

CRUISE RESULTS

NOAA FSV Henry B. Bigelow
Cruise No. HB 10-02 (Parts I - V)
Spring Bottom Trawl Survey

Submitted to: NOAA, NEFSC

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National Oceanic and Atmospheric Administration
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CRUISE PERIOD AND AREA

The cruise period was from 27 February to 3 May 2010 and was conducted in 5 parts: part I was from 27 February-11 March; part II, 16-25 March; part III, 31 March-8 April; part IV, 13-23 April; and part V, 26 April-3 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 10-02, parts I-V conformed with the Cruise Instructions for the Spring Bottom Trawl Survey dated 14 January 2010, Addendum I dated 19 February, Addendum II dated 3 March, Addendum III dated 23 March, Addendum IV dated 6 April, and Addendum V dated 19 April. Exceptions to the Cruise Instructions were: part I did not begin to work on the bottom trawl survey stations (Feb 27) until after the calibration part of the cruise (Feb 24-25) and repairs made. Part V arrived one day early due to completion of all stations.

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 10-02 survey sampled at 403 stations with 105, 94, 67, 82, and 55 stations completed on parts I-V, respectively. A total of 13 FSCS 2.0 test stations were performed during the last two days of the survey. Additionally, direct comparisons were conducted between the current and new data acquisition software programs on two of the 13 stations.

Standard plankton tows were made at 114 stations. Bottom temperatures were collected at 395 stations using the CTD system. Bottom water samples for CTD calibration were taken at 82 stations.

A total of 13,098 feeding ecology and 16,651 age and growth samples were collected from 55

species (Table 1). A total of 5,920 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

Larry Brady ² , Chief Scientist ⁴	Paul Kostovick ⁵
John Galbraith, Chief Scientist ^{1,2,5}	Sean Lucey ¹
Phil Politis ¹ , Chief Scientist ³	Shad Mahlum ^{1,3,4}
Robert Alexander ^{1,3}	Kevin McInstosh ⁵
TK Arbusto ^{1,4}	Paul Nitschke ⁵
Christina Bascunan ¹	Michael Palmer ³
Laurel Col ²	Richard Raynes ⁵
William Duffy ^{4,5}	Stacy Rowe ^{2,4}
Jonathan Duquette ¹	Brian Smith ²
Sarah Emery ²	Grace Thornton ^{2,4}
Michael Jech ²	

NOAA/AGO, Norfolk, VA

Timothy Corrigan²
Timothy Wampler²

Knauss Fellow, NOAA Sea Grant Office, Washington, DC

Karen Carlson⁵

National Marine Fisheries Service, NERO, Gloucester, MA

Brett Alger³
Lindsey Feldman³
Travis Ford⁴

National Marine Fisheries Service, NEFSC, Narragansett, RI

David Richardson³

National Marine Fisheries Service, NSL, Washington, DC

Ruth Gibbons⁴

Univ of Massachusetts, Dartmouth, MA

Jonathan Breton³

Dalhousie Univ, Halifax, NS. Canada

Jackie Lighten¹

Volunteers:

Charles Bangle¹

William Davidson¹

Jennie Dean⁴

Kathleen Flaherty⁵

Anthony Gehman⁴

Richard Groux⁵

Jesse Luberoff²

Maria Mikolajczyk¹

Neven Popovik³

Glynn Rountree⁵

Skyler Sagarese⁵

Stephen Sutton²

Winterville, NC

Sandwich, MA

Washington, DC

Dracut, MA

Lititz, PA

Belchertown, MA

Burlington, VT

Wells, ME

Edgewater, MD

Arlington, VA

Riverhead, NY

Buskirk, NY

Contractors:

Ben Church³

Heath Cook^{1,3,4}

Joshua Cutler^{2,3,4,5}

Jakub Kircun^{1,4,5}

Christine LaFleur⁴

Stephanie Palker²

Adam Poquette³

Geoff Shook^{1,3,5}

Francine Stroman^{3,4,5}

Amanda Tong²

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¹ 27 Feb-11 Mar

² 16-25 Mar

³ 31 Mar-8 Apr

⁴ 13-23 Apr

⁵ 26 Apr-3 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 27 February – 3 May 2010.

Species	Feeding Ecology Observations	Age and Growth Samples
Acadian Redfish	245	881
American Plaice	343	935
American Shad	70	---
Atlantic Cod	375	939
Atlantic Croaker	4	26
Atlantic Halibut	34	32
Atlantic Herring	660	1873
Atlantic Mackerel	241	469
Atlantic Menhaden	8	---
Atlantic Wolffish	11	22
Barndoor Skate	328	---
Black Sea Bass	88	315
Blackbelly Rosefish	86	---
Blueback Herring	152	---
Bluefish	11	24
Buckler Dory	19	---
Butterfish	188	587
Clearnose Skate	222	---
Cunner	24	---
Cusk	19	19
Fawn Cusk-Eel	88	---
Fourbeard Rockling	126	---
Fourspot Flounder	266	274
Goosefish	225	435
Gulf Stream Flounder	223	---
Haddock	529	846
Little Skate	1306	---
Longhorn Sculpin	470	---
Northern Kingfish	1	---
Northern Searobin	133	---
Ocean Pout	307	261
Offshore Hake	86	91
Pollock	66	119
Red Hake	516	514
Rosette Skate	57	---
Scup	89	256
Sea Raven	216	---
Silver Hake	1031	1143
Smooth Dogfish	90	---
Smooth Skate	284	---
Spiny Dogfish	600	507
Spot	12	---
Spotted Hake	199	279
Striped Bass	77	56
Striped Searobin	37	---

Species	Feeding Ecology Observations	Age and Growth Samples
Summer Flounder	281	915
Thorny Skate	166	---
Tilefish	8	8
Weakfish	16	42
White Hake	296	927
Windowpane	317	581
Winter Flounder	530	1250
Winter Skate	556	---
Witch Flounder	343	605
Yellowtail Flounder	423	1420
TOTALS	13098	16651

Table 2. Miscellaneous scientific collections made on NOAA FSV *Henry B. Bigelow*, Spring Bottom Trawl Survey, during 27 February – 3 May 2010.

Investigator and Affiliation	Samples Saved	Approximate Number
Danial Badger, New England Aquarium, Boston, MA	various species	58 indiv.
Jonathan Breton, U. of MA, Dartmouth, MA	yellowtail flounder	56 examined
	yellowtail flounder	33 fin clips
	yellowtail flounder	55 preserved
Peter Canavin, NMFS, NEFSC, Woods Hole, MA	various species	79 indiv.
Toni Chute, NMFS, NEFSC, Woods Hole, MA	red crab	1 indiv.
Bruce Collette, NMFS, Smithsonian, Washington, DC	various species	15 indiv.
Ashok Deshpande, NMFS, NEFSC, Sandy Hook, NJ	sea herring	3 indiv.
John Galbraith, NMFS, NEFSC, Woods Hole, MA	unidentified/various species	1110 indiv.
Melisa Giresi, TX A&M Univ, College Station, TX	various skates	276 indiv.
Guest	various species	47 indiv.
Lisa Hendrickson, NMFS, NEFSC, Woods Hole, MA	longfin squid	37 examined
	shortfin squid	9 examined
Chad Keith, NMFS, NEFSC, Woods Hole, MA	atlantic wolffish	23 examined
	atlantic wolffish	23 photo
	atlantic wolffish	21 preserved
Nancy Kohler, NMFS, NEFSC, Narragansett, RI	various sharks	56 tagged
Jason Link, NMFS, NEFSC, Woods Hole, MA	various species	333 preserved
Jack Lighten, Dalhousie Univ, Halifax, NS, Canada	various species	34 fin clips
Mike Mangold, US Fish & Wildlife Service, Annapolis, MD	atlantic sturgeon	2 examined
Holly McBride, NMFS, NEFSC, Woods Hole, MA	various species	112 indiv.
Richard McBride, NMFS, NEFSC, Woods Hole, MA	various flounders	190 examined
	gonads, various flounders	181 preserved
Joe Mello, NMFS, NEFSC, Woods Hole, MA	angel shark	39 indiv.
Tom Munroe, NMFS, NEFSC, Washington, DC	various flounders	451 indiv.
Belita Nguluwe, Univ of MD, Princess Anne, MD	goosefish	80 preserved
Martha Nizinski, NMFS, NEFSC, Washington, DC	various invertebrates	103 indiv.
Loretta O'Brien, NMFS, NEFSC, Woods Hole, MA	atlantic cod	483 examined
Anne Richards, NMFS, NEFSC, Woods Hole, MA	goosefish	3 indiv.
Kathy Sosebee, NMFS, NEFSC, Woods Hole, MA	various skates	1648 examined
	various rays	23 examined
	spiny dogfish	180 examined
Workshop, NMFS, NEFSC, Woods Hole, MA	various species	33 indiv.
Mark Wuenschel, NMFS, NEFSC, Woods Hole, MA	various gadids	97 examined
	gonads, various gadids	158 preserved

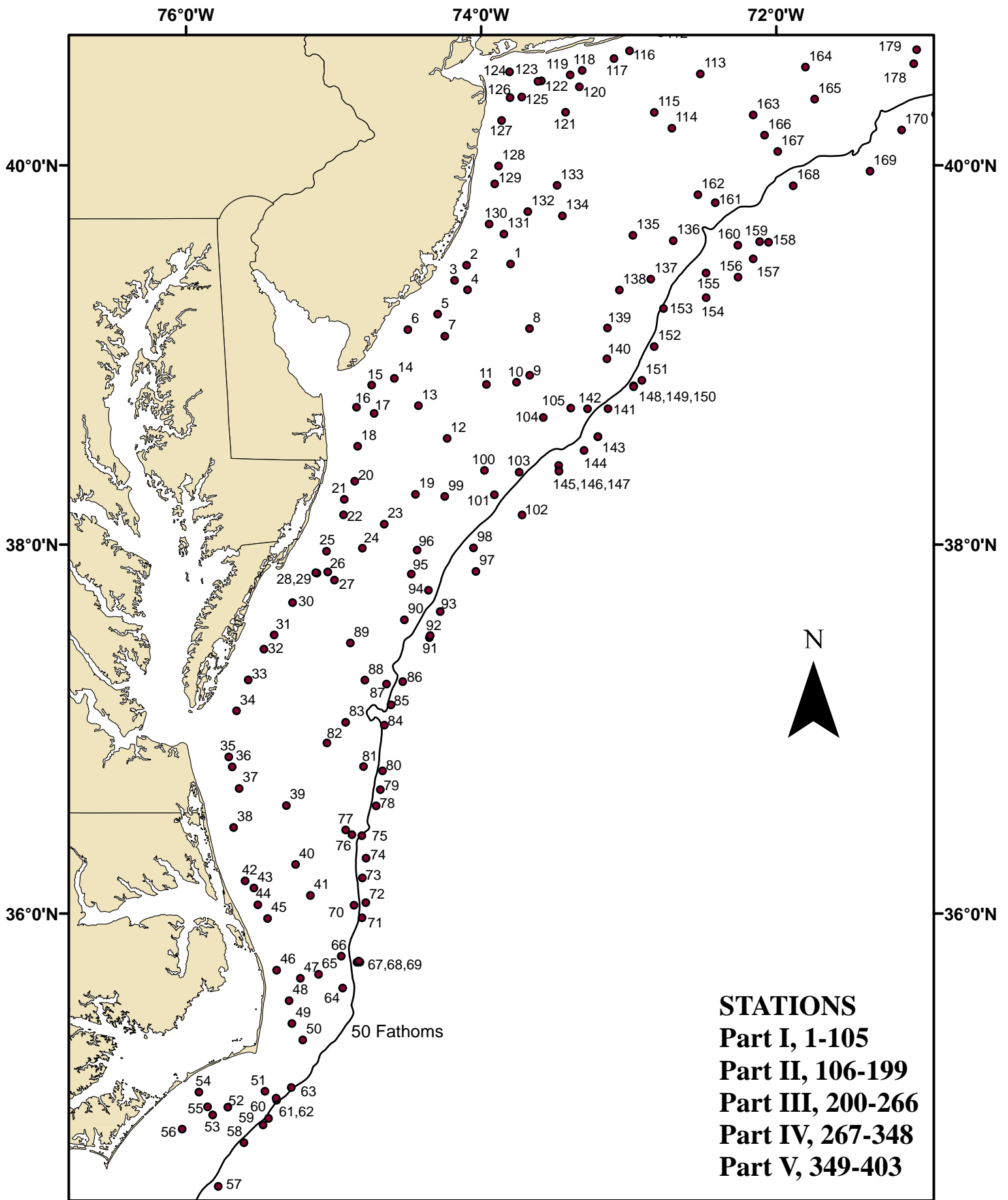


Figure 1. Trawl hauls made from NOAA FSV Henry B. Bigelow (10-02), during NOAA Fisheries Service, Northeast Fisheries Science Center spring bottom trawl survey, 27 February - 3 May 2010.

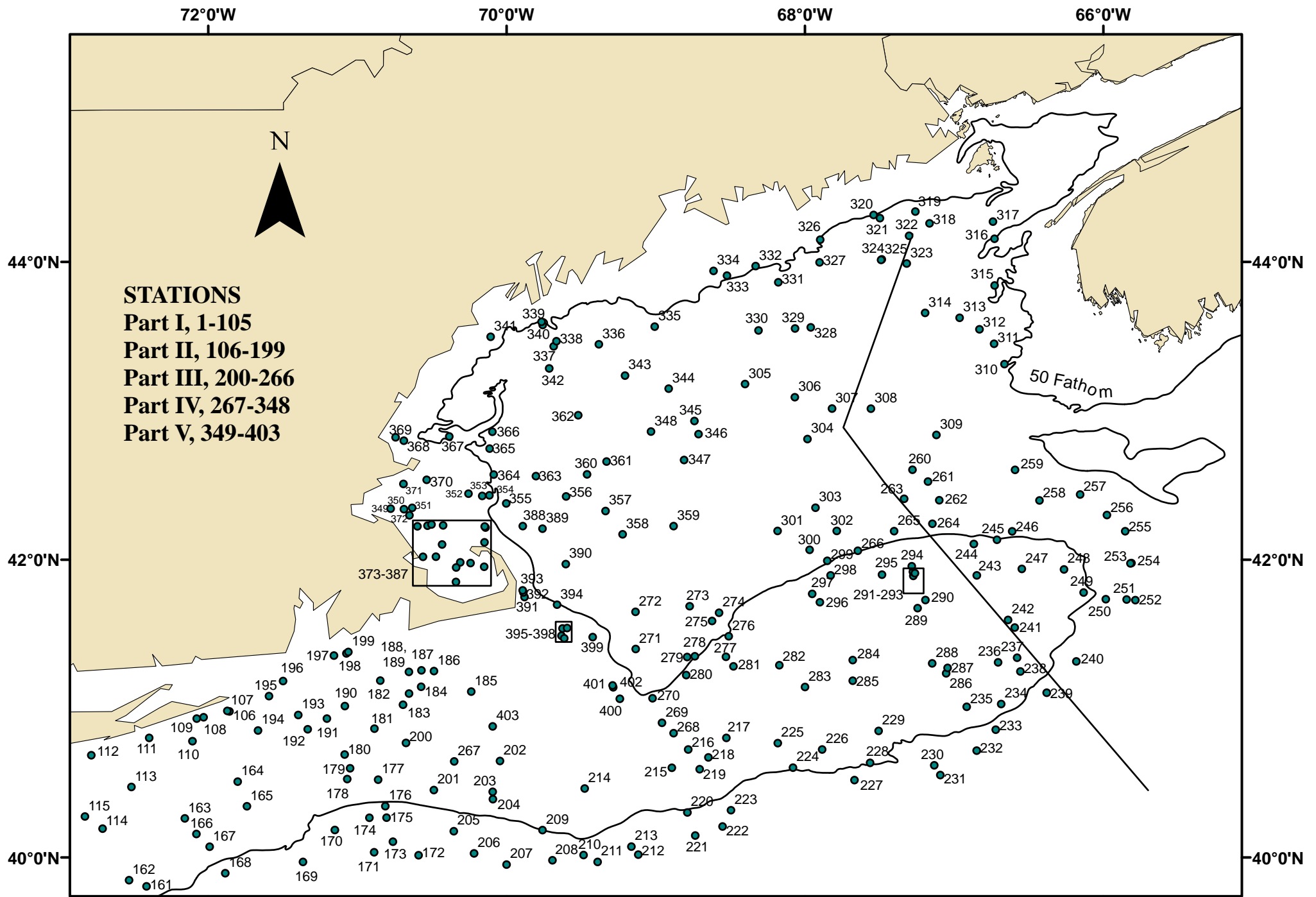


Figure 2. Trawl hauls made from NOAA FSV Henry B. Bigelow (10-02), during NOAA Fisheries Service, Northeast Fisheries Science Center spring bottom trawl survey, 27 February - 3 May 2010.