

CRUISE RESULTS

NOAA FRV Albatross IV

Cruise No. AL 08-01 (Parts I-V) and AL 08-02 (Parts I-II)

Spring Bottom Trawl Survey and Calibration Study

Submitted to: NOAA, NEFSC

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National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
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CRUISE PERIOD AND AREA

The AL 08-01 bottom trawl survey and calibration study was conducted in 5 parts: Part I was from 6-14 March; Part II, 18-28 March; Part III, 31 March-11 April; Part IV, 16-25 April; and Part V, 28 April-7 May. The area of operation was from Cape Hatteras to the western Scotian Shelf including the Gulf of Maine. Station locations are shown in Figures 1, 2 and 3.

The AL 08-02 calibration study was conducted in two parts: Part I was from 13-16 May; and Part II, 28 May-8 June. The area of operation was on Georges Bank and southern New England. Station locations are shown in Figure 4.

OBJECTIVES

The objectives of the survey 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, 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) conduct a hydroacoustic survey between stations; and (7) examine survey catchability difference between surveys conducted on the FSV *Henry B. Bigelow* and FRV *Albatross IV*.

METHODS

Operations and gear used during AL 08-01 Parts I-V conformed with the Cruise Instructions for the Spring Bottom Trawl Survey dated 10 January 2008 and Addendum 1 dated 26 February; Addendum 2 dated 13 March; Addendum 3 dated 31 March; Addendum 4 dated 8 April; and Addendum 5 dated 2 May. Exceptions to the Cruise Instructions are as follows: Part I left four days late due to mechanical problems; Part II left one day late due to bad weather; Part IV left two days late due to mechanical problems; and Part V docked on 3 May to disembark selected personnel and to restage for a scallop survey which was conducted from 4-7 May.

Operations and gear used during AL 08-02 Parts I-II conformed with the Cruise Instructions for the Calibration Study dated 10 March 2008; Addendum 2 dated 28 May; and Addendum 6 dated

28 April. Part I left five days late due to bad weather.

A 30-minute tow was made at each pre-selected survey station using a Northeast Fisheries Science Center (NEFSC) standard number 36 Yankee otter trawl rigged with 41 centimeter (cm) diameter rubber rollers, 9 meter (m) bridles. NEFSC standardized 450 kilogram (kg) polyvalent trawl doors rigged with chain backstraps were used. The trawl was fished at a scope of 4:1 in depths between 18 and 27 m; 3:1 in depths between 28 and 183 m; and 2.5:1 in depths of 184 m and greater. Towing speed was maintained at approximately 3.8 knots, speed over ground, using DGPS instrumentation. Direction of each tow was generally toward the next station. Throughout the cruise, a hydroacoustic survey was conducted during transit between bottom trawl stations using the Simrad EK-500 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 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.

During the standard Bottom Trawl Survey (AL 08-01, Parts I-V), 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 (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 described by volume.

During AL 08-02, Parts I-II Calibration Study, all species were weighed and measured only, and no species were sampled

Surface temperatures were measured using the hull-mounted temperature sensor at a depth of 3 meters. Temperature and conductivity profiles were made using a conductivity, temperature, and depth (CTD) system at each station. 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 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 *Albatross IV* conducted a brief scallop survey during AL 08-01 Part V, 4-7 May. Pre-selected random stations were sampled using a standard 2.44 meter (8') wide New Bedford type scallop dredge rigged with 5.1 cm (2 inch) diameter rings and lined with at 3.8 cm (1½ inch)

polyethylene stretched mesh liner. Tow duration was 15 minutes; tow speed was 3.8 knots and the dredge was fished using a 3:1 wire out to depth scope. A recording inclinometer was mounted on the dredge to collect bottom contact time data. Tow distance was recorded using differential GPS.

The entire catch was sorted at each scallop survey station into biological and habitat components. Live whole and clapper shells of both sea and Iceland scallops were measured on Limnoterra boards to the nearest millimeter. Selected fish species caught incidentally in the dredge were also measured to the nearest millimeter. Weights and total numbers were recorded for all other fish species at each station. Cancer crabs and starfish weights and total numbers were recorded at every third station. Habitat portions were estimated by volume and discarded.

RESULTS

The survey sampled at 554 stations with 64, 90, 86, 65, 90, 34 and 125 stations completed on AL 08-01 Parts I-V and AL 08-02 Parts I-II, respectively. Fifty-one stations from AL 08-01 Part V were conducted for the scallop survey.

Standard plankton tows were made at 52 stations. Bottom temperatures were collected at 137 stations using the CTD system. Bottom water samples for CTD calibration were taken at 44 stations.

A total of 8,165 feeding ecology and 9,546 age and growth samples were collected from 34 species (Table 1). A total of 5,259 requested samples were collected to support 22 internal and external investigations (Table 2).

DISPOSITION OF SAMPLES AND DATA

Age and growth samples, feeding ecology data and 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

Russell Brown, Chief Scientist ²	David Chevrier ^{1, 4, 8}	Timothy Miller ²
Linda Despres, Chief Scientist ^{3, 5, 6}	Jonathan Duquette ^{3, 4, 6}	Shad Muhlum ^{7, 8}
John Galbraith, Chief Scientist ¹	Chad Keith ^{1, 6}	Sarah Pregracke ¹
Phil Politis, Chief Scientist ⁸	Nathan Keith ^{5, 6}	Sandy Sutherland ²
Stacy Rowe, Chief Scientist ^{4, 7, participant 8}	David Kosewski ⁸	Grace Thornton ^{2, 4, 8}
Robert Alexander ^{7, 8}	Sean Lucey ^{5, 6, 8}	Mark Wuenschel ⁴
TK Arbusto ^{3, 5, 6}	Richard McBride ³	

National Marine Fisheries Service, NEFSC, Sandy Hook, NJ

Peter Plantamura¹

National Marine Fisheries Service, NERO, Gloucester, MA

Toby Curtis⁵
Caleb Gilbert²
Edward Stern^{5,6}
Micah Witri²

National Marine Fisheries Service, NSL, Washington, DC

Ruth Gibbons⁴
La'Shaun Willis³

National Marine Fisheries Service, OSF, Silver Spring, MD

Debra Lambert⁷

Contractors

Michael Ball ⁷	ITS, Woods Hole, MA
Laurel Col ⁷	ITS, Woods Hole, MA
Heath Cook ^{3,7}	ITS, Woods Hole, MA
Joshua Cutler ^{3,7}	ITS, Woods Hole, MA
Ellen Johnson ¹⁻⁶	ITS, Woods Hole, MA
Jakub Kircun ²	ITS, Woods Hole, MA
Ryan McDermott ¹	ITS, Woods Hole, MA
Stephanie Palker ⁷	ITS, Woods Hole, MA
Ray Shield ^{5,6,8}	ITS, Woods Hole, MA
Geoff Shook ^{1,2,4-6}	ITS, Woods Hole, MA
Francine Stroman ^{2,4,7}	ITS, Woods Hole, MA
Jiashen Tang ⁷	ITS, Woods Hole, MA
Amanda Tong ⁷	ITS, Woods Hole, MA
Melanie Underwood ^{1,6}	ITS, Woods Hole, MA

Volunteers

Elizabeth Bierbower ⁸	Harwich, MA
Walter Buble ⁴	Durham, NH
Jay Caldwell III ¹	McGuire AFB, NJ
Genevieve Ellison ⁸	Dover, NH
Lauren Ewing ³	Marathon, FL
Sarah Giltz ⁷	Roanoke, VA
Teagen Gray ¹	Raleigh, NC
Scott Kaplan ^{5,6}	Teaticket, MA
Jesse Kelly ^{3,4}	Ontario, Canada
Jesselynne Krief ²	New York, NY
Jessica Lavash ¹	Cambridge, MA
Elizabeth Maguire ²	Cambridge, MA
Hannah Medd ³	Middletown, MD
Theresa Morton ^{5,6}	Warren, RI

Giacomo Chato Osio²
Adam Poquette²
Molly Thorton⁸
Andrew Williston¹
Tamara Wilson^{5,6}

Durham, NH
New Fairfield, CT
Fairbanks, AK
Cambridge, MA
Halifax, NS, Canada

¹ 6-14 March (AL 08-01, Part I)

² 8-28 March (AL 08-01, Part II)

³ 31 March-11 April (AL 08-01, Part III)

⁴ 6-25 April (AL 08-01, Part IV)

⁵ 28 April-3 May (AL 08-01, Part V)

⁶ 4-7 May (AL 08-01, Part V)

⁷ 13-16 May (AL 08-02, Part I)

⁸ 28 May-8 June (AL 08-02, Part II)

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) 495-2380; 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 feeding ecology, and age and growth studies on NOAA FRV *Albatross IV*, Spring Bottom Trawl Survey and Calibration Study, during 6 March to 8 June 2008.

Species	Feeding Ecology Observations	Age and Growth Samples
Acadian redbfish	167	464
American plaice	293	616
American shad	60	---
Atlantic cod	303	559
Atlantic croaker	34	106
Atlantic halibut	23	19
Atlantic herring	275	838
Atlantic mackerel	124	266
Atlantic menhaden	15	---
Atlantic wolffish	1	1
Barndoor skate	61	---
Black sea bass	23	62
Blackbelly rosefish	58	---
Blueback herring	114	---
Bluefish	7	7
Buckler dory	2	---
Butterfish	144	363
Clearnose skate	122	---
Cunner	8	---
Cusk	2	2
Fawn cusk-eel	17	---
Fourbeard rockling	35	---
Fourspot flounder	130	165
Goosefish	58	83
Gulf stream flounder	49	---
Haddock	429	560
Hickory shad	1	---
Little skate	787	---
Longhorn sculpin	338	1
Northern kingfish	7	---
Northern searobin	50	---
Ocean pout	135	102
Offshore hake	10	10
Pollock	90	206
Red hake	413	409
Rosette skate	7	---
Scup	44	91
Sea raven	182	2
Silver hake	478	1,113
Smooth dogfish	138	---
Smooth skate	80	---
Spiny dogfish	566	782
Spot	17	2

Spotted hake	225	268
Striped sea bass	102	71
Species	Feeding Ecology Observations	Age and Growth Samples
Striped searobin	17	---
Summer flounder	136	195
Tautog	2	---
Thorny skate	58	---
Weakfish	38	123
White hake	142	368
Windowpane	246	291
Winter flounder	428	655
Winter skate	378	---
Witch flounder	253	247
Yellowtail flounder	243	499
TOTALS	8,165	9,546

Table 2. Miscellaneous scientific collections made on NOAA FRV *Albatross IV*, Spring Bottom Trawl Survey and Calibration Study, during 6 March to 8 June 2008.

Investigator and Affiliation	Samples Saved	Approximate Number
Daniel Badger, New England Aquarium, Boston, MA	Various species	128 indiv.
Michael Ball, NMFS, NEFSC, Woods Hole, MA	Various species	297 indiv.
Walter Bublely, U. of New Hampshire, Durham, NH	Spiny dogfish	60 indiv.
Peter Chase, NMFS, NEFSC, Woods Hole, MA	Scup	936 indiv.
Kerin Cleason, U. of Texas, Austin, TX	Various elasmobranchs	48 indiv.
Bruce Collette, NMFS, NSL, Washington, DC	Various species	30 indiv.
John Galbraith, NMFS, NEFSC, Woods Hole, MA	Unidentified / various species	872 indiv.
Guest	Various species	64 indiv.
Heather Haas, NMFS, NEFSC, Woods Hole, MA	Sea turtles	2 exam.
Josef Idoine, NMFS, NEFSC, Woods Hole, MA	Shrimp	69 bags
Nancy Kohler, NMFS, NEFSC, Narragansett, RI	Various sharks	2 tagged
Jason Link/Brian Smith, NMFS, NEFSC, Woods Hole, MA	Various species	224 preserved
Michael Mangold, US Fish & Wildlife, Annapolis, MD	Atlantic Sturgeon	8 exam.
Rich McBride, NMFS, NEFSC, Woods Hole, MA	Various species	43 indiv.
	Various species ovary	185 preserved
	Various species photos	31 exam.
Nancy McHugh, NMFS, NEFSC, Woods Hole, MA	Various species	52 exam.
Tom Munroe, NMFS, NSL, Washington, DC	Various flounder	613 indiv.
Loretta O'Brien, NMFS, NEFSC, Woods Hole, MA	Atlantic cod	206 exam.
Katherine Sosebee, NMFS, NEFSC, Woods Hole, MA	Various skate species	609 indiv.
	Various rays species	66 exam.
	Spiny dogfish	438 exam.
	Longfin squid	1 exam.
Michelle Staudinger, U. of Massachusetts, Amherst, MA	Various cephalopods	103 indiv.
	Various species	25 indiv.
David Stormer, U. of Massachusetts, Amherst, MA	Bluefish	6 indiv.
Workshop, NMFS, NEFSC, Woods Hole, MA	Various species	141 indiv.

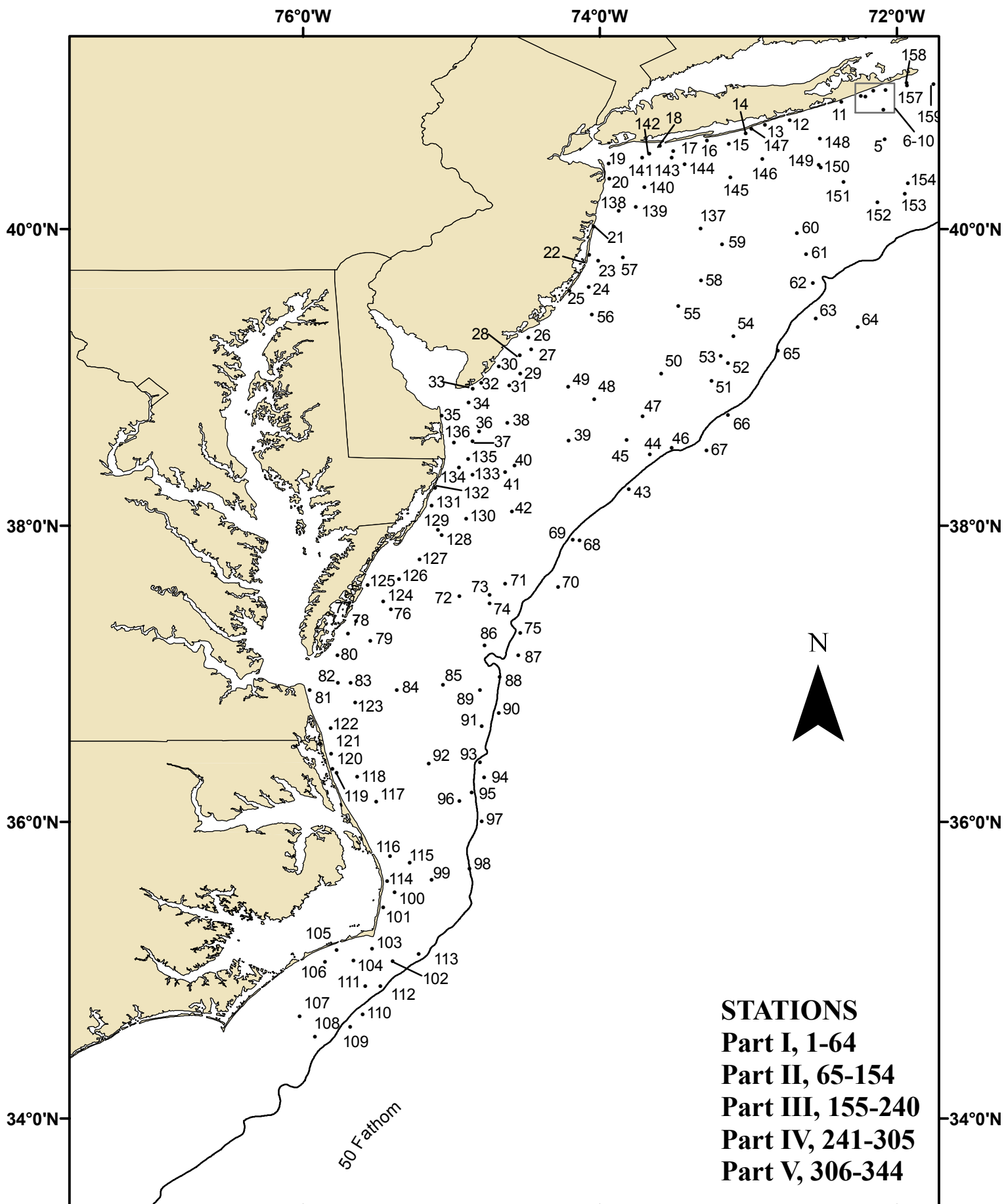


Figure 1. Trawl hauls made from NOAA FRV *Albatross IV* (08-01), during NOAA Fisheries Service, Northeast Fisheries Science Center spring bottom trawl survey and calibration study, 6 March - 7 May 2008.

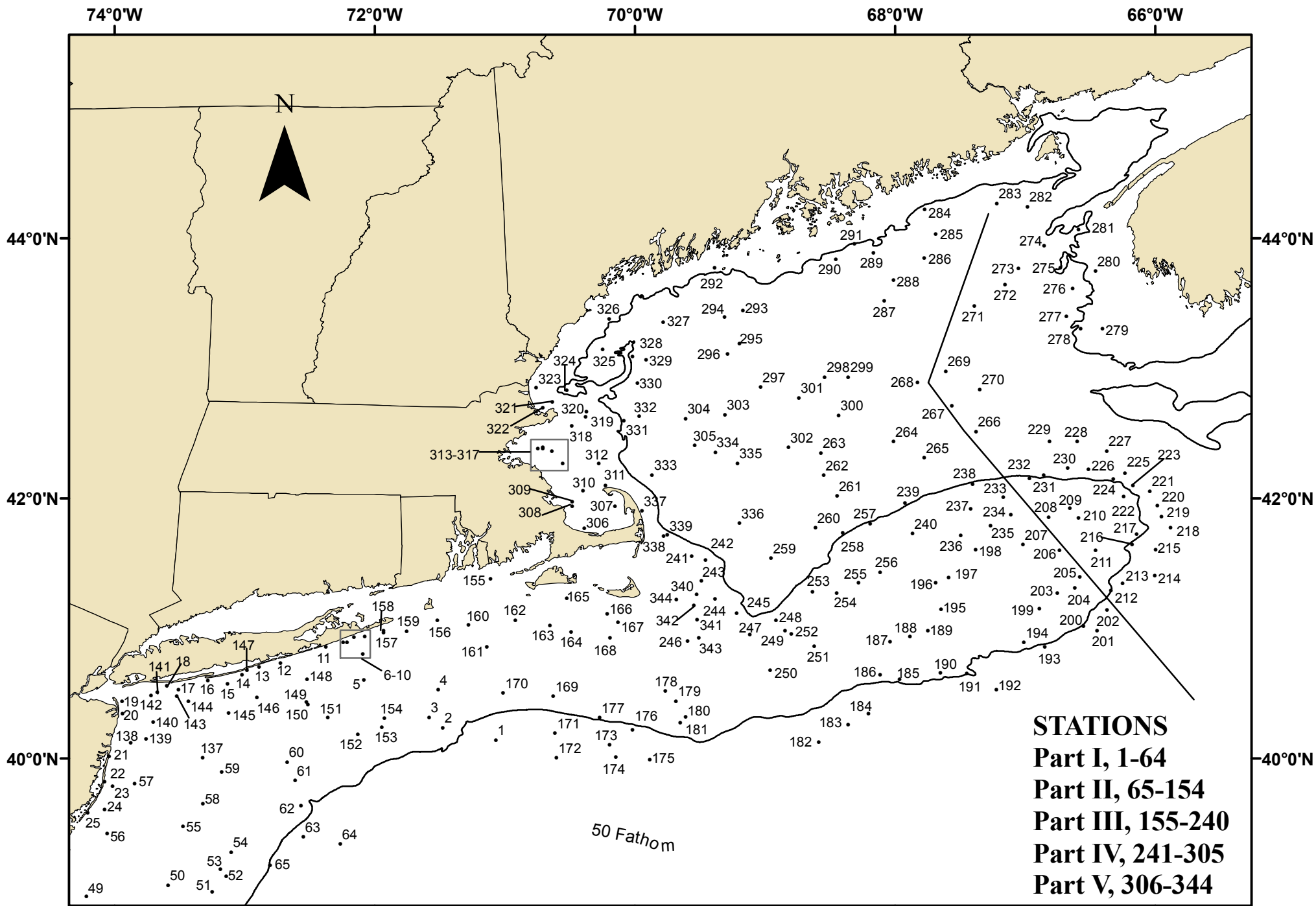


Figure 2. Trawl hauls made from NOAA FRV *Albatross IV* (08-01), during NOAA Fisheries Service, Northeast Fisheries Science Center spring bottom trawl survey and calibration study, 6 March - 7 May 2008.

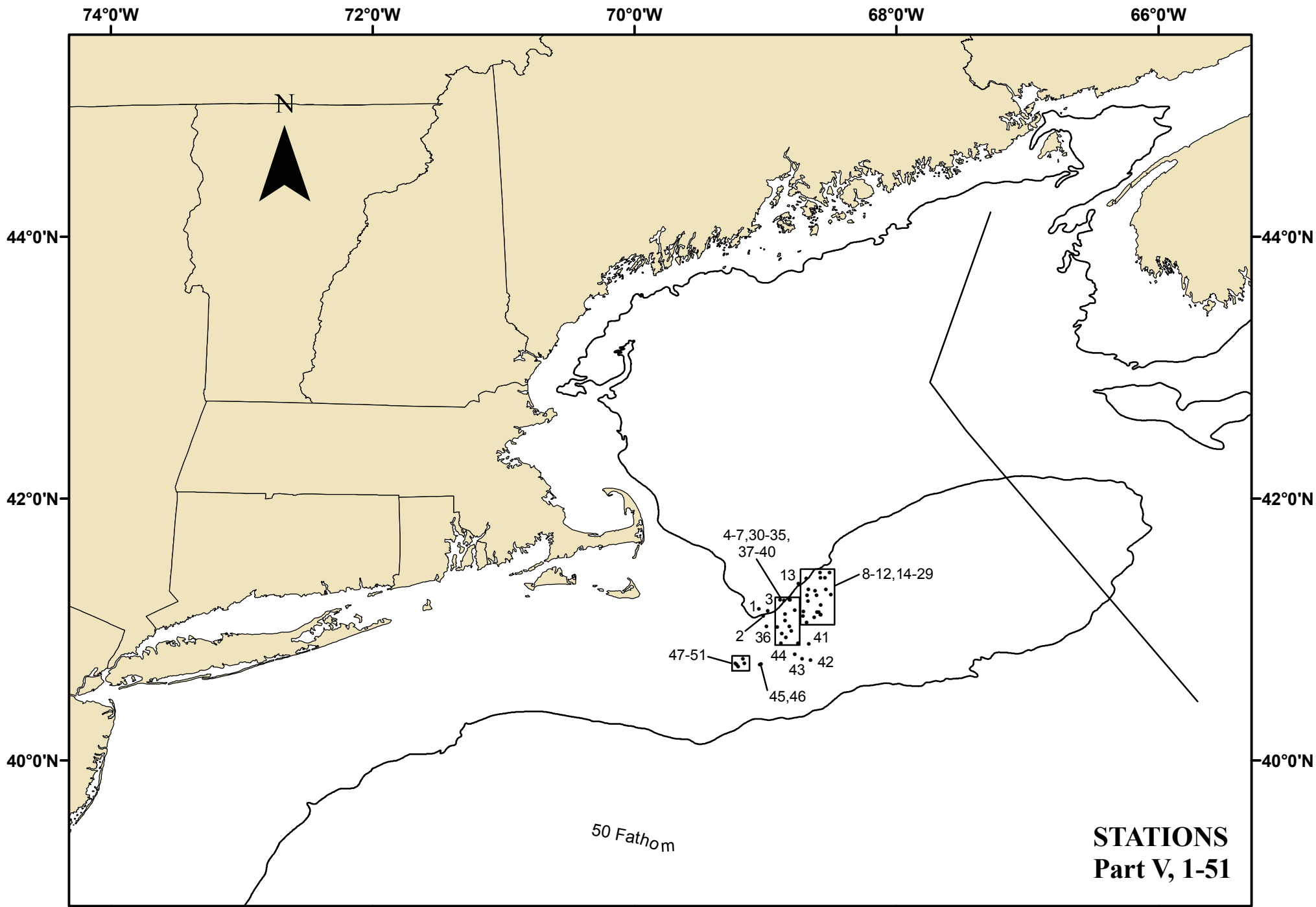


Figure 3. Scallop survey hauls made from NOAA FRV *Albatross IV* (08-01 Part V, 4-7 May), during NOAA Fisheries Service, Northeast Fisheries Science Center spring bottom trawl survey, 6 March-7 May 2008.

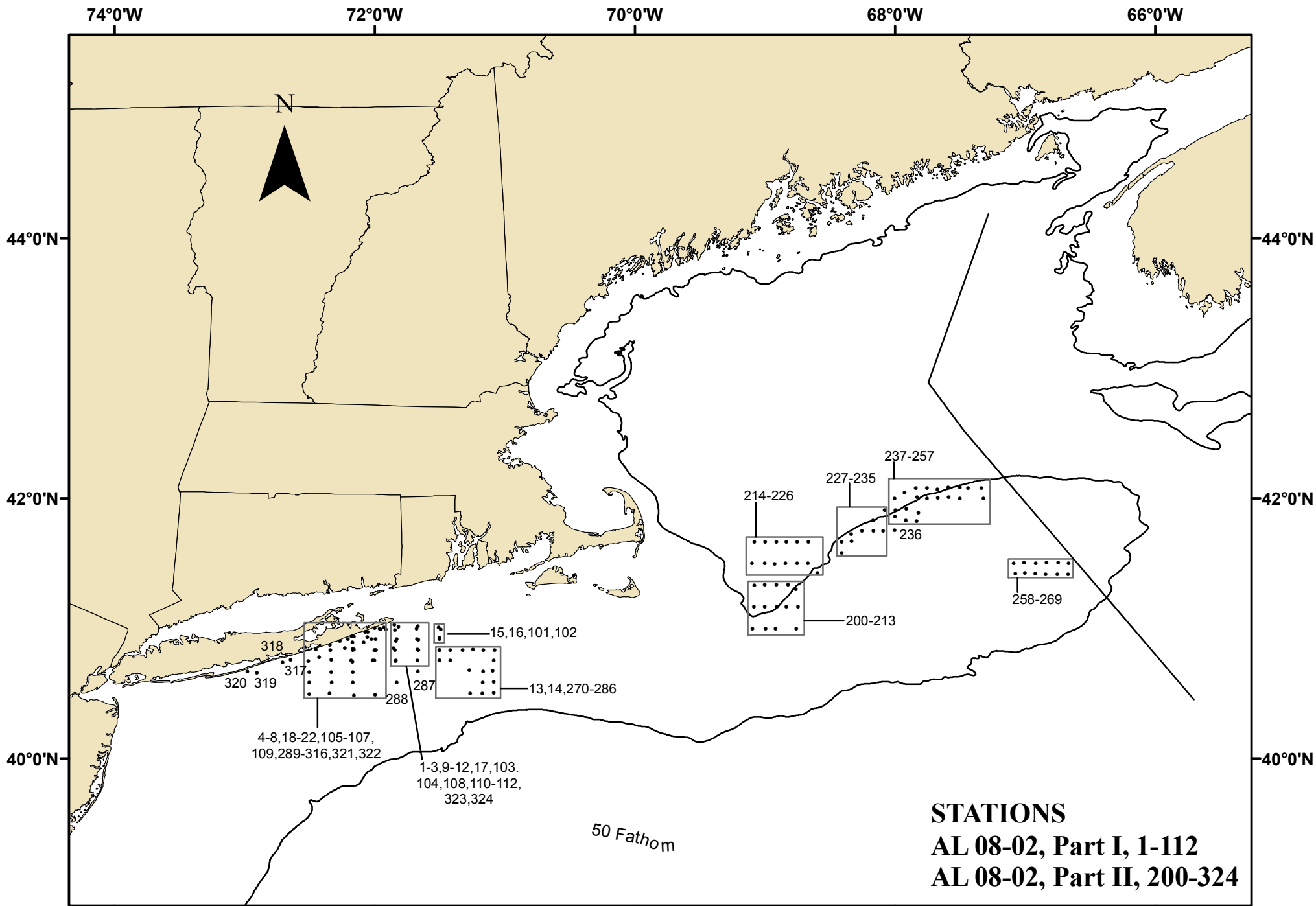


Figure 4. Trawl hauls made from NOAA FRV *Albatross IV* (AL 08-02), during NOAA Fisheries Service, Northeast Fisheries Science Center calibration study, 13 May - 8 June 2008.