, Woods Hole, MA	*Illex* squid *Loligo* squid	47 examined 549 examined
Idoine, Joe NMFS, NEFSC, Woods Hole, MA	northern shrimp	80.216 kg
Keith, Chad NMFS, NEFSC, Woods Hole, MA	Atlantic wolffish	8 examined 8 preserved 10 indiv
Kohler, Nancy NMFS, NEFSC, Narragansett, RI	various sharks	14 tagged
Kostovick, Paul NMFS, NEFSC, Woods Hole, MA	various species	751 indiv
Kunkel, Joseph UMASS, Amherst, MA	American lobster	2 carapace samples
Lighten, Jack Dalhousie Univ., Halifax, NS, Canada	winter skates	50 fin clips
Lindemayer, Morgan UMASS, Amherst, MA	various species	45 indiv
McBride, Richard NMFS, NEFSC, Woods Hole, MA	summer flounder winter flounder	51 examined 50 preserved 61 examined 57 preserved
McElroy, David NMFS, NEFSC, Woods Hole, MA	*Illex* squid *Loligo* squid	4 indiv 5 indiv
Mello, Joseph NMFS, NEFSC, Woods Hole, MA	Atlantic angel shark	15 indiv
Milliken, Cheryl Falmouth High School, Falmouth, MA	various species	50 indiv
Munroe, Thomas NMFS, National Systematics Laboratory, Washington DC	smallmouth flounder	54 indiv
Niziniski, Martha NMFS, National Systematics Laboratory, Washington DC	Galatheid crab *Hippasteria* starfish	1243 indiv 16 indiv
O'Brien, Loretta NMFS, NEFSC, Woods Hole, MA	Atlantic cod	146 examined
Perrault, Justin Florida Atlantic University, Fort Pierce, FL	various jellyfish	21 stations
Richards, Anne NMFS, NEFSC, Woods Hole, MA	blackfin monkfish	1 indiv

Table 2 (continued): Miscellaneous scientific collections made on NOAA FSV *Henry B. Bigelow*, Autumn Bottom Trawl Survey, during 8 September to 3 December 2010.

Investigator and Affiliation	**Samples Saved**	**Approximate Number**
Smith, Brian NMFS, NEFSC, Woods Hole, MA	various species	230 indiv
Sosebee, Kathy NMFS, NEFSC, Woods Hole, MA	spiny female dogfish rays skates: little and winter skates: all, except winter and little	36 examined 157 examined 538 examined 607 examined
Stockwell, Jason GMRI, Portland, ME	alewife	171 indiv
Wuenschel, Mark NMFS, NEFSC, Woods Hole, MA	black sea bass Atlantic cod haddock	32 examined 33 preserved 36 preserved 63 examined 55 preserved
TOTALS		11,629 samples

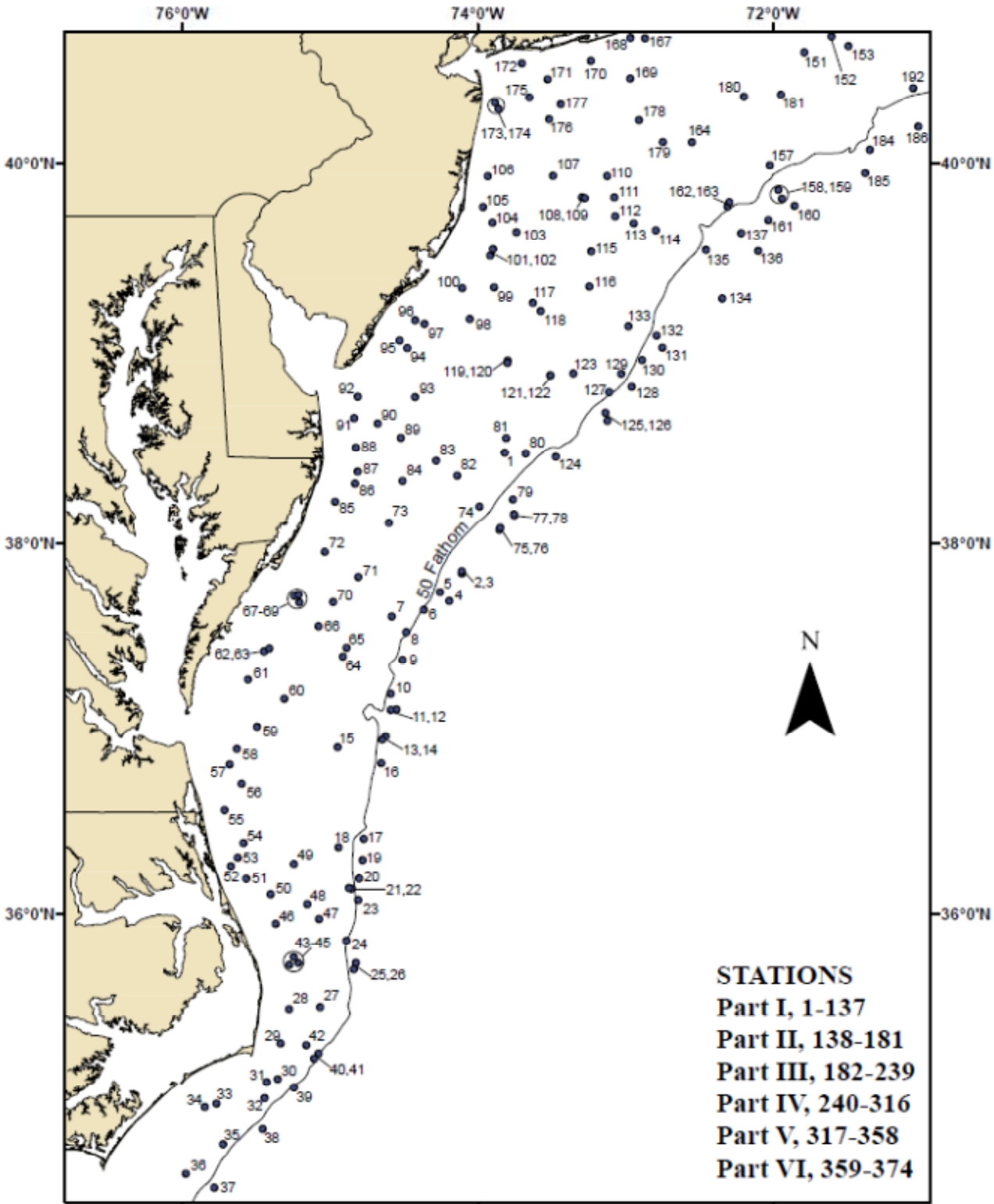

Figure 1. Trawl hauls made from NOAA FSV Henry B. Bigelow (10-05), during NOAA Fisheries Service, Northeast Fisheries Science Center autumn bottom trawl survey, 8 September - 3 December 2010.
Map 1of 2

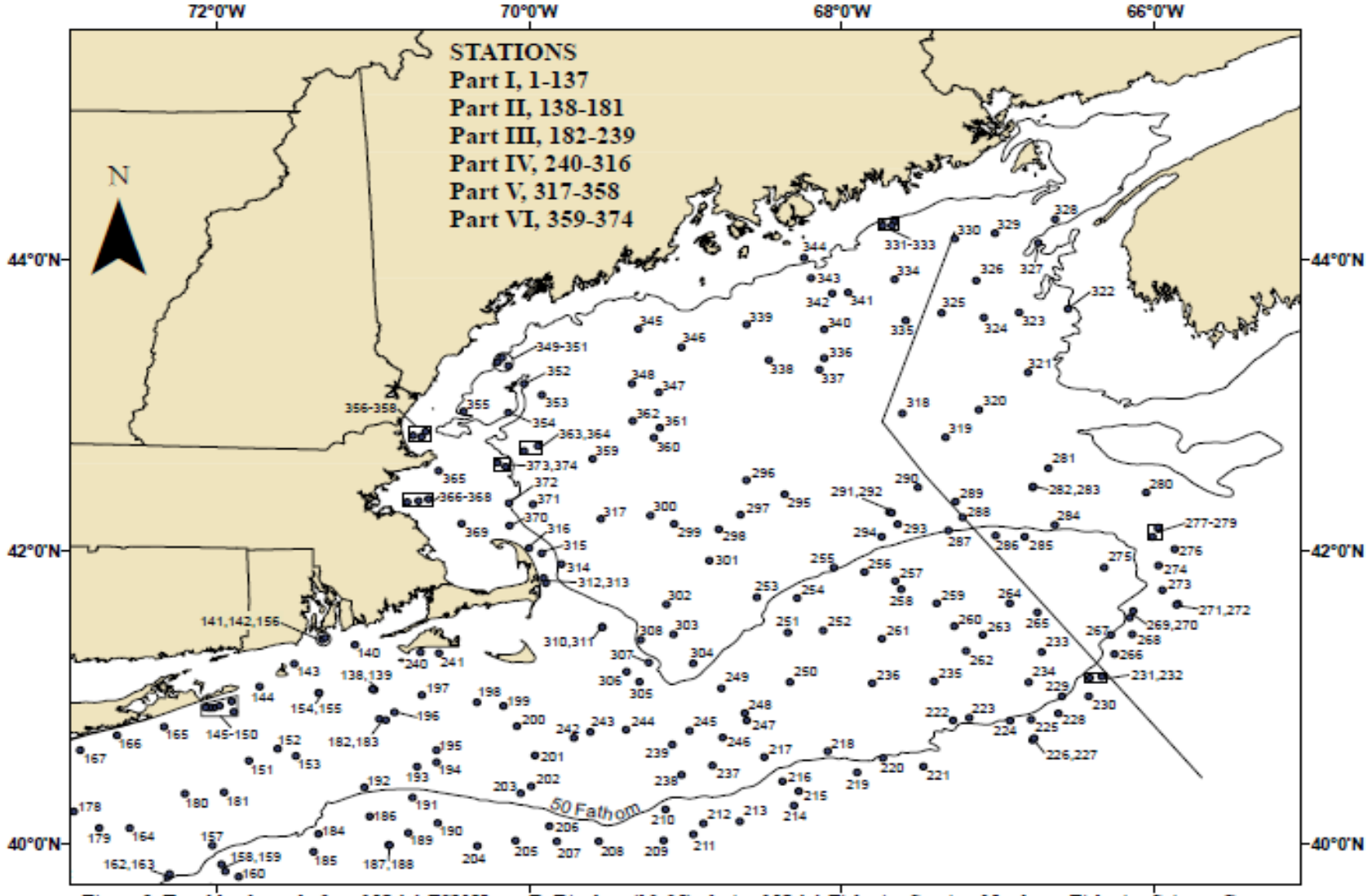

Figure 2. Trawl hauls made from NOAA FSV Henry B. Bigelow (10-05), during NOAA Fisheries Service, Northeast Fisheries Science Center autumn bottom trawl survey, 8 September - 3 December 2010.

Map 2 of 2