

DRAFT

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Appendix B

**Spatial and Temporal Distribution of NEFSC Fisheries
Research Effort**



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Appendix B

Spatial and Temporal Distribution of NEFSC Fisheries Research Effort

This Appendix provides an analysis of the spatial and temporal distributions of NEFSC fisheries research effort, by season and by LME subarea, through figures and detailed tables.

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Spatial and Temporal Distribution of NEFSC Research Activity

The amount of research effort exerted in particular seasons and in particular areas impacts the potential effects resulting from that research, i.e. to what extent are research activities concentrated in time and space. Many of the large surveys have consistent levels of effort every year but are stratified random designs so the specific location of sample sites is different every year. Other research activities, especially short-term cooperative research projects, may not have consistent levels of effort with different gear types or occur in the same general areas each year. The information in this appendix is therefore an approximation of a “typical” year of NEFSC fisheries research based on the average level of gear deployment for all surveys and projects from 2008 through 2012. Figures B-1 through B-4 break down this representative research effort by LME subarea and season, with individual tables summarizing activity by gear type and survey effort. This allows the reader to judge the concentration of research by gear type in different regions of the Northeast Continental Shelf LME. Tables B-1 through B-5 summarize the research effort in each LME subarea by season, with general descriptions of survey and gear types, along with effort levels. When combined with the figures referenced above, it provides a more complete understanding of the NEFSC research effort. See Table 2.2-1, Table 2.2-2, and Appendix A for more details on the gears used in NEFSC fisheries and ecosystem research.

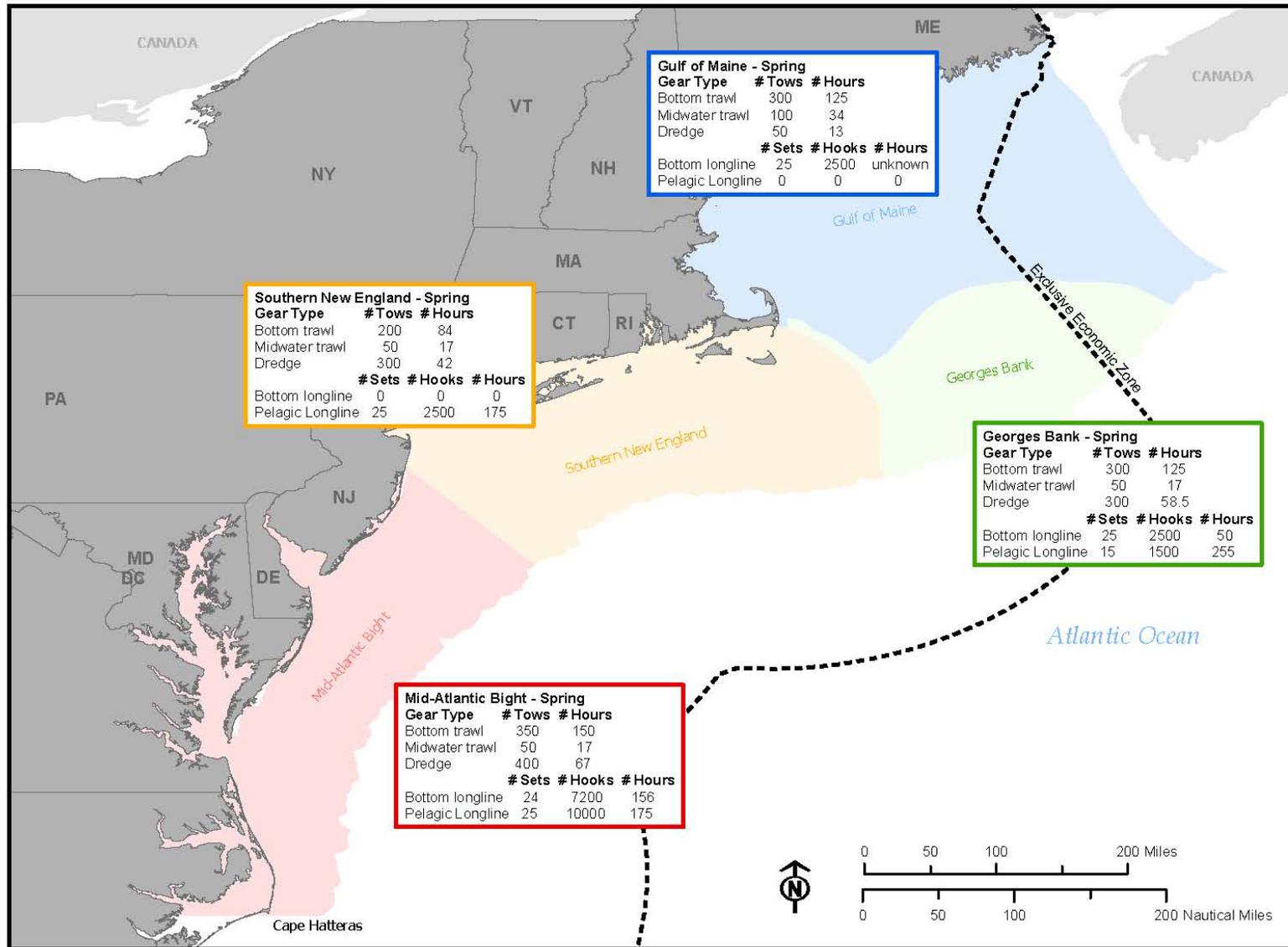


Figure B-1. Distribution of NEFSC Fisheries Research by Gear Type in March-May.

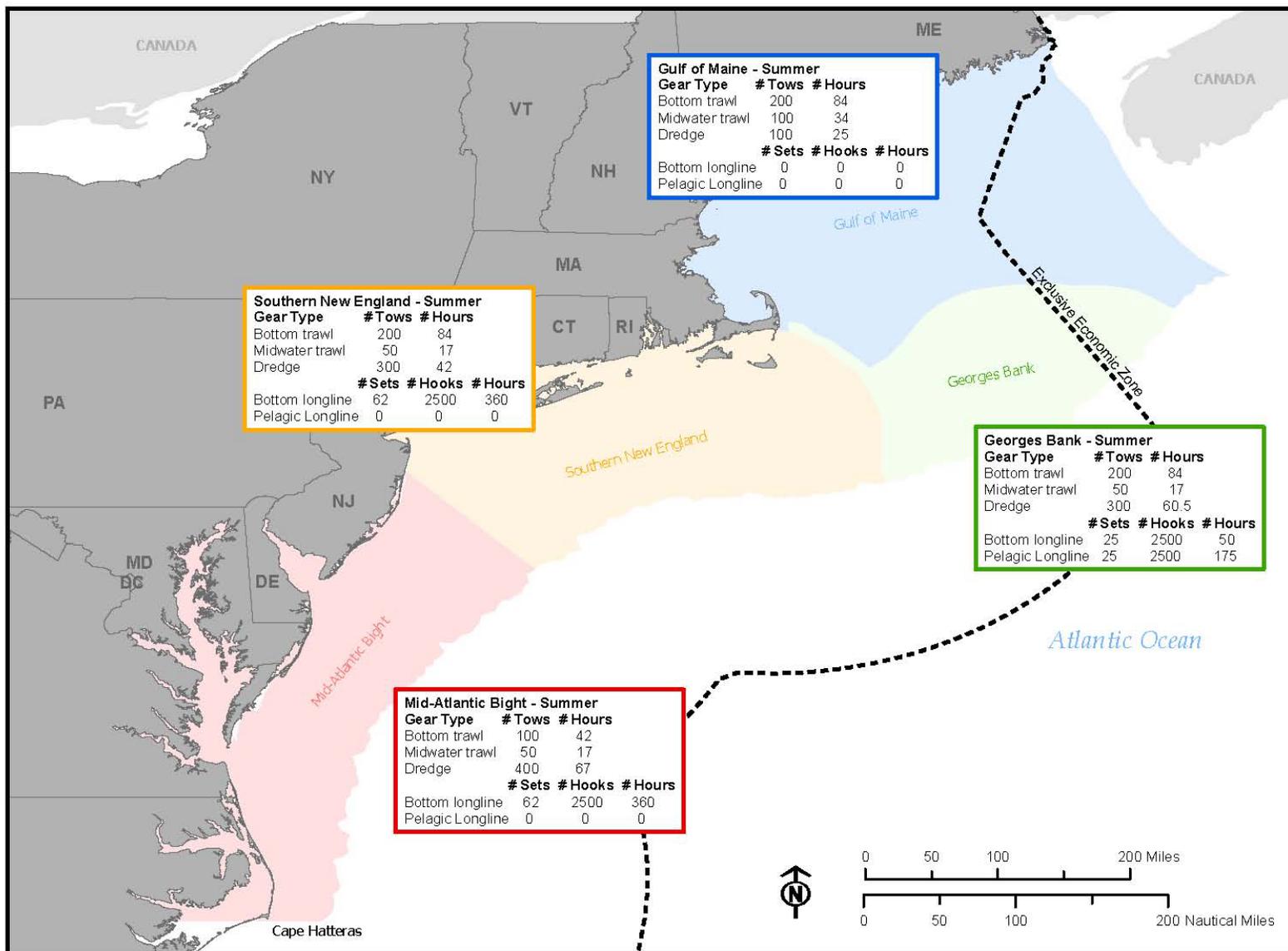


Figure B-2. Distribution of NEFSC Fisheries Research by Gear Type in June-August.

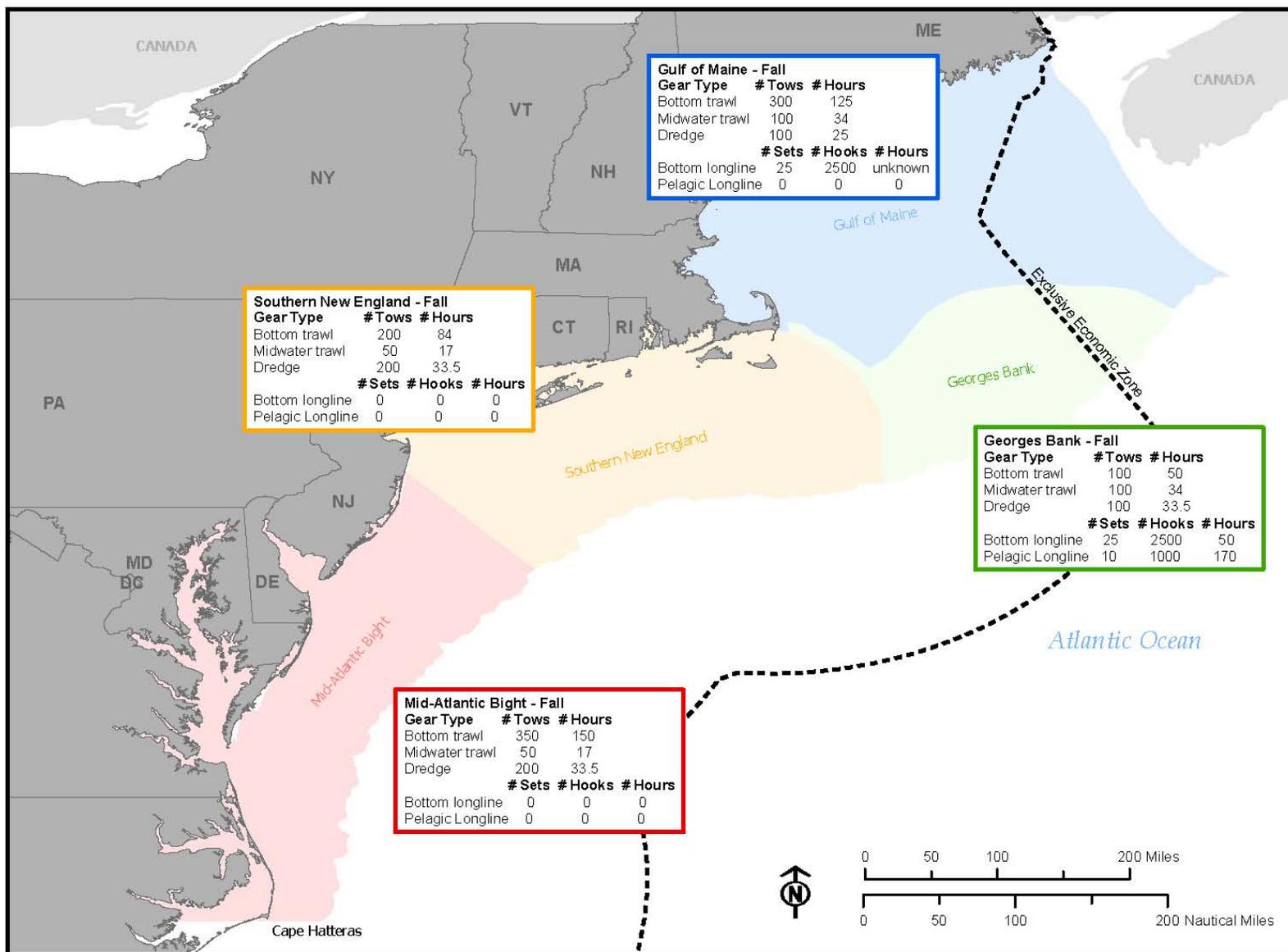


Figure B-3. Distribution of NEFSC Fisheries Research by Gear Type in September-November.

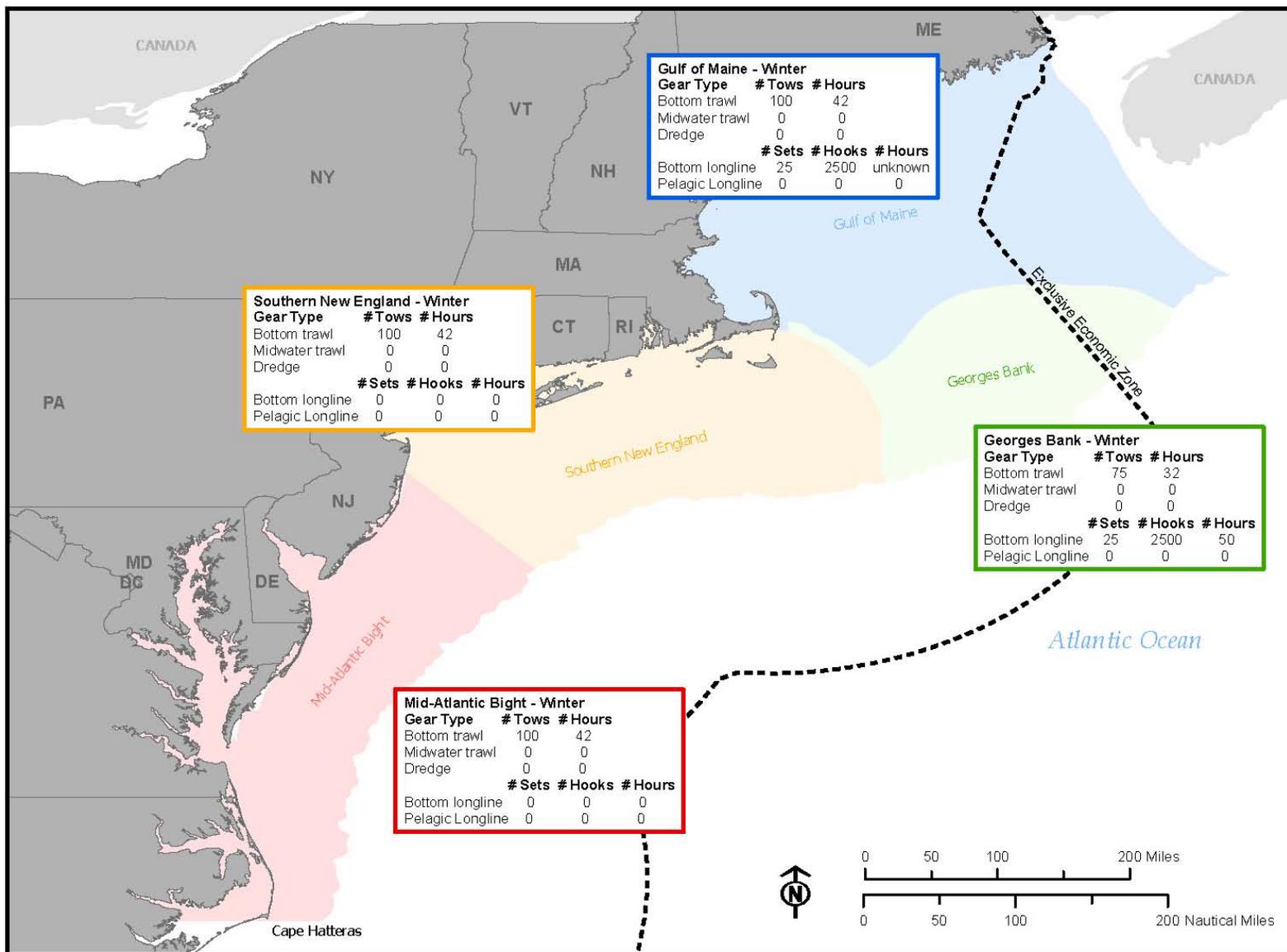


Figure B-4. Distribution of NEFSC Fisheries Research by Gear Type in December-February.

Table B-1. Distribution of research effort by gear type and season in the Gulf of Maine

Gear type	Surveys	Gear details	Sampling Events	Effort
Spring (March-May) Gulf of Maine				
Bottom Trawling	NEFSC Spring BTS NEFSC Gear Studies Maine-NH Spring BTS Integrated Benthic Surveys Cooperative Research Alosid Predation Studies MA Div of Marine Fisheries Bottom Trawl Surveys	400x12 4-Seam, Yankee 36, NEFSC Flatfish, Commercial, and Small Scientific Trawls	354 tows	20-30 min tows; ~ 142 hrs bottom time
Pelagic Trawling	Cooperative Research Atlantic Salmon Trawl Survey Penobscot Estuarine Fish Community and Ecosystem Survey	Irish Midwater and Commercial Midwater Tows Modified mid-water trawl that fishes at the surface Mamou shrimp trawl modified to fish at surface	100 tows 130 tows 50 tows	10-30 min tows; ~ 34 hrs fishing time 30-60 min tows, ~98 hrs 20 min tows, ~17 hrs
Net Sonde and Monitoring Gear	NEFSC Spring BTS NEFSC Gear Studies Maine-NH Spring BTS Integrated Benthic Surveys Cooperative Research Alosid Predation Studies	Scanmar Scanmate 6 & Scanbass Netmind Simrad ITI, PI32 & FS900	400 tows	~ 200 hrs in the water
Scallop Dredging	Cooperative Research	8' NEFSC Survey and/or 15' Commercial Dredge	50	10-15 min tows; ~13 hrs bottom time
Sediment Sampling Dredges	Integrated Benthic Surveys	Eckman Dredge Ponar Grab	50 dredge samples	10 m ³ of sediment
Bottom Longline	Cooperative Research	Commercial bottom longline	25 100-hook sets	5000 hook days
Split Beam Acoustics	NEFSC Spring BTS NEFSC Gear Studies Maine-NH Spring BTS Integrated Benthic Surveys Cooperative Research Alosid Predation Studies	Simrad EK-60 Simrad EK-500	Continuous Operations	500 hrs

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Gear type	Surveys	Gear details	Sampling Events	Effort
Multibeam Acoustics	NEFSC Spring BTS NEFSC Gear Studies Integrated Benthic Surveys	Simrad ME-70 EM-3002	Continuous Operations	500 hrs
Acoustic Doppler Current Profiler	NEFSC Spring BTS NEFSC Gear Studies Integrated Benthic Surveys	Teledyne Workhorse Mariner RD Instruments OS 75	Continuous Operations	500 hrs
Sidescan Sonar	Integrated Benthic Surveys Survey	Edgetech Side Scan Sonar	Continuous Operations	500 hrs
Acoustic Telemetry	Inshore Telemetry Studies Cooperative Research	Vemco VR-2 Receivers	Up to 50 Moorings	Up to 1000 Mooring Days
Suspended and Towed Underwater Video Systems	Integrated Benthic Surveys Scallop RSA Studies	HabCam System SMAST Tripod Camera	Continuous Operations	500 hrs
CTD	NEFSC Spring BTS NEFSC Gear Studies Maine-NH Spring BTS Integrated Benthic Surveys Cooperative Research Alosid Predation Studies	Seabird CTD and Other CTD models	150 casts	75 hrs in water
Plankton Sampling	NEFSC Spring BTS NEFSC Gear Studies Maine-NH Spring BTS Integrated Benthic Surveys Cooperative Research Alosid Predation Studies	Bongo Nets Smaller Research Plankton Nets	150 samples	75 hrs

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Gear type	Surveys	Gear details	Sampling Events	Effort
Summer (June-August) Gulf of Maine				
Bottom Trawling	AFMSC Shrimp Integrated Benthic Surveys NEFSC Gear Studies Cooperative Research Alosid Predation Studies	NEFSC Shrimp, 400X12 4-Seam, Yankee 36, NEFSC Flatfish, Commercial and Small Scientific Trawls	200 tows	20-30 min tows; ~ 144 hrs bottom time
	Changes in the Community Structure of Benthic Fishes	16 ft trawl	176 tows	
	Deep-sea Coral Survey	2-m beam trawl	8 tows	
Pelagic Trawling	Cooperative Research	Irish Midwater and Commercial Midwater Tows	100 tows	10-30 min tows; ~ 51 hrs fishing time
	Penobscot Estuarine Fish Community and Ecosystem Survey	Mamou shrimp trawl modified to fish at surface	50 tows	
Net Sonde and Monitoring Gear	AFMSC Shrimp Integrated Benthic Surveys NEFSC Gear Studies Cooperative Research Alosid Predation Studies	Scanmar Scanmate 6 & Scanbass Netmind Simrad ITI, I32	300 tows	~ 150 hrs in the water
Beach Seine	Beach Seine Survey	45 m beach seine, 5mm nylon mesh	100 sets	Variable
Fyke Net	Fyke Net Survey	2m fyke:- 2x2m – 1.9 cm main/0.6cm mesh 1m fyke:- 1x1m – 0.6cm mesh	100 sets	Variable
Scallop Dredging	NEFSC Sea Scallop Cooperative Research	8' NEFSC Survey and/or 15' Commercial Dredge	100 tows	10-15 min tows; ~25 hrs bottom time
Sediment Sampling Dredges	Integrated Benthic Surveys	Eckman Dredge Ponar Grab	50 dredge samples	10 m ³ of sediment
Bottom Longline	Cooperative Research	Commercial bottom longline	25 100-hook sets	5000 hook days
Split Beam Acoustics	AFMSC Shrimp Integrated Benthic Surveys NEFSC Gear Studies Cooperative Research Alosid Predation Studies	Simrad EK-60 Simrad EK-500	Continuous Operations	500 hrs

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Gear type	Surveys	Gear details	Sampling Events	Effort
Multibeam Acoustics	AFMSC Shrimp Integrated Benthic Surveys NEFSC Gear Studies Alosid Predation Studies	Simrad ME-70 EM-3002	Continuous Operations	500 hrs
Acoustic Doppler Current Profiler	Integrated Benthic Surveys NEFSC Gear Studies	Teledyne Workhorse Mariner RD Instruments OS 75	Continuous Operations	500 hrs
Acoustic Telemetry	Inshore Telemetry Studies Cooperative Research	Vemco VR-2 Receivers	Up to 50 Moorings	Up to 1000 Mooring Days
Sidescan Sonar	Integrated Benthic Surveys Survey	Edgetech Side Scan Sonar	Continuous Operations	500 hrs
Suspended and Towed Underwater Video Systems	Integrated Benthic Surveys Scallop RSA Studies	HabCam System SMAST Tripod Camera	Continuous Operations	500 hrs
CTD	AFMSC Shrimp Integrated Benthic Surveys NEFSC Gear Studies Cooperative Research Alosid Predation Studies	Seabird CTD and Other CTD models	150 casts	75 hrs in water
Plankton Sampling	AFMSC Shrimp Integrated Benthic Surveys NEFSC Gear Studies Cooperative Research Alosid Predation Studies	Bongo Nets and Smaller Research Plankton Nets	150 samples	75 hrs
Fall (September-November) Gulf of Maine				
Bottom Trawling	NEFSC Autumn BTS NEFSC Gear Studies Maine-NH Autumn BTS Alosid Predation Studies MA Div of Marine Fisheries Bottom Trawl Surveys	400x12 4-Seam, Yankee 36, NEFSC Flatfish, Commercial, and Small Scientific Trawls	354 tows	20-30 min tows; ~ 142 hrs bottom time

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Gear type	Surveys	Gear details	Sampling Events	Effort
Pelagic Trawling	NEFSC Herring Acoustic Survey Cooperative Research Penobscot Estuarine Fish Community and Ecosystem Survey	Irish Midwater, High Speed Rope and Commercial Midwater Trawls Mamou shrimp trawl modified to fish at surface	100 tows 50 tows	10-30 min tows; ~ 51 hrs fishing time
Net Sonde and Monitoring Gear	NEFSC Autumn BTS NEFSC Gear Studies Maine-NH Autumn BTS NEFSC Herring Acoustic Survey Integrated Benthic Surveys Cooperative Research Alosid Predation Studies	Scanmar Scanmate 6 & Scanbass Netmind Simrad ITI, PI32 & FS900	400 tows	~ 200 hrs in the water
Scallop Dredging	Cooperative Research	8' NEFSC Survey and/or 15' Commercial Dredge	100	10-15 min tows; ~25 hrs bottom time
Sediment Sampling Dredges	Integrated Benthic Surveys	Eckman Dredge Ponar Grab	50 dredge samples	10 m3 of sediment
Bottom Longline	Cooperative Research	Commercial bottom longline	25 100-hook sets	5000 hook days
Split Beam Acoustics	NEFSC Autumn BTS NEFSC Gear Studies Maine-NH Autumn BTS Alosid Predation Studies NEFSC Herring Acoustic Survey Cooperative Research	Simrad EK-60 Simrad EK-500	Continuous Operations	500 hrs
Multibeam Acoustics	NEFSC Autumn BTS NEFSC Gear Studies NEFSC Herring Acoustic Survey	Simrad ME-70 EM-3002	Continuous Operations	500 hrs
Acoustic Telemetry	Inshore Telemetry Studies Cooperative Research	Vemco VR-2 Receivers	Up to 50 Moorings	Up to 1000 Mooring Days
Sidescan Sonar	Integrated Benthic Surveys Survey	Edgetech Side Scan Sonar	Continuous Operations	500 hrs
Suspended and Towed Underwater Video Systems	Integrated Benthic Surveys Scallop RSA Studies	HabCam System SMAST Tripod Camera	Continuous Operations	500 hrs

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Gear type	Surveys	Gear details	Sampling Events	Effort
Acoustic Doppler Current Profiler	NEFSC Autumn BTS NEFSC Gear Studies NEFSC Herring Acoustic Survey	Teledyne Workhorse Mariner RD Instruments OS 75	Continuous Operations	1500 hrs
CTD	NEFSC Autumn BTS NEFSC Gear Studies Maine-NH Autumn BTS Alosid Predation Studies NEFSC Herring Acoustic Survey Cooperative Research	Seabird CTD and Other CTD models	150 casts	75 hrs in water
Plankton Sampling	NEFSC Autumn BTS NEFSC Gear Studies Maine-NH Autumn BTS Alosid Predation Studies NEFSC Herring Acoustic Survey Cooperative Research	Bongo Nets and Smaller Research Plankton Nets	150 samples	75 hrs
Winter (December-February) Gulf of Maine				
Bottom Trawling	Cooperative Research LMRCSC Survey NEFSC Gear Studies	400X12 4-Seam and Commercial Trawls	100 tows	20-30 min tows; ~ 42 hrs bottom time
Pelagic	Penobscot Estuarine Fish Community and Ecosystem Survey	Mamou shrimp trawl modified to fish at surface	50 tows	20 min tows, 17 hrs
Net Sonde and Monitoring Gear	Cooperative Research LMRCSC Survey NEFSC Gear Studies	Scanmar Scanmate 6 & Scanbass Netmind Simrad ITI, I32	100 tows	~ 60 hrs in the water
Bottom Longline	Cooperative Research	Commercial bottom longline	25 100-hook sets	5000 hook days
Split Beam Acoustics	Cooperative Research LMRCSC Survey NEFSC Gear Studies	Simrad EK-60 Simrad EK-500	Continuous Operations	500 hrs
Multibeam Acoustics	LMRCSC Survey	Simrad ME-70 EM-3002	Continuous Operations	500 hrs

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Gear type	Surveys	Gear details	Sampling Events	Effort
Acoustic Doppler Current Profiler	Cooperative Research LMRCSC Survey NEFSC Gear Studies	Teledyne Workhorse Mariner RD Instruments OS 75	Continuous Operations	1500 hrs
CTD	Cooperative Research LMRCSC Survey NEFSC Gear Studies	Seabird CTD and Other CTD models	150 casts	75 hrs in water
Plankton Sampling	Cooperative Research LMRCSC Survey	Bongo Nets and Smaller Research Plankton Nets	100 samples	50 hrs

Table B-2. Distribution of research effort by gear type and season in Georges Bank

Gear type	Surveys	Gear details	Sampling Events	Effort
Spring (March-May) Georges Bank				
Bottom Trawling	NEFSC Spring BTS NEFSC Gear Studies Integrated Benthic Surveys Cooperative Research	400X12 4-Seam, Yankee 36, NEFSC Flatfish and Commercial Trawls	300 tows	20-30 min tows; ~ 125 hrs bottom time
Pelagic Trawling	Cooperative Research	Irish Midwater and Commercial Midwater	50 tows	10-30 min tows; ~ 17 hrs fishing time
Net Sonde and Monitoring Gear	NEFSC Spring BTS NEFSC Gear Studies Maine-NH Spring BTS Integrated Benthic Surveys Cooperative Research Alosid Predation Studies	Scanmar Scanmate 6 & Scanbass Netmind Simrad ITI, PI32 & FS900	350 tows	~ 180 hrs in the water
Scallop Dredging	Cooperative Research	8' NEFSC Survey and/or 15' Commercial Dredge	200	10-15 min tows; ~50 hrs bottom time
Clam Dredging	NEFSC Surfclam and Ocean Quahog Dredge Cooperative Research	NEFSC Clam and/or Commercial Dredge	100	5 min tows; ~ 8.5 hrs bottom time
Bottom Longline	Cooperative Research	Commercial bottom longline	25 100-hook sets	5000 hook days
Sediment Sampling Dredges	Integrated Benthic Surveys Surveys	Eckman Dredge Ponar Grab	50 dredge samples	10 m ³ of sediment
Split Beam Acoustics	NEFSC Spring BTS NEFSC Gear Studies Integrated Benthic Surveys Cooperative Research NEFSC Surfclam and Ocean Quahog Dredge NEFSC Apex Predator	Simrad EK-60 Simrad EK-500	Continuous Operations	500 hrs
Multibeam Acoustics	NEFSC Spring BTS NEFSC Gear Studies Integrated Benthic Surveys	Simrad ME-70 EM-3002	Continuous Operations	500 hrs
Acoustic Doppler Current Profiler	NEFSC Spring BTS NEFSC Gear Studies Integrated Benthic Surveys	Teledyne Workhorse Mariner RD Instruments OS 75	Continuous Operations	500 hrs

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Gear type	Surveys	Gear details	Sampling Events	Effort
Sidescan Sonar	Integrated Benthic Surveys Survey	Edgetech Side Scan Sonar	Continuous Operations	500 hrs
Suspended and Towed Underwater Video Systems	Integrated Benthic Surveys Scallop RSA Studies	HabCam System SMAST Tripod Camera	Continuous Operations	500 hrs
CTD	NEFSC Spring BTS NEFSC Gear Studies Integrated Benthic Surveys Cooperative Research NEFSC Surfclam and Ocean Quahog Dredge NEFSC Apex Predator	Seabird CTD and Other CTD models	150 casts	75 hrs in water
Plankton Sampling	NEFSC Spring BTS Integrated Benthic Surveys Cooperative Research NEFSC Surfclam and Ocean Quahog Dredge NEFSC Apex Predator	Bongo Nets and Smaller Research Plankton Nets	150 samples	75 hrs
Summer (June-August) Georges Bank				
Bottom Trawling	NEFSC Gear Studies Integrated Benthic Surveys Cooperative Research Deep-sea Coral Survey	400X12 4-Seam, Yankee 36, NEFSC Flatfish and Commercial Trawls 2 m beam trawl	208 tows	20-30 min tows; ~ 87 hrs bottom time
Pelagic Trawling	Cooperative Research	Irish Midwater and Commercial Midwater Trawls	50 tows	10-30 min tows; ~ 17 hrs fishing time
Net Sonde and Monitoring Gear	NEFSC Gear Studies Integrated Benthic Surveys Cooperative Research Alosid Predation Studies	Scanmar Scanmate 6 & Scanbass Netmind Simrad ITI, PI32	250 tows	~ 130 hrs in the water
Scallop Dredging	NEFSC Sea Scallop Cooperative Research	8' NEFSC Survey and/or 15' Commercial Dredge	200	10-15 min tows; ~52 hrs bottom time
Clam Dredging	NEFSC Surfclam and Ocean Quahog Dredge Cooperative Research	NEFSC Clam and/or Commercial Dredge	100	5 min tows; ~ 8.5 hrs bottom time
Sediment Sampling Dredges	Integrated Benthic Surveys Surveys	Eckman Dredge Ponar Grab	50 dredge samples	10 m ³ of sediment
Bottom Longline	Cooperative Research	Commercial bottom longline	25 100-hook sets	5000 hook days

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Gear type	Surveys	Gear details	Sampling Events	Effort
Split Beam Acoustics	NEFSC Gear Studies Integrated Benthic Surveys Cooperative Research NEFSC Sea Scallop NEFSC Surfclam and Ocean Quahog Dredge	Simrad EK-60 Simrad EK-500	Continuous Operations	500 hrs
Multibeam Acoustics	NEFSC Gear Studies Integrated Benthic Surveys	Simrad ME-70 EM-3002	Continuous Operations	500 hrs
Acoustic Doppler Current Profiler	NEFSC Gear Studies Integrated Benthic Surveys NEFSC Sea Scallop NEFSC Surfclam and Ocean Quahog Dredge	Teledyne Workhorse Mariner RD Instruments OS 75	Continuous Operations	500 hrs
Sidescan Sonar	Integrated Benthic Surveys Survey	Edgetech Side Scan Sonar	Continuous Operations	500 hrs
Suspended and Towed Underwater Video Systems	Integrated Benthic Surveys Scallop RSA Studies	HabCam System SMAST Tripod Camera	Continuous Operations	500 hrs
CTD	NEFSC Gear Studies Integrated Benthic Surveys Cooperative Research NEFSC Sea Scallop NEFSC Surfclam and Ocean Quahog Dredge	Seabird CTD and Other CTD models	100 casts	100 hrs in water
Plankton Sampling	NEFSC Gear Studies Integrated Benthic Surveys Cooperative Research NEFSC Sea Scallop NEFSC Surfclam and Ocean Quahog Dredge	Bongo Nets and Smaller Research Plankton Nets	150 samples	75 hrs
Fall (September-November) Georges Bank				
Bottom Trawling	NEFSC Autumn BTS NEFSC Gear Studies Autumn	400X12 4-Seam, Yankee 36 , NEFSC Flatfish, and Commercial Trawls	100 tows	20-30 min tows; ~ 50 hrs bottom time
Pelagic Trawling	NEFSC Herring Acoustic Cooperative Research	Irish Midwater, High Speed Rope, and/or Commercial Midwater Trawls	100 tows	10-30 min tows; ~ 34 hrs fishing time
Net Sonde and Monitoring	NEFSC Autumn BTS	Scanmar Scanmate 6 & Scanbass	200 tows	~ 110 hrs in the water

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Gear type	Surveys	Gear details	Sampling Events	Effort
Gear	NEFSC Gear Studies Maine-NH Autumn BTS Integrated Benthic Surveys Cooperative Research Alosid Predation Studies	Netmind Simrad ITI, PI32 & FS900		
Scallop Dredging	Cooperative Research	8' NEFSC Survey and/or 15' Commercial Dredge	100	10-15 min tows; ~25 hrs bottom time
Clam Dredging	Cooperative Research	NEFSC Clam and/or Commercial Dredge	100	5 min tows; ~ 8.5 hrs bottom time
Bottom Longline	Cooperative Research	Commercial bottom longline	25 100-hook sets	5000 hook days
Pelagic Longline	Apex Predators Pelagic Nursery Grounds Shark	Commercial Pelagic Longline 1020 hooks	10 sets	~17 hrs in the water/set ~170 hrs in the water
Split Beam Acoustics	NEFSC Autumn BTS NEFSC Gear Studies Autumn NEFSC Herring Acoustic Cooperative Research	Simrad EK-60 Simrad EK-500	Continuous Operations	500 hrs
Multibeam Acoustics	NEFSC Autumn BTS NEFSC Gear Studies NEFSC Herring Acoustic	Simrad ME-70 EM-3002	Continuous Operations	500 hrs
Acoustic Doppler Current Profiler	NEFSC Autumn BTS NEFSC Gear Studies Autumn NEFSC Herring Acoustic	Teledyne Workhorse Mariner RD Instruments OS 75	Continuous Operations	500 hrs
Sidescan Sonar	Integrated Benthic Surveys Survey	Edgetech Side Scan Sonar	Continuous Operations	500 hrs
Suspended and Towed Underwater Video Systems	Integrated Benthic Surveys Scallop RSA Studies	HabCam System SMASST Tripod Camera	Continuous Operations	500 hrs
CTD	NEFSC Autumn BTS NEFSC Gear Studies Autumn NEFSC Herring Acoustic Cooperative Research	Seabird CTD and Other CTD models	100 casts	100 hrs in water
Plankton Sampling	NEFSC Autumn BTS NEFSC Gear Studies Autumn NEFSC Herring Acoustic	Bongo Nets and Smaller Research Plankton Nets	150 samples	75 hrs

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Gear type	Surveys	Gear details	Sampling Events	Effort
Winter (December-February) Georges Bank				
Bottom Trawling	Cooperative Research LMRCSC Survey NEFSC Gear Studies Integrated Benthic Surveys	400X12 4-Seam, Commercial and Small Scientific Trawls	75 tows	20-30 min tows; ~ 32 hrs bottom time
Net Sonde and Monitoring Gear	Cooperative Research LMRCSC Survey NEFSC Gear Studies Integrated Benthic Surveys	Scanmar Scanmate 6 & Scanbass Netmind Simrad ITI, PI32 & FS900	75 tows	~ 50 hrs in the water
Bottom Longline	Cooperative Research	Commercial bottom longline	25 100-hook sets	5000 hook days
Split Beam Acoustics	Cooperative Research LMRCSC Survey NEFSC Gear Studies Integrated Benthic Surveys	Simrad EK-60 Simrad EK-500	Continuous Operations	200 hrs
Multibeam Acoustics	LMRCSC Survey Integrated Benthic Surveys	Simrad ME-70	Continuous Operations	500 hrs
Acoustic Doppler Current Profiler	Cooperative Research LMRCSC Survey NEFSC Gear Studies	Teledyne Workhorse Mariner RD Instruments OS 75	Continuous Operations	500 hrs
CTD	Cooperative Research LMRCSC Survey NEFSC Gear Studies	Seabird CTD and Other CTD models	150 casts	75 hrs in water
Plankton Sampling	Cooperative Research LMRCSC Survey	Bongo Nets and Smaller Research Plankton Nets	100 samples	50 hrs

Table B-3. Distribution of research effort by gear type and season in Southern New England

Gear type	Surveys	Gear details	Sampling Events	Effort
Spring (March-May) Southern New England				
Bottom Trawling	NEFSC Spring BTS NEFSC Gear Studies NEAMAP Spring BTS Integrated Benthic Surveys Cooperative Research MA Div of Marine Fisheries Bottom Trawl Surveys	400X12 4-Seam, Yankee 36, NEFSC Flatfish and Commercial Trawls Otter trawls	254 tows	20-30 min tows; ~ 101 hrs bottom time
Pelagic Trawling	Cooperative Research	Irish Midwater and Commercial Midwater Trawls	50 tows	10-30 min tows; ~ 17 hrs fishing time
Net Sonde and Monitoring Gear	NEFSC Spring BTS NEFSC Gear Studies NEAMAP Spring BTS Integrated Benthic Surveys Cooperative Research	Scanmar Scanmate 6 & Scanbass Netmind Simrad ITI, PI32 & FS900	250 tows	~ 110 hrs in the water
Gillnet	Inshore Telemetry	Variable mesh experimental gillnets	10 100-foot gillnets	2 hour soak time/set; 600 hrs total soak time
Scallop Dredging	NEFSC Sea Scallop Cooperative Research	8' NEFSC Survey and/or 15' Commercial Dredge	100 tows	10-15 min tows; ~25 hrs bottom time
Clam Dredging	NEFSC Surfclam and Ocean Quahog Dredge Cooperative Research	NEFSC Clam Dredge and/or Commercial Dredge	200 tows	5 min tows; ~ 17 hrs bottom time
Sediment Sampling Dredges	NEFSC Sea Scallop NEFSC Surfclam and Ocean Quahog Integrated Benthic Surveys Survey	Eckman Dredge Ponar Grab	50 dredge samples	10m ³ of sediment
Split Beam Acoustics	NEFSC Spring BTS NEFSC Gear Studies NEAMAP Spring BTS NEFSC Surfclam and Ocean Quahog Dredge NEFSC Sea Scallop Integrated Benthic Surveys	Simrad EK-60 Simrad EK-500	Continuous Operations	500 hrs

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Gear type	Surveys	Gear details	Sampling Events	Effort
Multibeam Acoustics	NEFSC Spring BTS NEFSC Gear Studies	Simrad ME-70	Continuous Operations	500 hrs
Acoustic Doppler Current Profiler	NEFSC Spring BTS NEFSC Gear Studies	Teledyne Workhorse Mariner RD Instruments OS 75	Continuous Operations	500 hrs
Sidescan Sonar	Integrated Benthic Surveys Survey	Edgetech Side Scan Sonar	Continuous Operations	500 hrs
Suspended and Towed Underwater Video Systems	Integrated Benthic Surveys Scallop RSA Studies	HabCam System SMAST Tripod Camera	Continuous Operations	500 hrs
CTD	NEFSC Spring BTS NEFSC Gear Studies NEAMAP Spring BTS NEFSC Surfclam and Ocean Quahog Dredge NEFSC Sea Scallop Integrated Benthic Surveys	Seabird CTD and Other CTD models	150 casts	75 hrs in water
Plankton Sampling	NEFSC Spring BTS NEFSC Surfclam and Ocean Quahog Dredge NEFSC Sea Scallop Integrated Benthic Surveys Survey	Bongo Nets and Smaller Research Plankton Nets	100 samples	50 hrs
Summer (June-August) Southern New England				
Bottom Trawling	Integrated Benthic Surveys NEFSC Gear Studies Cooperative Research Deep-sea Coral Survey	400X12 4-Seam, Yankee 36, NEFSC Flatfish and Commercial Trawls 2-m beam trawl	200 tows 8 tows	20-30 min tows; ~ 87 hrs bottom time
Pelagic Trawling	Cooperative Research	Irish Midwater Trawl and/or Commercial Midwater Trawls	50 tows	10-30 min tows; ~ 17 hrs fishing time
Net Sonde and Monitoring Gear	Integrated Benthic Surveys NEFSC Gear Studies Cooperative Research	Scanmar Scanmate 6 & Scanbass Netmind Simrad ITI, PI32 & FS900	250 tows	~ 110 hrs in the water
Gillnet	Inshore Telemetry Studies	Variable Mesh Experimental Gillnets	10 100-foot gillnets	2 hour soak time; 600 total net hrs
Beach Seine	Beach Seine Survey	45 m beach seine, 5mm nylon mesh	90 sets	Variable

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Gear type	Surveys	Gear details	Sampling Events	Effort
Scallop Dredging	NEFSC Sea Scallop Cooperative Research	8' NEFSC Survey and/or 15' Commercial Dredge	100	10-15 min tows; ~25 hrs bottom time
Clam Dredging	NEFSC Surfclam and Ocean Quahog Dredge Cooperative Research	NEFSC Clam Dredge Commercial Dredge	200	5 min tows; ~ 17 hrs bottom time
Sediment Sampling Dredges	NEFSC Sea Scallop NEFSC Surfclam and Ocean Quahog Dredge Integrated Benthic Surveys	Eckman Dredge Ponar Grab	50 dredge samples	10 m ³ of sediment
Bottom Longline	Cooperative Atlantic States Shark Popping and Nursery (COASTSPAN) Longline Surveys	Small juvenile and large juvenile/adult shark rigs	50 sets at 25-50 hooks each	0.5 hour soak juvenile gear, ~1.5 hrs in the water per set 2 hour soak large juvenile/adult gear, ~4 hrs in the water per set
Split Beam Acoustics	Integrated Benthic Surveys NEFSC Gear Studies	Simrad EK-60 Simrad EK-500	Continuous Operations	500 hrs
Multibeam Acoustics	Integrated Benthic Surveys NEFSC Gear Studies Cooperative Research	Simrad ME-70 EM-3002	Continuous Operations	500 hrs
Acoustic Doppler Current Profiler	Integrated Benthic Surveys NEFSC Gear Studies NEFSC Sea Scallop Cooperative Research	Teledyne Workhorse Mariner RD Instruments OS 75	Continuous Operations	500 hrs
Sidescan Sonar	Integrated Benthic Surveys Survey	Edgetech Sidescan Sonar	Continuous Operations	200 hrs
Acoustic Telemetry Studies	Inshore Telemetry Studies Cooperative Research	Vemco VR-2 Receivers	Up to 50 Moorings	Up to 1000 Mooring Days
Suspended and Towed Underwater Video Systems	Integrated Benthic Surveys Scallop RSA Studies	HabCam System SMAST Tripod Camera	Continuous Operations	500 hrs
CTD	Integrated Benthic Surveys NEFSC Gear Studies NEFSC Sea Scallop Cooperative Research	Seabird CTD and Other CTD models	100 casts	50 hrs in water
Plankton Sampling	Integrated Benthic Surveys NEFSC Sea Scallop	Bongo Nets and Smaller Research Plankton Nets	100 samples	50 hrs

APPENDIX B
Spatial and Temporal Distribution of NEFSC Fisheries Research Effort

Gear type	Surveys	Gear details	Sampling Events	Effort
Fall (September-November) Southern New England				
Bottom Trawling	NEFSC Autumn BTS NEFSC Gear Studies NEAMAP Autumn BTS Integrated Benthic Surveys MA Div of Marine Fisheries Bottom Trawl Surveys	400X12 4-Seam, Yankee 36, NEFSC Flatfish and Commercial Trawls Otter trawls	254 tows	20-30 min tows; ~ 101 hrs bottom time
Pelagic Trawling	Cooperative Research	Irish Midwater and/or Commercial Midwater Trawls	50 tows	10-30 min tows; ~ 17 hrs fishing time
Net Sonde and Monitoring Gear	NEFSC Autumn BTS NEFSC Gear Studies NEAMAP Autumn BTS Integrated Benthic Surveys	Scanmar Scanmate 6 & Scanbass Netmind Simrad ITI, PI32 & FS900	250 tows	~ 110 hrs in the water
Gillnet	Inshore Telemetry Studies	Variable mesh experimental nets	10 100-foot gillnets	2 hour soak time 600 total net hrs
Scallop Dredging	Cooperative Research	8' NEFSC Survey and/or 15' Commercial Dredge	100	10-15 min tows; ~25 hrs bottom time
Clam Dredging	Cooperative Research	NEFSC Clam Dredge Commercial Dredge	100	5 min tows; ~ 8.5 hrs bottom time
Split Beam Acoustics	NEFSC Autumn BTS NEFSC Gear Studies Integrated Benthic Surveys	Simrad EK-60 Simrad EK-500	Continuous Operations	500 hrs
Multibeam Acoustics	NEFSC Autumn BTS NEFSC Gear Studies	Simrad ME-70 EM-3002	Continuous Operations	500 hrs
Acoustic Doppler Current Profiler	NEFSC Autumn BTS NEFSC Gear Studies Integrated Benthic Surveys	Teledyne Workhorse Mariner RD Instruments OS 75	Continuous Operations	500 hrs
Sidescan Sonar	Integrated Benthic Surveys	Edgetech Sidescan Sonar	Continuous Operations	200 hrs
Acoustic Telemetry Studies	Inshore Telemetry Studies Cooperative Research	Vemco VR-2 Receivers	Up to 50 Moorings	Up to 1000 Mooring Days

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Spatial and Temporal Distribution of NEFSC Fisheries Research Effort

Gear type	Surveys	Gear details	Sampling Events	Effort
Suspended and Towed Underwater Video Systems	Integrated Benthic Surveys Scallop RSA Studies	HabCam System SMAST Tripod Camera	Continuous Operations	300 hrs
CTD	NEFSC Autumn BTS NEFSC Gear Studies NEAMAP Autumn BTS Integrated Benthic Surveys Inshore Telemetry Studies Cooperative Research	Seabird CTD and Other CTD models	100 casts	50 hrs in water
Plankton Sampling	NEFSC Autumn BTS Integrated Benthic Surveys Cooperative Research	Bongo Nets and Smaller Research Plankton Nets	100 samples	50 hrs
Winter (December-February) Southern New England				
Bottom Trawling	NEFSC Spring BTS NEFSC Gear Studies LMRCSC Survey	400X12 4-Seam and Commercial Trawls	100 tows	20-30 min tows; ~ 42 hrs bottom time
Net Sonde and Monitoring Gear	NEFSC Spring BTS NEFSC Gear Studies LMRCSC Survey	Scanmar Scanmate 6 & Scanbass Netmind Simrad ITI, PI32 & FS900	100 tows	~ 60 hrs in the water
Split Beam Acoustics	NEFSC Spring BTS NEFSC Gear Studies LMRCSC Survey	Simrad EK-60 Simrad EK-500	Continuous Operations	300 hrs
Multibeam Acoustics	NEFSC Spring BTS NEFSC Gear Studies LMRCSC Survey	Simrad ME-70	Continuous Operations	300 hrs
Acoustic Doppler Current Profiler	NEFSC Spring BTS NEFSC Gear Studies LMRCSC Survey	Teledyne Workhorse Mariner RD Instruments OS 75	Continuous Operations	300 hrs
CTD	NEFSC Spring BTS NEFSC Gear Studies LMRCSC Survey	Seabird CTD and Other CTD models	100 casts	50 hrs in water

APPENDIX B
Spatial and Temporal Distribution of NEFSC Fisheries Research Effort

Gear type	Surveys	Gear details	Sampling Events	Effort
Plankton Sampling	NEFSC Spring BTS NEFSC Gear Studies LMRCSC Survey	Bongo Nets and Smaller Research Plankton Nets	100 samples	50 hrs

Table B-4. Distribution of research effort by gear type and season in the Mid-Atlantic Bight

Gear type	Surveys	Gear details	Sampling Events	Effort
Spring (March-May) Mid-Atlantic Bight				
Bottom Trawling	NEFSC Spring BTS NEFSC Gear Studies NEAMAP Spring BTS Integrated Benthic Surveys Cooperative Research	400X12 4-Seam, Yankee 36, NEFSC Flatfish and Commercial Trawls	350 tows	20-30 min tows; ~ 150 hrs bottom time
Pelagic Trawling	Cooperative Research	Irish Midwater and Commercial Midwater Trawls	50 tows	10-30 min tows; ~ 17 hrs fishing time
Net Sonde and Monitoring Gear	NEFSC Spring BTS NEFSC Gear Studies NEAMAP Spring BTS Integrated Benthic Surveys Cooperative Research	Scanmar Scanmate 6 & Scanbass Netmind Simrad ITI, PI32 & FS900	450 tows	~ 210 hrs in the water
Gillnet	Inshore Telemetry Studies	Variable Mesh Experimental Gillnets	10 100-foot gillnets	2 hour soak time 600 hrs total soak time
Scallop Dredging	NEFSC Sea Scallop Cooperative Research	8' NEFSC Survey and/or 15' Commercial Dredge	200 tows	10-15 min tows; ~50 hrs bottom time
Clam Dredging	NEFSC Surfclam and Ocean Quahog Dredge Cooperative Research	NEFSC Clam Dredge Commercial Dredge	200 tows	5 min tows; ~ 17 hrs bottom time
Sediment Sampling Dredges	NEFSC Sea Scallop NEFSC Surfclam and Ocean Quahog Dredge Integrated Benthic Surveys	Eckman Dredge Ponar Grab	50 dredge samples	10 m ³ of sediment
Bottom Longline	Apex Predator Coastal Shark Surveys	300 hooks of traditional Florida style monofilament	24 sets	3 hour soak ~6.4 hrs/set ~156 hrs in the water
Split Beam Acoustics	NEFSC Spring BTS NEFSC Gear Studies Integrated Benthic Surveys NEFSC Surfclam and Ocean Quahog Dredge	Simrad EK-60 Simrad EK-500	Continuous Operations	500 hrs
Multibeam Acoustics	NEFSC Spring BTS NEFSC Gear Studies	Simrad ME-70	Continuous Operations	500 hrs

APPENDIX B
Spatial and Temporal Distribution of NEFSC Fisheries Research Effort

Gear type	Surveys	Gear details	Sampling Events	Effort
Acoustic Doppler Current Profiler	NEFSC Spring BTS NEFSC Gear Studies Integrated Benthic Surveys NEFSC Surfclam and Ocean Quahog Dredge	Teledyne Workhorse Mariner RD Instruments OS 75	Continuous Operations	500 hrs
Sidescan Sonar	Ecology of Coastal Ocean Seascapes Integrated Benthic Surveys	Edgetech Sidescan Sonar	Continuous Operations	400 hrs
Acoustic Telemetry Studies	Inshore Telemetry Studies	Vemco VR-2 Receivers	Up to 50 Moorings	Up to 1000 Mooring Days
Suspended and Towed Underwater Video Systems	Integrated Benthic Surveys Scallop RSA Studies	HabCam System SMAST Tripod Camera	Continuous Operations	300 hrs
CTD	NEFSC Spring BTS NEFSC Gear Studies Integrated Benthic Surveys NEFSC Surfclam and Ocean Quahog Dredge NEFSC Apex Predator Ecology of Coastal Ocean Seascapes Cooperative Research	Seabird CTD and Other CTD models	100 casts	50 hrs in water
Plankton Sampling	NEFSC Spring BTS Integrated Benthic Surveys NEFSC Surfclam and Ocean Quahog Dredge Ecology of Coastal Ocean Seascapes Cooperative Research	Bongo Nets and Smaller Research Plankton Nets	100 samples	50 hrs
Summer (June-August) Mid-Atlantic Bight				
Bottom Trawling	NEFSC Gear Studies Integrated Benthic Surveys Cooperative Research Habitat Mapping Survey Deep-sea Coral Survey	400X12 4-Seam, Yankee 36, NEFSC Flatfish and Commercial Trawls 2-m beam trawl	100 tows 54 tows	20-30 min tows; ~ 72 hrs bottom time
Pelagic Trawling	Cooperative Research	Irish Midwater and/or Commercial Midwater Trawl	50 tows	10-30 min tows; ~ 17 hrs fishing time
Net Sonde and Monitoring Gear	NEFSC Gear Studies Integrated Benthic Surveys Cooperative Research	Scanmar Scanmate 6 & Scanbass Netmind Simrad ITI, PI32 & FS900	150 tows	~ 80 hrs in the water

APPENDIX B
Spatial and Temporal Distribution of NEFSC Fisheries Research Effort

Gear type	Surveys	Gear details	Sampling Events	Effort
Gillnet	Inshore Telemetry Studies	Variable Mesh Experimental Gillnets	10 100-foot gillnets	2 hour soak time 600 hrs total soak time
Scallop Dredging	NEFSC Sea Scallop Cooperative Research	8' NEFSC Survey and/or 15' Commercial Dredge	200	10-15 min tows; ~50 hrs bottom time
Clam Dredging	NEFSC Surfclam and Ocean Quahog Dredge Cooperative Research	NEFSC Clam Dredge Commercial Dredge	200	5 min tows; ~ 17 hrs bottom time
Sediment Sampling Dredges	NEFSC Sea Scallop NEFSC Surfclam and Ocean Quahog Dredge Integrated Benthic Surveys	Eckman Dredge Ponar Grab	50 dredge samples	10 m ³ of sediment
Bottom Longline	COASTSPAN Longline Surveys	Small juvenile and large juvenile/adult shark rigs	210 sets at 25-50 hooks each	0.5 hour soak small juvenile gear, ~1.5 hrs in the water per set, ~20 hrs in the water total 2 hour soak large juvenile/adult gear, ~4 hrs in the water per set,
Anchored Sinking Gillnet	COASTSPAN Gillnet Surveys	Anchored sinking gillnet	12 325 ft x 10 ft gillnet sets	3 hour soak time with continuous monitoring ~ 4.5 hrs in the water per set
Split Beam Acoustics	NEFSC Gear Studies Integrated Benthic Surveys NEFSC Sea Scallop NEFSC Surfclam and Ocean Quahog	Simrad EK-60 Simrad EK-500	Continuous Operations	500 hrs
Multibeam Acoustics	NEFSC Gear Studies Integrated Benthic Surveys	Simrad ME-70	Continuous Operations	500 hrs
Acoustic Doppler Current Profiler	NEFSC Gear Studies Integrated Benthic Surveys NEFSC Sea Scallop NEFSC Surfclam and Ocean Quahog	Teledyne Workhorse Mariner RD Instruments OS 75	Continuous Operations	500 hrs
Sidescan Sonar	Ecology of Coastal Ocean Seascapes Integrated Benthic Surveys	Edgetech Sidescan Sonar	Continuous Operations	400 hrs
Acoustic Telemetry Studies	Inshore Telemetry Studies	Vemco VR-2 Receivers	Up to 50 Moorings	Up to 1000 Mooring Days
Suspended and Towed Underwater Video Systems	Integrated Benthic Surveys Scallop RSA Studies	HabCam System SMAST Tripod Camera	Continuous Operations	300 hrs

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Spatial and Temporal Distribution of NEFSC Fisheries Research Effort

Gear type	Surveys	Gear details	Sampling Events	Effort
CTD	NEFSC Gear Studies NEFSC Sea Scallop NEFSC Surfclam and Ocean Quahog Ecosystem Monitoring Survey Integrated Benthic Surveys Surveys Ecology of Coastal Ocean Seascapes Cooperative Research	Seabird CTD and Other CTD models	100 casts	50 hrs in water
Plankton Sampling	NEFSC Sea Scallop NEFSC Surfclam and Ocean Quahog Ecosystem Monitoring Survey Integrated Benthic Surveys Ecology of Coastal Ocean Seascapes Cooperative Research	Bongo Nets and Smaller Research Plankton Nets	100 samples	50 hrs
Fall (September-November) Mid-Atlantic Bight				
Bottom Trawling	NEFSC Autumn BTS NEFSC Gear Studies NEAMAP Autumn BTS Cooperative Research	400X12 4-Seam, Yankee 36, NEFSC Flatfish, Commercial and Small Scientific Trawls	350 tows	20-30 min tows; ~ 150 hrs bottom time
Pelagic Trawling	Cooperative Research	Irish Midwater and/or Commercial Midwater Trawls	50 tows	10-30 min tows; ~ 17 hrs fishing time
Net Sonde and Monitoring Gear	NEFSC Autumn BTS NEFSC Gear Studies NEAMAP Autumn BTS Cooperative Research	Scanmar Scanmate 6 & Scanbass Netmind Simrad ITI, PI32 & FS900	400 tows	~ 210 hrs in the water
Gillnet	Inshore Telemetry Studies	Variable Mesh Experimental Gillnets	10 100-foot gillnets	2 hour soak time 600 hrs total soak time
Scallop Dredging	Cooperative Research	8' NEFSC Survey and/or 15' Commercial Dredge	100	10-15 min tows; ~25 hrs bottom time
Clam Dredging	Cooperative Research	NEFSC Clam Dredge Commercial Dredge	100	5 min tows; ~ 8.5 hrs bottom time

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Spatial and Temporal Distribution of NEFSC Fisheries Research Effort

Gear type	Surveys	Gear details	Sampling Events	Effort
Sediment Sampling Dredges	Integrated Benthic Surveys	Eckman Dredge Ponar Grab	50 dredge samples	10 m ³ of sediment
Split Beam Acoustics	NEFSC Autumn BTS NEFSC Gear Studies Integrated Benthic Surveys	Simrad EK-60 Simrad EK-500	Continuous Operations	500 hrs
Multibeam Acoustics	NEFSC Autumn BTS NEFSC Gear Studies Integrated Benthic Surveys	Simrad ME-70	Continuous Operations	500 hrs
Acoustic Doppler Current Profiler	NEFSC Autumn BTS NEFSC Gear Studies Integrated Benthic Surveys	Teledyne Workhorse Mariner RD Instruments OS 75	Continuous Operations	500 hrs
Sidescan Sonar	Ecology of Coastal Ocean Seascapes Integrated Benthic Surveys	Edgetech Sidescan Sonar	Continuous Operations	400 hrs
Acoustic Telemetry Studies	Inshore Telemetry Studies	Vemco VR-2 Receivers	Up to 50 Moorings	Up to 1000 Mooring Days
Suspended and Towed Underwater Video Systems	Integrated Benthic Surveys Scallop RSA Studies	HabCam System SMASST Tripod Camera	Continuous Operations	300 hrs
CTD	NEFSC Autumn BTS NEAMAP Autumn BTS NEFSC Gear Studies Ecosystem Monitoring Survey Integrated Benthic Surveys Surveys Ecology of Coastal Ocean Seascapes Cooperative Research	Seabird CTD and Other CTD models	100 casts	50 hrs in water
Plankton Sampling	NEFSC Autumn BTS NEFSC Gear Studies Ecosystem Monitoring Survey Integrated Benthic Surveys Surveys Ecology of Coastal Ocean Seascapes Cooperative Research	Bongo Nets and Smaller Research Plankton Nets	100 samples	50 hrs

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Spatial and Temporal Distribution of NEFSC Fisheries Research Effort

Gear type	Surveys	Gear details	Sampling Events	Effort
Winter (December-February) Mid-Atlantic Bight				
Bottom Trawling	NEFSC Spring BTS NEFSC Gear Studies LMRCSC Survey	400X12 4-Seam, Yankee 36 , NEFSC Flatfish and Commercial Trawls	100 tows	20-30 min tows; ~ 42 hrs bottom time
Net Sonde and Monitoring Gear	NEFSC Spring BTS NEFSC Gear Studies LMRCSC Survey	Scanmar Scanmate 6 & Scanbass Netmind Simrad ITI, PI32 & FS900	100 tows	~ 60 hrs in the water
Split Beam Acoustics	NEFSC Spring BTS NEFSC Gear Studies LMRCSC Survey	Simrad EK-60 Simrad EK-500	Continuous Operations	500 hrs
Multibeam Acoustics	NEFSC Spring BTS NEFSC Gear Studies LMRCSC Survey	Simrad ME-70	Continuous Operations	500 hrs
Acoustic Doppler Current Profiler	NEFSC Spring BTS NEFSC Gear Studies LMRCSC Survey	Teledyne Workhorse Mariner RD Instruments OS 75	Continuous Operations	500 hrs
CTD	NEFSC Spring BTS NEFSC Gear Studies LMRCSC Survey	Seabird CTD and Other CTD models	100 casts	50 hrs in water
Plankton Sampling	NEFSC Spring BTS LMRCSC Survey	Bongo Nets and Smaller Research Plankton Nets	100 samples	50 hrs

Table B-5. Distribution of research effort by gear type and season in the Southeast U.S. Continental Shelf LME

Gear type	Surveys	Gear details	Sampling Events	Effort
Spring (March - May) Southeast Atlantic				
Bottom Longline	Apex Predator Coastal Shark Surveys	Florida style monofilament	71 sets at 300 hooks each	~6.5 hrs/set, ~462 hrs in the water
Summer (June - August) Southeast Atlantic				
Bottom Longline	COASTSPAN Longline Surveys	Small juvenile and large juvenile/adult shark rigs	450 sets at 25-50 hooks each	0.5 hour soak juvenile gear, ~1.5 hrs in the water per set 2 hour soak large juvenile/adult gear, ~4 hrs in the water per set
Anchored Sinking Gillnet	COASTSPAN Gillnet Surveys	Anchored sinking gillnet	40 325 ft x 10 ft gillnet sets	3 hour soak time with continuous monitoring ~ 4.5 hrs in the water per set