

CRUISE RESULTS

NOAA FRV Albatross IV
Cruise No. AL 08-03 (Parts I-V)
Autumn Bottom Trawl Survey and
Calibration Study

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 cruise period was from 2 September to 14 November 2008. The AL 08-03 bottom trawl survey and calibration study was conducted in 5 parts: Part I was from 2-16 September; Part II, 19-25 September and 29 September-3 October; Part III, 6-17 October; Part IV, 21-31 October; and Part V, 3-14 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 and 2.

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 08-03 Parts I-V conformed with the Cruise Instructions for the Autumn Bottom Trawl Survey dated 10 July 2008 and Addendum 1 dated 28 August; Addendum 2 dated 18 September; Addendum 3 dated 26 September; Addendum 4 dated 8 October; and Addendum 5 dated 27 October. Exceptions to the Cruise Instructions are as follows: Part I returned one day early due to bad weather; Part II docked in Woods Hole from 25-29 September due to bad weather; and Part IV left one day 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 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.

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.

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 441 stations with 113, 75, 96, 47, 110 stations completed on AL 08-03 Parts I-V, respectively.

Standard plankton tows were made at 11 stations. Bottom temperatures were collected at 104 stations using the CTD system. Bottom water samples for CTD calibration were taken at 36 stations.

A total of 8,700 feeding ecology and 12,699 age and growth samples were collected from 61 species (Table 1). A total of 6,219 requested samples were collected to support 30 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 ^{3,5}	David Chevrier ^{1,4,5}	Brian Smith ²
John Galbraith, Chief Scientist ^{1,2}	Stephanie Floyd ^{2,3}	Kris Tholke ³
Stacy Rowe, Chief Scientist ⁴	Rob Johnston ³	Grace Thornton ⁴
TK Arbusto ^{3,5}	Chris Legault ⁵	Susan Wigley ⁵
Cristina Bascunan ²	Sean Lucey ^{1,3}	Mark Wuenschel ³
Larry Brady ⁵	Joseph Mello ¹	
Elizabeth Brooks ¹	Victor Nordahl ⁵	
Elizabeth Broughton ⁵	Michael Palmer ⁴	
Jay Burnett ⁵	Nancy Lee Peltier ^{3,5}	

National Marine Fisheries Service, NERO, Gloucester, MA

Zachary Kennedy¹
Alden Sweet⁴
James Tarantino³

National Marine Fisheries Service, NSL, Washington, DC

La'Shaun Willis³

National Marine Fisheries Service, SEFSC, Beaufort, SC

Michael Burton²

South Carolina Division of Natural Resources, Charleston, SC

Erin Levesque¹

Contractors

Frank Capitanio ¹	ITS, Woods Hole, MA
Laurel Col ²	ITS, Woods Hole, MA
Heath Cook ^{3,4}	ITS, Woods Hole, MA
Joshua Cutler ¹	ITS, Woods Hole, MA
Sarah Emery ³	ITS, Woods Hole, MA
Corrin Flora ³	ITS, Woods Hole, MA
Ellen Johnson ^{2,3,4,5}	ITS, Woods Hole, MA
Jakub Kircun ^{1,4}	ITS, Woods Hole, MA
Ryan McDermott ¹	ITS, Woods Hole, MA
Stephanie Palker ¹	ITS, Woods Hole, MA
Adam Poquette ^{2,4}	ITS, Woods Hole, MA

Anna Priester²
Ray Shield⁴
Geoff Shook^{2, 5}
Tyler Staples⁴
Francine Stroman⁴
Amanda Tong²
Melanie Underwood⁴

A.I.S., Inc., New Bedford, MA
ITS, Woods Hole, MA
ITS, Woods Hole, MA
ITS, Woods Hole, MA
ITS, Woods Hole, MA
ITS, Woods Hole, MA
ITS, Woods Hole, MA

Volunteers

Walter Bubley⁴
Mark Burgess⁵
Lane Kester²
Rebecca Leuck²
W. David McElroy¹
Neven Popovic^{1, 5}
Elizabeth Wagley²

Dover, NH
Dennisport, MA
Madison, WI
Seattle, WA
Charlestown, RI
Edgewater, MD
Quaker Hill, CT

¹ 2-16 September

² 19-25 September and 29 September-3 October

³ 6-17 October

⁴ 21-31 October

⁵ 3-14 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 2 September to 14 November 2008.

Species	Feeding Ecology Observations	Age and Growth Samples
Acadian redfish	282	1,006
Alewife	---	3
American plaice	241	656
American shad	18	---
Atlantic cod	206	398
Atlantic croaker	187	742
Atlantic halibut	27	24
Atlantic herring	171	759
Atlantic mackerel	51	76
Atlantic menhaden	4	---
Atlantic sharpnose shark	3	---
Atlantic wolffish	7	7
Barndoor skate	137	---
Black sea bass	68	141
Blackbelly rosefish	39	---
Blueback herring	31	---
Bluefish	193	360
Buckler dory	10	---
Butterfish	342	912
Clearnose skate	136	---
Cunner	36	---
Cusk	7	7
Fawn cusk-eel	74	---
Fourbeard rockling	16	---
Fourspot flounder	204	244
Goosefish	72	96
Greater amberjack	---	1
Greenland halibut	1	2
Gulf stream flounder	102	---
Haddock	411	454
Hickory shad	3	---
Little skate	474	1
Longhorn sculpin	210	---
Northern kingfish	6	---
Northern searobin	127	2
Ocean pout	105	75
Offshore hake	19	18
Pollock	53	105
Red drum	1	1
Red hake	429	461
Rosette skate	32	1
Scup	206	421
Sea raven	137	---
Silver hake	587	1,647
Smooth dogfish	287	---

Species	Feeding Ecology Observations	Age and Growth Samples
Smooth skate	59	---
Spiny dogfish	424	574
Spot	129	5
Spotted hake	296	226
Striped bass	14	7
Striped searobin	70	---
Summer flounder	199	433
Tautog	1	1
Thorny skate	58	---
Tilefish	1	1
Weakfish	182	664
White hake	246	591
Windowpane	250	295
Winter flounder	340	561
Winter skate	218	---
Witch flounder	188	165
Yellowtail flounder	273	556
TOTALS	8,700	12,699

Table 2. Miscellaneous scientific collections made on NOAA FRV *Albatross IV*, Autumn Bottom Trawl Survey, during 2 September to 14 November 2008.

Investigator and Affiliation	Samples Saved	Approximate Number
Michael Burton, NMFS, Beaufort, NC	Black sea bass	47 indiv.
Peter Chase, NMFS, NEFSC, Woods Hole, MA	Summer flounder	1 indiv.
Bruce Collette, NMFS, NSL, Washington, DC	Various species	7 indiv.
Sergiusz Czesny, Illinois National History, Zion, IL	Alewife	17 preserved
David Dodge, USCG Academy, New London, CT	Various species	43 indiv.
Michael Fine, Virginia Commonwealth U., Richmond, VA	Striped cusk-eel	1 indiv.
John Galbraith, NMFS, NEFSC, Woods Hole, MA	Unidentified / various species	2,862 indiv.
Guest	Various species	39 indiv.
Heather Haas, NMFS, NEFSC, Woods Hole, MA	Sea turtles	1 exam.
Lisa Hendrickson, NMFS, NEFSC, Woods Hole, MA	Squid	164 indiv.
Joe Idoine, NMFS, NEFSC, Woods Hole, MA	Shrimp	77 bags
Francis Juanes, U. of Massachusetts, Amherst, MA	Offshore hake	12 preserved
	Silver hake	80 preserved
Nancy Kohler, NMFS, NEFSC, Narragansett, RI	Various sharks	12 tagged
Sheila Langosch, U. of Illinois, Chicago, IL	Clearnose skate	84 preserved
Jason Link/Brian Smith, NMFS, NEFSC, Woods Hole, MA	Various species	159 preserved
Michael Mangold, US Fish & Wildlife, Annapolis, MD	Atlantic sturgeon	1 exam.
Richard McBride, NMFS, NEFSC, Woods Hole, MA	Various species ovaries	61 exam.
Kevin McIntosh, NMFS, NEFSC, Woods Hole, MA	Various species	39 indiv.
Joe Mello, NMFS, NEFSC, Woods Hole, MA	Various sharks	11 exam.
	Various sharks	3 indiv.
Jon Moore, Florida Atlantic U., Jupiter, FL	Various species	57 indiv.
David Mountain, U. of Arizona, Tucson, AZ	Various species	115 indiv.
Tom Munroe, NMFS, NSL, Washington, DC	Tonguefish	42 indiv.
Martha Nizinski, NMFS, NSL, Washington, DC	Galatheids	16 indiv.
Loretta O'Brien, NMFS, NEFSC, Woods Hole, MA	Atlantic cod	219 exam.
Kathy Sosebee, NMFS, NEFSC, Woods Hole, MA	Spiny dogfish	188 exam.
	Various ray species	394 exam.
	Various skate species	470 exam.
Michelle Staudinger, U. of Massachusetts, Amherst, MA	Various cephalopods	50 indiv.
	Various species	365 indiv.
David Stormer, U. of Massachusetts, Amherst, MA	Bluefish	293 indiv.
Susan Wigley, NMFS, NEFSC, Woods Hole, MA	Witch flounder	1 indiv.
Workshop, NMFS, NEFSC, Woods Hole, MA	Various species	205 indiv.
Mark Wuenschel, NMFS, NEFSC, Woods Hole, MA	Haddock	83 exam./preserved

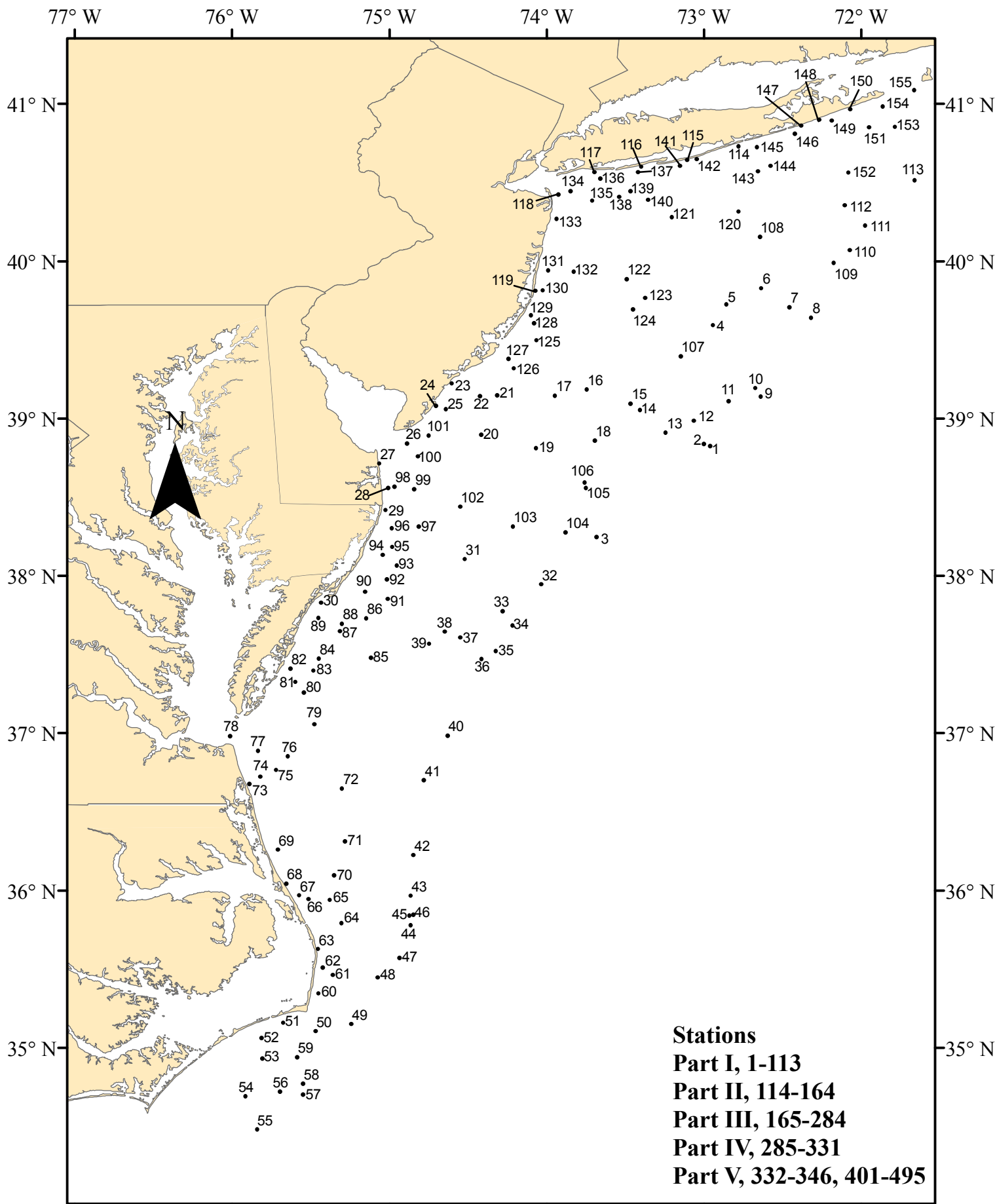


Figure 1. Trawl hauls made from NOAA FRV *Albatross IV* (08-03), during NOAA Fisheries Service, Northeast Fisheries Science Center autumn calibration survey, 2 September - 14 November, 2008.

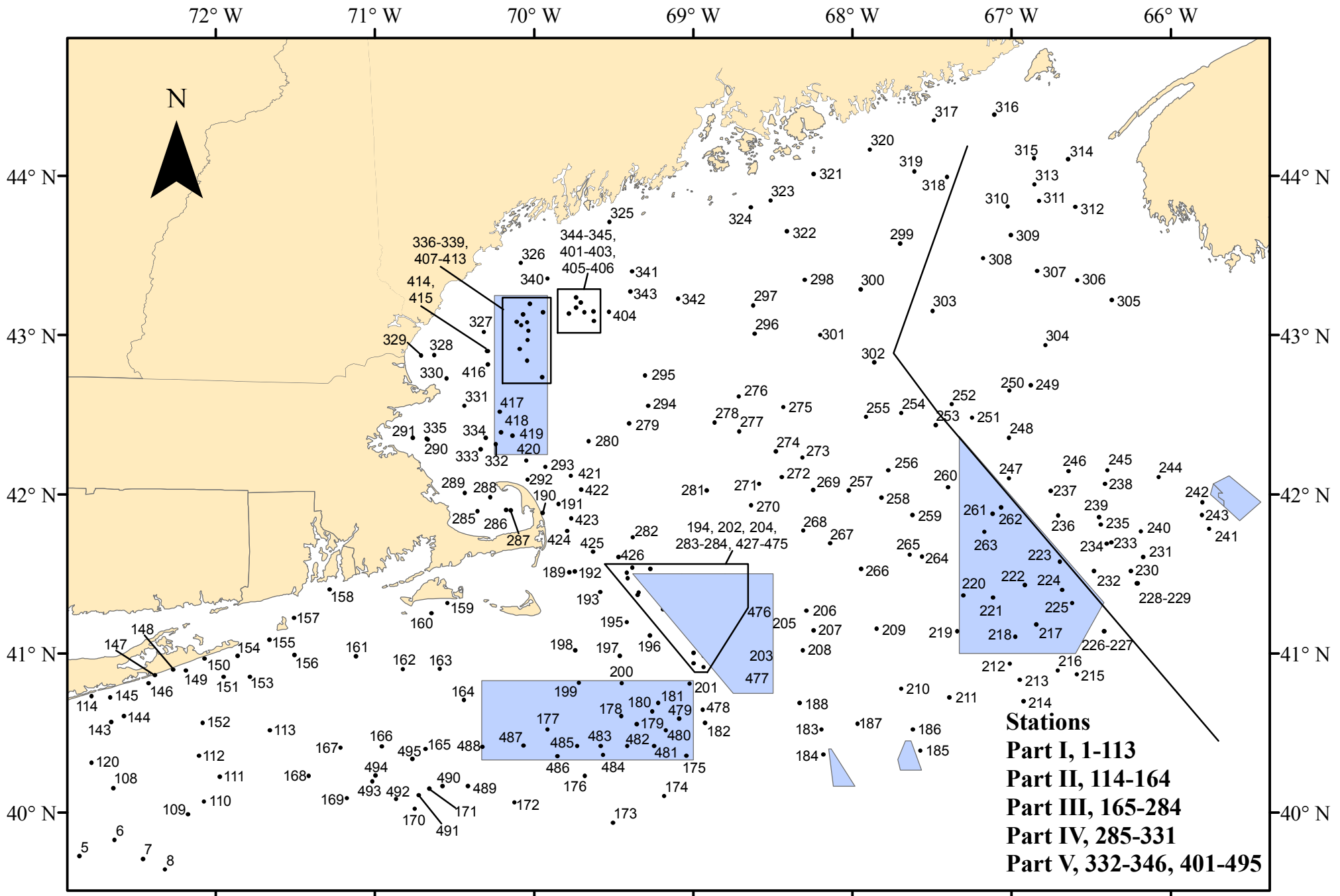


Figure 2. Trawl hauls made from NOAA FRV *Albatross IV* (08-03), during NOAA Fisheries Service, Northeast Fisheries Science Center cwwop calibration survey, 2 September - 14 November, 2008.