CRUISE RESULTS

NOAA Ship ALBATROSS IV
Cruise No. AL 07-07 (Parts I-IV) & AL 07-08 (Parts Va & Vb)
Autumn Bottom Trawl Survey and Calibration Study

Submitted to: NOAA, NEFSC

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Date: 20 February 2008

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National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Northeast Fisheries Science Center
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CRUISE PERIOD AND AREA

The cruise period was from 4 September to 16 November 2007. The AL07-07 bottom trawl survey was conducted in 4 parts: Part I was from 4-14 September; Part II, 17-28 September; Part III, 2-12 October; Part IV, 15-26 October. The AL 07-08 calibration study was conducted as Part V(a), 29 October - 6 November; Part V(b), 9-16 November. 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.

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; and (6) conduct a hydroacoustic survey between stations.

METHODS

Operations and gear used during Parts I-V conformed with the Cruise Instructions for the Autumn Bottom Trawl Survey dated 3 August 2007 and Addendum 1 dated 28 August; Addendum 2 dated 12 September; Addendum 3 dated 28 September; Addendum 4 dated 10 October; Addendum 5a dated 29 October; Addendum 5b dated 23 October. Exceptions to the Cruise Instructions are as follows: Part I docked in Norfolk, VA from the 9-10 September due to bad weather, Part III left one day late due to engine problems, Part Va arrived one day early due to bad weather, and Part Vb left one day late.

A 30-minute tow was made at each 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 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 the completion of the bottom trawl stations, during part Va of the survey, a grid pattern of fixed stations was completed in Cape Cod Bay and also in Closed Area I (completed during Vb). At each fixed station, a 20 minute tow was completed. The vessel returned to the start location and repeated the tow with offsets of either 250 m or 500 m (offsets of the second tow were randomly selected). A third tow at the start location was taken using the opposite offset of what was selected on the second tow. Once the FSV HENRY B. BIGELOW arrived on the site during Part Vb, the two vessels continued to do paired tows previously selected at the fixed station grid in Closed Area I.

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.

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 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.

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.

RESULTS

The survey sampled at 448 stations with 45, 108, 102, 80, 113 stations completed on parts I-V, respectively.

Standard plankton tows were made at 108 stations. Bottom temperatures were collected at 435

stations using the CTD system. Bottom water samples for CTD calibration were taken at 62 stations.

A total of 6,135 feeding ecology and 11,905 age and growth samples were collected from 59 species (Table 1). A total of 6,908 requested samples were collected to support 28 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

Linda Despres, Chief Scientist[2,5a]
John Galbraith, Chief Scientist[1,4]
Stacy Rowe, Chief Scientist[3,5b]
Robert Alexander[5a]
Larry Brady[1,4,5a]
Elizabeth Brooks[5b]
Elizabeth Broughton[3,4]
David Chevrier[1]
Jonathan Duquette[5a]
Chad Keith[5b]
Nathan Keith[3]
Chris Legault[5b]
Sean Lucey[2]
Holly McBride[5a]
Paul Nitschke[5b]
Michael Palmer[2]
Nancy Lee Peltier[3]
Sarah Pregracke[1,]
Kathy Sosebee[1]
Grace Thornton[2]

National Marine Fisheries Service, HDQ, Silver Spring, MD

Matthew Thorburn[5b]

National Marine Fisheries Service, NERO, Gloucester, MA

Douglas Christel[1]
David Stevenson[5b]
Alyssa Theodore[3]

National Marine Fisheries Service, NSL, Washington, DC

Ruth Gibbons[4]
La'Shaun Willis[5a]

South Carolina Division of Natural Resources, Charleston, SC

Erin Levesque[1]

University of Massachusetts, Amherst, MA

Joseph Kunkel[3]

Contractors

Jessica Blaylock[5b]	ITS, Woods Hole, MA
Laurel Col[2,5b]	ITS, Woods Hole, MA
Heath Cook[3,4,5a]	ITS, Woods Hole, MA
Debra Duarte[5a]	ITS, Woods Hole, MA
Corrin Flora[2]	ITS, Woods Hole, MA
Lara Jarvis[1,3,5a,5b]	ITS, Woods Hole, MA
Ellen Johnson[3,4,5a]	ITS, Woods Hole, MA
Jakub Kircun[2,4,5b]	ITS, Woods Hole, MA
Nikolai Klibansky[1,5a, 5b]	ITS, Woods Hole, MA
Sarah Pierce[5a]	ITS, Woods Hole, MA
Ray Shield[2]	ITS, Woods Hole, MA
Geoff Shook[2,3,4,5b]	ITS, Woods Hole, MA
Kris Tholke[2]	ITS, Woods Hole, MA
Melanie Underwood[3,4]	ITS, Woods Hole, MA
Brian Westell[5b]	ITS, Woods Hole, MA

Volunteers

Daniel Badger[4]	Dover, NH
Benjamin Barbee[3]	Red Lodge, MT
Walter Bubley[4]	Durham, NH
Maria Clementi[2]	Ashland, OR
Thomas Dame[2]	Chester Heights, PA
Daniel Durr[3]	Newcastle, WA
Jamie Giganti[5a]	Marathon, FL
John Gilmartin[4]	Portsmouth, RI
Emily Klein[4]	Newmarket, NH
Seth Kuppinen[5a]	Woods Hole, MA
Celeste Leroux[2]	Univ. of Alaska, Fairbanks, AK
Meghan Massua[4]	China Village, ME
Jennifer Moorehead[1]	Norwich, OH
Neven Popovic[5a]	Rockville, MD
Tim Rasman[1]	Green Bay, WI
Holly Rolls[3]	Long Key, FL
Ana Verissimo[2]	VIMS, Gloucester Point, VA

[1] 4 - 14 September
[2] 17 - 28 September
[3] 2 - 12 October
[4] 15 - 26 October
[5a] 29 October - 6 November
[5b] 9 - 16 November

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, Autumn Bottom Trawl Survey, during 4 September to 16 November 2007.

Species	Feeding Ecology Observations	Age and Growth Samples
Acadian redfish	208	742
American plaice	222	601
American shad	13	-
Atlantic cod	116	250
Atlantic croaker	129	716
Atlantic halibut	13	15
Atlantic herring	200	1003
Atlantic mackerel	34	63
Atlantic menhaden	7	-
Atlantic sharpnose shark	1	-
Barndoor skate	42	-
Black drum	1	1
Black sea bass	41	118
Blackbelly rosefish	76	-
Blueback herring	12	-
Bluefish	120	311
Buckler dory	13	-
Butterfish	286	761
Clearnose skate	50	-
Cunner	19	-
Cusk	2	2
Fawn cusk-eel	82	-
Fourbeard rockling	20	-
Fourspot flounder	167	240
Goosefish	64	81
Gulf Stream flounder	101	-
Haddock	256	700
Hickory shad	1	-
Little skate	200	-
Longhorn sculpin	154	-
Northern kingfish	28	-
Northern searobin	86	-
Ocean pout	54	56
Offshore hake	38	38
Pollock	34	67
Red hake	351	440
Rosette skate	10	-
Scup	209	530
Sea raven	142	-
Silver hake	438	1319
Smooth dogfish	144	-
Smooth skate	20	-
Southern kingfish	2	-
Spiny dogfish	291	506
Spot	65	-
Spotted hake	153	158

Species	Feeding Ecology Observations	Age and Growth Samples
Striped sea bass	16	16
Striped searobin	62	-
Summer flounder	195	456
Tautog	7	-
Thorny skate	24	-
Tilefish	1	-
Weakfish	133	748
White hake	185	559
Windowpane	177	286
Winter flounder	201	475
Winter skate	118	-
Witch flounder	121	145
Yellowtail flounder	180	502
TOTALS	6,135	11,905

Table 2. Miscellaneous scientific collections made on NOAA FRV ALBATROSS IV, Autumn Bottom Trawl Survey, during 4 September to 16 November 2007.

Investigator and Affiliation	Samples Saved	Approximate Number
Aquarium, NMFS, NEFSC, Woods Hole, MA	Loligo squid	13 bags
	Atlantic herring	22 bags
	Shrimp	22 bags
	Misc. live species	2 indiv.
Saeful Amar, Woods Hole, MA	Atlantic rock crabs	10 indiv.
Neil Aschliman, Florida State University, Tallahassee, FL	Various skates/rays	38 indiv.
Walter Bubley, UNH, Durham, NH	Spiny dogfish	55 indiv.
Steve Campana, Fisheries and Oceans, Canada	Spiny dogfish	63 indiv.
Peter Chase, NMFS, NEFSC, Woods Hole, MA	Various species	395 indiv.
Bruce Collette, NMFS, NSL, Washington, DC	Various species	95 indiv.
John Galbraith, NMFS, NEFSC, Woods Hole, MA	Unidentified / various species	3074 indiv.
Heather Haas, NMFS, NEFSC, Woods Hole, MA	Sea turtles	2 examined
Dvora Hart, NMFS, NEFSC, Woods Hole, MA	Sea scallop	13 indiv.
Josef Idoine, NMFS, NEFSC, Woods Hole, MA	Shrimp	84 bags
Charles Keith, NMFS, NEFSC, Woods Hole, MA	Atlantic hagfish	6 indiv.
Nancy Kohler, NMFS, NEFSC, Narragansett, RI	Various sharks	9 tagged
Joseph Kunkel, UMASS, Amherst, MA	Various decapods	23 preserved
	Water sample	37 samples
	American lobster	1 indiv.
Erin Levesque, SCDNR, Charleston, SC	Atlantic croaker	199 preserved
	Weakfish	182 preserved
Jason Link/Brian Smith, NMFS, NEFSC, Woods Hole, MA	Various species	230 preserved
Sean Lucey, NMFS, NEFSC, Woods Hole, MA	Various species ovary	11 indiv.
Rich McBride, NMFS, NEFSC, Woods Hole, MA	Various species	96 indiv.
	Various species ovary	103 indiv.
Kristin Smith, WHOI, Woods Hole, MA	Various species	52 indiv.
Nancy McHugh, NMFS, NEFSC, Woods Hole, MA	Various species	168 exam.
Karina Mrakovcich, USCGA, New London, CT	Various species	36 indiv.
Loretta O'Brien, NMFS, NEFSC, Woods Hole, MA	Atlantic cod	315 exam.
Anne Richards, NMFS, NEFSC, Woods Hole, MA	Goosefish illicium	80 indiv.
	Goosefish	74 exam.
Katherine Sosebee, NMFS, NEFSC, Woods Hole, MA	Various skate species examined	542 indiv.
	Vaious rays species examined	389 exam.
	Female spiny dogfish	169 exam.
Michelle Staudinger, UMASS, Amherst, MA	Various cephalopods	102 indiv.
Ana Verissimo, VIMS, Gloucester Point, VA	Spiny dogfish	82 preserved
Susan Wigley, NMFS, NEFSC, Woods Hole, MA	Witch flounder	5 indiv.
John Ziskowski, NMFS, NEFSC, Milford, CT	American plaice	109 indiv.

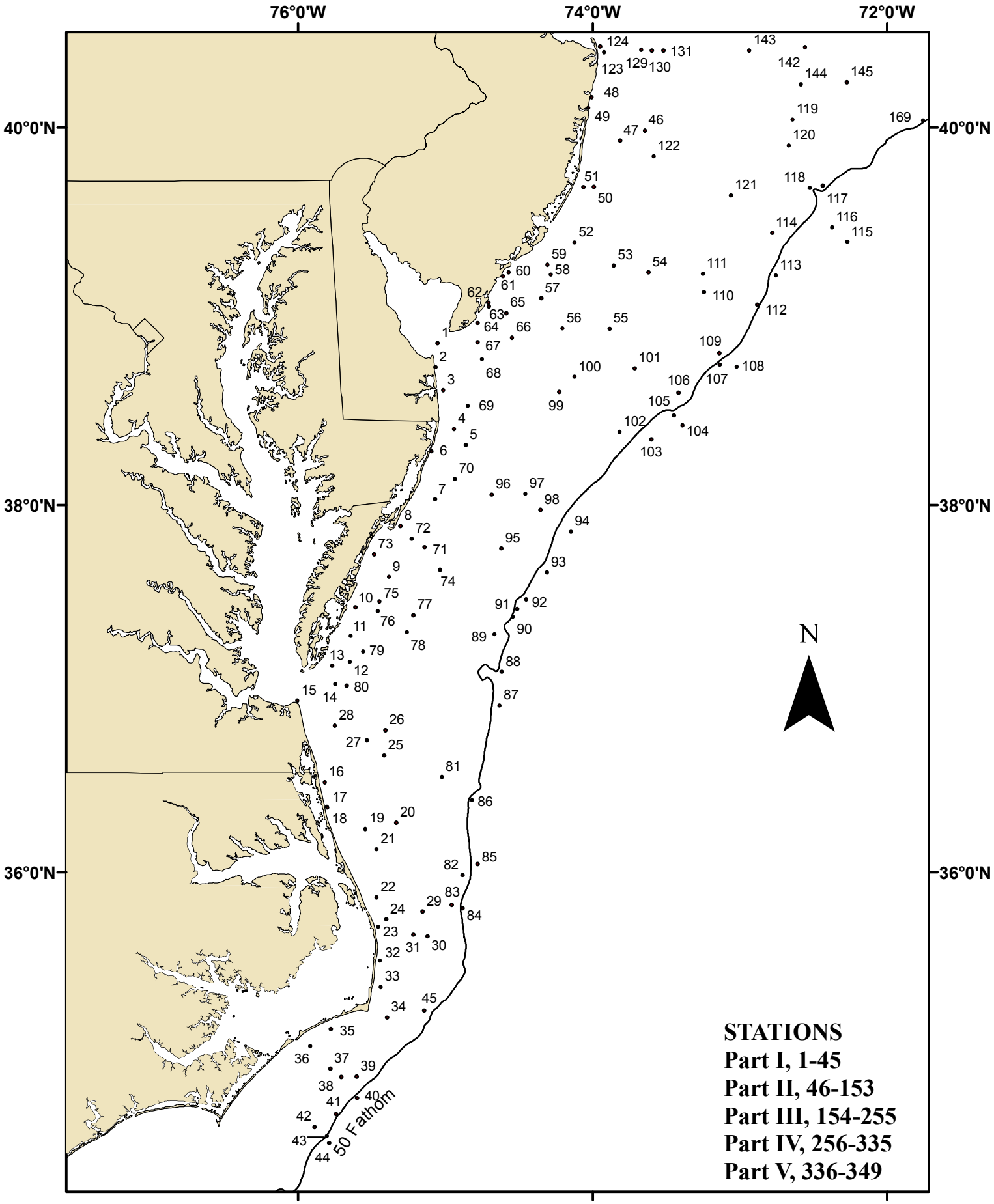

Figure 1. Trawl hauls made from NOAA Ship Albatross IV (07-07), during NOAA Fisheries Service, Northeast Fisheries Science Center fall bottom trawl survey, 5 September - 1 November 2007.

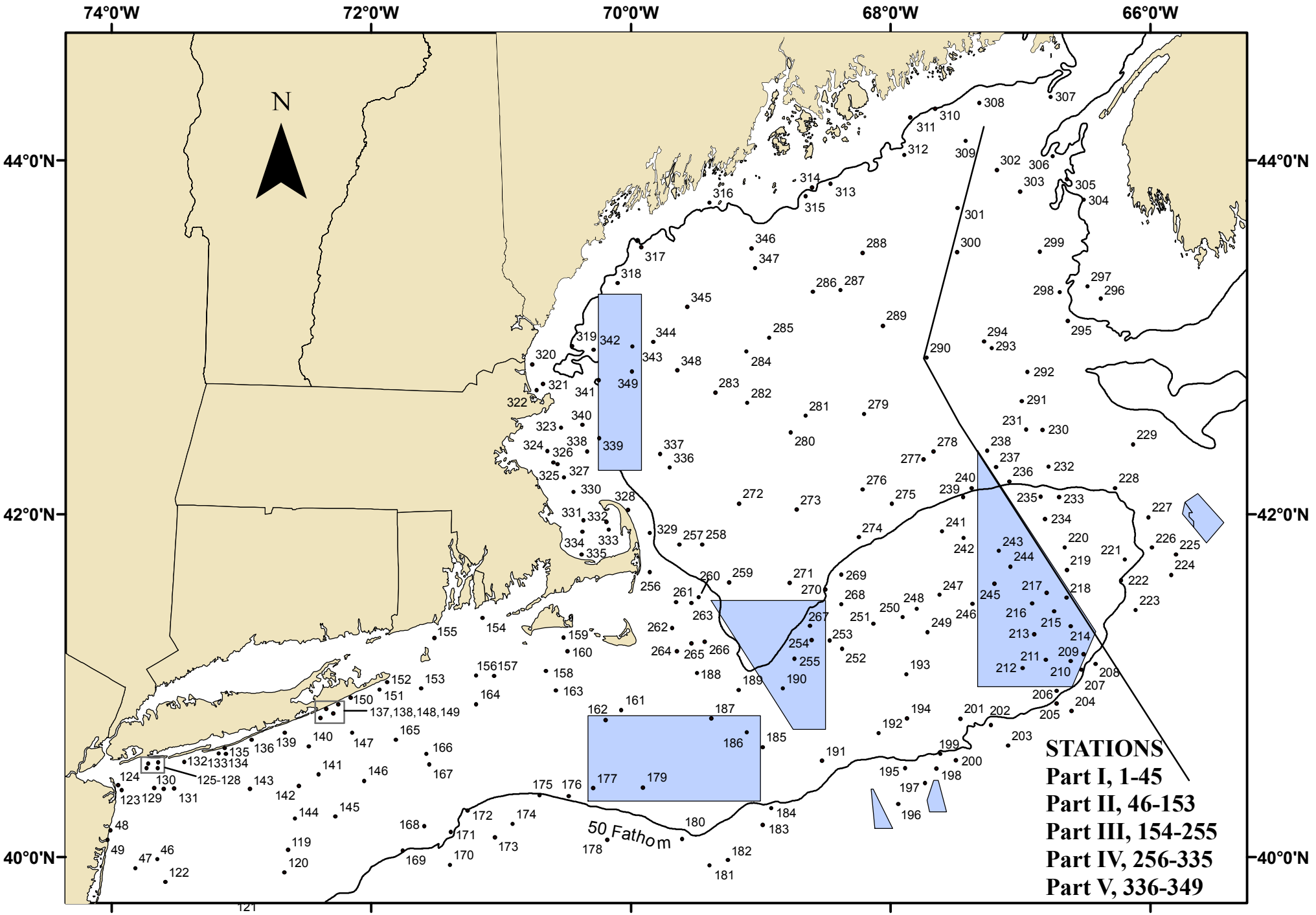

Figure 2. Trawl hauls made from NOAA FRV Albatross IV (07-07), during NOAA Fisheries Service, Northeast Fisheries Science Center fall bottom trawl survey, 5 September - 1 November 2007.

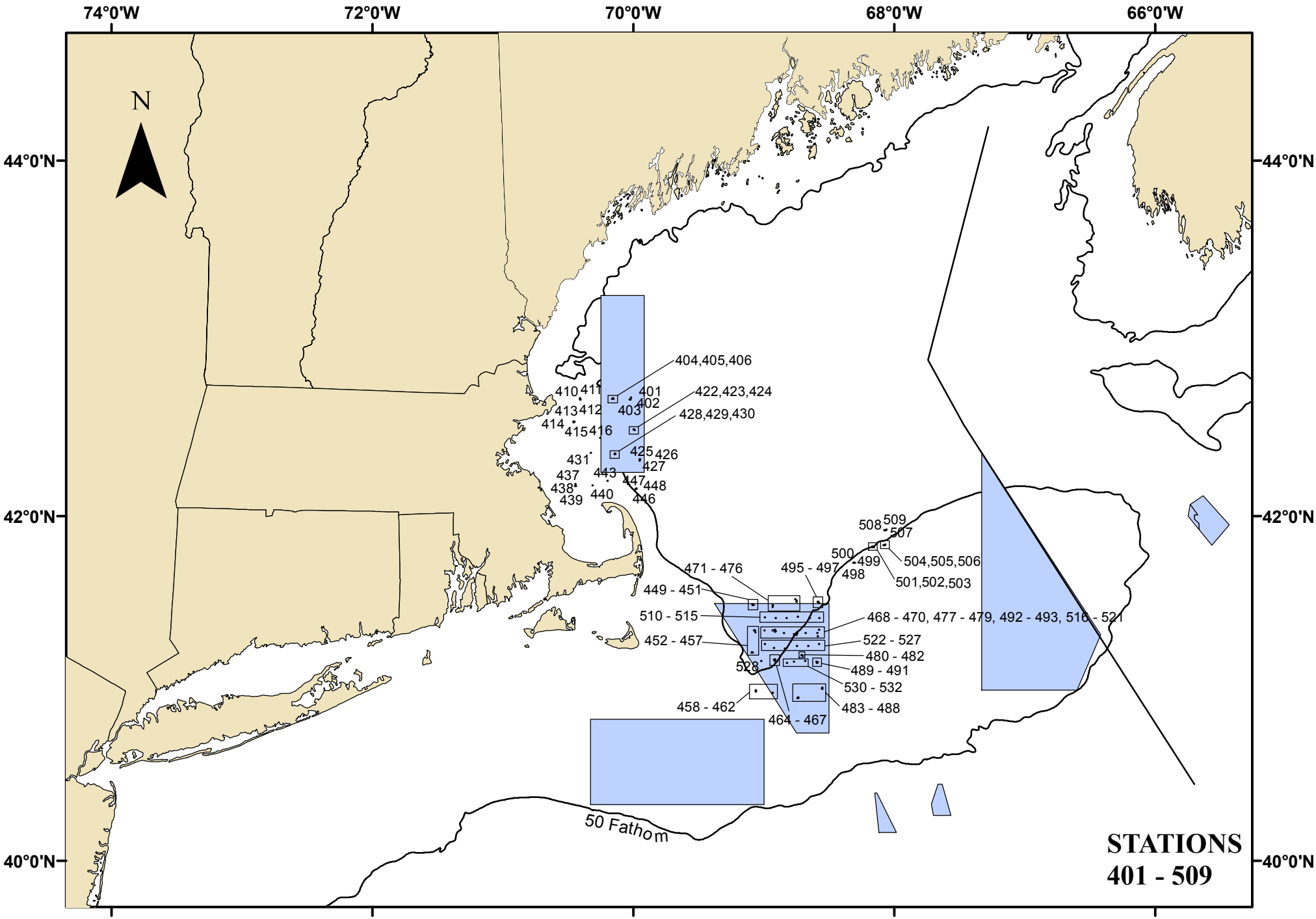

Figure 3. Trawl hauls made from NOAA FRV Albatross IV (07-08), during NOAA Fisheries Service, Northeast Fisheries Science Center calibration study, 29 October - 16 November 2007.