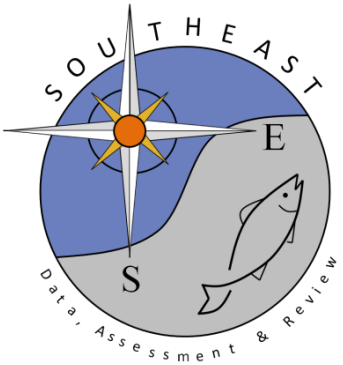
Sandbar Shark Length Composition Submitted for Use in the SEDAR 101 Data Workshop

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SEDAR101-DW-22

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Length Composition Submitted for Use in the SEDAR101 Data Workshop

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07/21/26: Updated document to separate composition data by disposition (discarded vs. retained).
08/20/26: Revised the document to fix errors identified in the raw commercial data.

Overview

This report summarizes the length composition data sources proposed for the SEDAR 101 HMS Sandbar shark (*Carcharhinus plumbeus*) stock assessment. Data were compiled from various commercial, recreational, and scientific surveys to help the assessment team determine the most appropriate stock assessment software based on the volume and distribution of available measurements. Between 1974 and 2024, twenty-two data sources provided a total of 115,744 sandbar shark records. Of these, fishery-dependent sources (commercial and recreational) accounted for 78,337 records, while fishery-independent surveys contributed 37,407 records. To facilitate model input, length data were categorized into 2, 5, and 10 cm fork length (FL) increments by year, ending in 2024. Extracted matrices and length-frequency histograms were generated to visualize distributions across different years, regions, gears, disposition (retained vs discarded) and fishing modes. While significant data were collected, the sources exhibited notable variability regarding the span of years available and the specific size distributions of the specimens recorded.

Methods

Ahead of the SEDAR101 data workshop scheduled for April 21, 2026 through April 24, 2026, length data were submitted for sandbar shark. This submission aims to quantify and describe the distribution of available length data, assisting the assessment team in selecting the appropriate stock assessment methods for these data. Spanning 1974-2024, the data were obtained from fishery-independent scientific surveys and fishery dependent records from commercial and recreational sources. Data were recorded by research fisheries biologists, at-sea and dock-side fisheries observers, and from various fishing events. Fork length (FL) served as the primary measurement unit; when necessary, other units were converted to cm FL using the combined-sex equation from SEDAR101-RD-04. The data was organized into three primary regions: the Gulf of America, the Atlantic Ocean, and an aggregated region. In the case of commercial longline fishing gear, the Atlantic Ocean region was subdivided into North and South Atlantic, separated along the boundary line between North Carolina and Virginia. Data within each region were sorted by sex (male, female, unknown, or combined) and grouped into annual 2, 5, and 10 cm FL bins. These binned data were used to create length matrices representing the proportion of captures for each year. To ensure data quality, a size-selectivity filter determined by the life history working group re-classified any "measured" lengths below 35 cm FL or above 200 cm FL as "outliers". To ensure data accuracy, only lengths categorized as "measured" and “non-outliers” were utilized for plotting length frequency histograms. Additional plotting by survey, gear type, disposition (retained vs discarded) and fishing mode was conducted to determine if specific years or categories required exclusion from the final assessment.

Fishery-Dependent Data Sources

07/21/26: Updated document to separate composition data by disposition (discarded vs. retained).
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Recreational Catches: Marine Recreational Information Program (MRIP), Southeast Region Head Boat Survey (SRHS), Large Pelagic Survey (LPS), and Maryland Department of Natural Resources (MDNR)

Length composition data for sandbar sharks were available via the Marine Recreational Information Program (MRIP) and the Southeast Region Head Boat Survey (SRHS) operated by the Southeast Fisheries Science Center (SEFSC) Beaufort, SC Laboratory. These data were available from 1981-2024 (n = 1,859; Table 2 & 3). Additional length composition data from 2003 – 2011 (n = 14) were available via the Large Pelagic Survey operated by the Northeast Fisheries Science Center (Table 2 &3). Personal logbooks of recreational charter captain, Mark Sampson, are archived in a database at Maryland Department of Natural Resource (MDNR), these data were available from 2007-2024 (n = 2,218; Table2). Data were split into three regions Gulf of America, Atlantic Ocean, and combined Gulf of America and Atlantic Ocean.

Northeast Fisheries Observer Program (NEFOP)

Sandbar shark length data were available from 1995-2024 from observer coverage of the Northeast Fisheries Observer Program in the Atlantic Ocean (Table 2 & 3). Gears included were commercial trawl (n=1,580) and gillnet (n = 2,604; Table 2; Figure1).

Pelagic Longline Observer Program (POP)

Length composition data were available from 1992-2024 (n=1,642) from observer coverage in the large pelagic fisheries longline fleet. Data were split into four regions: Gulf of America, North Atlantic Ocean, South Atlantic Ocean and combined Gulf of America and Atlantic Ocean.

Southeast Reef fish Observer Program (SRFOP)

Observer coverage of the Southeast Reef Fish Observer Program provided length data from 2006 – 2024 (Table 2 & 3). Length composition data for sandbar shark were available from vertical longlines (n = 33) and bottom longline (n = 469). Data were split into four : Gulf of America, North Atlantic Ocean, South Atlantic Ocean and combined Gulf of America and Atlantic Ocean.

Shark Bottom Longline Observer Program (SBLOP)

Observations by at-sea observers of the shark-directed bottom longline fishery in the Atlantic Ocean and Gulf of America were available from 2005-2021(n = 3,811; Table 2 & 3). Data were split into four : Gulf of America, North Atlantic Ocean, South Atlantic Ocean and combined Gulf of America and Atlantic Ocean.

Shark Research Fishery (SRF)

The Shark Research Fishery contributed length composition data were available from 2008-2024 (n = 41,931; Table 2 & 3). Data were split into four : Gulf of America, North Atlantic Ocean, South Atlantic Ocean and combined Gulf of America and Atlantic Ocean.

Southeast Gillnet Observer Program

The Florida-Georgia Shark Gillnet Fishery observer program provided length composition data for sandbar sharks from 2008-2024 (n = 151; Table 2 & 3). Data were split into three regions Gulf of America, Atlantic Ocean, and combined Gulf of America and Atlantic Ocean region.

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University of Florida

Length composition data were available from 1993-2005 (n = 22,025) from the University of Florida shark-directed bottom longline observer program. Data were split into four : Gulf of America, North Atlantic Ocean, South Atlantic Ocean and combined Gulf of America and Atlantic Ocean.

Fishery-Independent Data Sources

NOAA Fisheries Cooperative Atlantic States Shark Pupping and Nursery Longline Survey

Length compositions from longline surveys were available from 1998-2024 providing data for 6,595 animals (Table 4). Matrices were created for the Atlantic Ocean region.

Dauphin Island Sea Lab Bottom Longline

Length composition data were available for 763 animals from 2010-2024 (Table 4). Matrices were created for the Gulf of America region.

Delaware Bay Longline

Length composition data were available for 3,099 animals from 2006-2024 (Table 4). Matrices were created for the Atlantic Ocean region.

Mote Marine Laboratory Surveys

Length composition data were available from 2002-2022. Logline gear captured 148 animals while drumline gear captured 118 animals, and the gear description was unavailable for one individual (Table 4). Matrices were created for the Gulf of America region.

NOAA Northeast Fisheries Science Center Longline Survey

Length composition data were available from 1996-2024 from 9,756 animals in the Atlantic Ocean region (Table 4).

NOAA Fisheries Southeast Fisheries Science Center Bottom Longline

Length Compositions were provided for 2,183 individuals from 1995-2024 (Table 4). Matrices were created for the Gulf of America, Atlantic Ocean, and regions combined.

Southeast Area Monitoring and Assessment Program Bottom Longline (SEAMAP)

Surveys spanned from South Carolina to the east coast of Florida providing length compositions for 4,111 animals from 2006-2024 (Table 4).

Virginia Institute of MARINE Science (COASTSPAN) Longline

Length composition data were available from 2012-2024 for 4,889 animals. Matrices were created for the Atlantic Ocean region.

Virginia Institute of Marine Science Longline

Length compositions were available from 1974-2024 for 5,744 animals. Matrices were created for the Atlantic Ocean region (Table 4).

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08/20/26: Revised the document to fix errors identified in the raw commercial data.

Summary

To support the SEDAR 101 HMS sandbar shark (*Carcharhinus plumbeus*) stock assessment, this report summarizes 115,744 length records collected between 1974 and 2024. These data, collected from fishery-independent scientific surveys and fishery-dependent commercial and recreational sources, were compiled to help the assessment team select suitable modeling software. Measurements were standardized into 2, 5, and 10 cm fork length (FL) bins across three geographical designations: the Atlantic Ocean, the Gulf of America, and a combined region, with the Atlantic Ocean further split into the North Atlantic and South Atlantic for longline gears. A total of 22 sources submitted data, which included both estimated and measured lengths. Measurements were classified as estimated when an animal could not be landed and an at-sea observer or scientist made an estimate of the animal's length. Conversely, a length was categorized as measured if the animal was landed or brought on board and measured with a tape measure to the nearest centimeter. To maintain data integrity, a size-selectivity filter established by the life-history working groups was applied, reclassifying any values outside the 35–200 cm FL range as outliers. Furthermore, length-frequency histogram visualizations relied exclusively on confirmed measured lengths to identify any categories or years that might require exclusion from the final assessment.

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Tables

Table 1. summarizes the available length composition data for the sandbar shark (*Carcharhinus plumbeus*) spanning the period from 1974 to 2024. The data are categorized as either fishery-independent or fishery-dependent. Recreational data is included in the fishery-dependent data summaries. The term "Estimated" indicates that the fork length (FL) measurements were approximations rather than exact measurements. "Unknown" indicates fork length measurements for which information regarding whether they were measured or exact was not provided.

Data Sources	**Sandbar Shark**
Fishery-Independent	31,529
Estimated Fishery-Independent	5,873
Unknown Fishery-Independent	5
Total	**37,407**
Fishery-Dependent	61,926
Estimated Fishery-Dependent	16,411
Unknown Fishery-Dependent	0
Total	**78,337**
Grand Total	**115,744**

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08/20/26: Revised the document to fix errors identified in the raw commercial data.

Table 2. Fishery-dependent data sources from commercial and recreational catches broken up by gear type for possible use in the assessment.

Data Source	Years of Coverage	Gear Type	Sandbar (Estimated)	Sandbar (Measured)	Sandbar (Unknown)	Total
Recreational Catches						
SRHS	1986-2014					
		Unknown	2	103	0	105
MRIP	1981-2024					
		Gillnet	0	10	0	10
		Hook & Line	31	1641	0	1672
		Seine	0	3	0	3
		Spear	0	5	0	5
		Unknown	4	60	0	64
LPS	2003-2011					
		Hook & Line	0	14	0	14
MDNR	2007-2024					
		Hook & Line	177	2041	0	2218
Northeast Fisheries Observer Program (NEFOP)	1995-2024					
		Gillnet	962	1642	0	2604
		Trawl	732	848	0	1580
Pelagic Longline Observer Program (POP)	1992-2024					
		Pelagic Longline	1362	280	0	1642
Reef Fish (REEF)	2006-2024					
		Bottom Longline	433	36	0	469
		Vertical Longline	32	1	0	33
Shark Observer Program (SBLOP)	2005-2021					
		Bottom Longline	796	3015	0	3811
Shark Research Fishery (SRF)	2008-2024					

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Data Source	Years of Coverage	Gear Type	Sandbar (Estimated)	Sandbar (Measured)	Sandbar (Unknown)	Total
		Bottom Longline	12065	29866	0	41931
Southeast Gillnet (GILL)	2008-2024					
		Gillnet	29	122	0	151
University of Florida (UF)	1993-2005					
		Bottom Longline	0	22025	0	22025
Total(s)			16,411	61,926	0	**78,337**

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Table 3. Fishery-dependent data sources from commercial and recreational catches broken up by status (retained/discarded) for possible use in the assessment.

Data Source	Years of Coverage	Status	Sandbar (Estimated)	Sandbar (Measured)	Sandbar (Unknown)	Total
Recreational Catches						
SRHS	1986-2014					
		Retained	0	105	0	105
MRIP	1981-2024					
		Retained	0	1754	0	1754
LPS	2003-2011					
		Unknown	0	14	0	14
MDNR	2007-2024					
		Discarded	0	2218	0	2218
Northeast Fisheries Observer Program (NEFOP)	1995-2024					
		Discarded	1694	2490	0	4184
Pelagic Longline Observer Program (POP)	1992-2024					
		Retained	9	209	0	218
		Discarded	1351	71	0	1422
		Unknown	2	0	0	2
Reef Fish Bottom Longline	2006-2024					
		Retained	0	6	0	6
		Discarded	432	30	0	462
		Unknown	1	0	0	1
Reef Fish Vertical Longline	2019-2024					
		Discarded	32	1	0	33
Shark Observer Program (SBLOP)	2005-2021					
		Retained	310	2877	0	3187
		Discarded	486	138	0	64
Shark Research Fishery (SRF)	2008-2024					
		Retained	9371	29370	0	38741

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Data Source	Years of Coverage	Status	Sandbar (Estimated)	Sandbar (Measured)	Sandbar (Unknown)	Total
		Discarded	2490	438	0	2928
		Unknown	204	58	0	262
Southeast Gillnet (GILL)	2008-2024					
		Retained	3	35	0	38
		Discarded	26	87	0	113
University of Florida (UF)	1993-2005					
		Retained	0	21125	0	21125
		Discarded	0	894	0	894
		Unknown	0	6	0	6
Total(s)			16,411	61,926	0	**78,337**

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Table 4. Fishery-independent data broken up by gear type for potential use in the assessment.

Data Source	Years of Coverage	Gear	Sandbar (Estimated)	Sandbar (Measured)	Sandbar (Unknown)	Total
Cooperative Atlantic States Shark Pupping and Nursery (COASTSPAN)						
Northeast Atlantic	2001-2024					
		Longline	78	2883	5	2966
Southeast Atlantic	1998-2024					
		Longline	19	3608	0	3627
		Unknown	0	2	0	2
Dauphin Island Sea Lab Bottom Longline	2010-2024					
		Bottom Longline	0	763	0	763
Delaware Bay Longline	2006-2024					
		Longline	88	3011	0	3099
Mote Marine Lab	2002-2022					
		Drumline	0	118	0	118
		Longline	0	148	0	148
		Unknown	0	1	0	1
NEFSC	1996-2024					
		Longline	4692	5064	0	9756
NMFS Bottom Longline	1995-2024					
		Bottom Longline	734	1449	0	2183
Southeast Area Monitoring and Assessment Program	2006-2024					
		Longline	262	3849	0	4111
Virginia Institute Marine Science (COASTSPAN) Longline	2012-2024					
		Bottom Longline	0	4889	0	4889

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Data Source	Years of Coverage	Gear	Sandbar (Estimated)	Sandbar (Measured)	Sandbar (Unknown)	Total
Virginia Institute Marine Science Longline	1974-2024					
		Bottom Longline	0	5744	0	5744
Total			5,873	31,529	5	**37,407**

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Figures

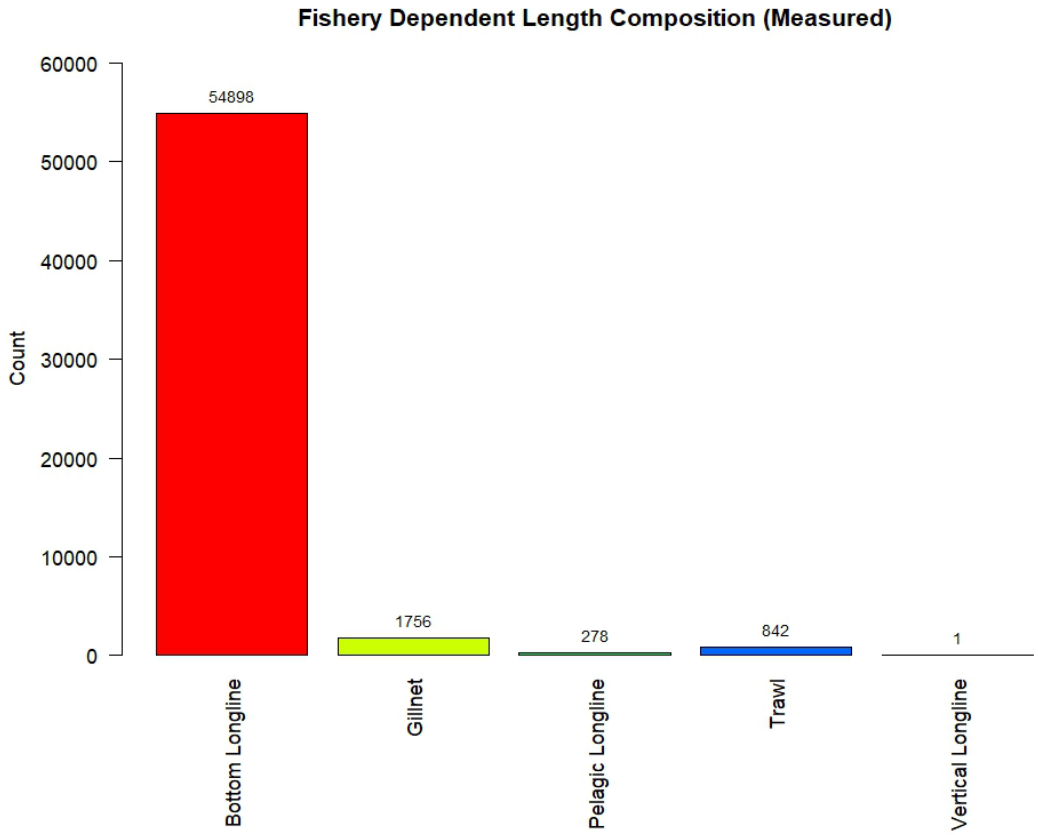


Figure 1. Comparison of sample size by gear type for sandbar sharks from fishery-dependent data sources where lengths were directly measured (not estimated). Gear types are combined for the Atlantic Ocean and Gulf of America regions.

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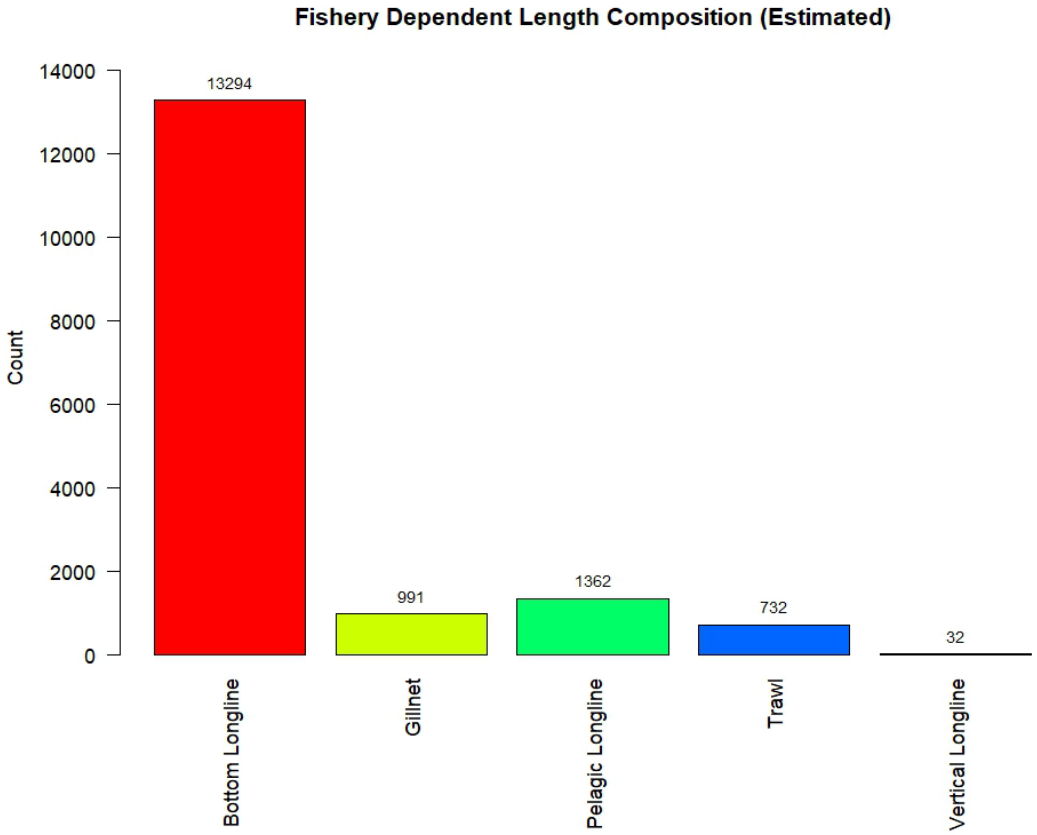


Figure 1a. Comparison of sample size by gear type for sandbar sharks from fishery-dependent data sources where lengths were estimated. Gear types are combined for the Atlantic Ocean and Gulf of America regions.

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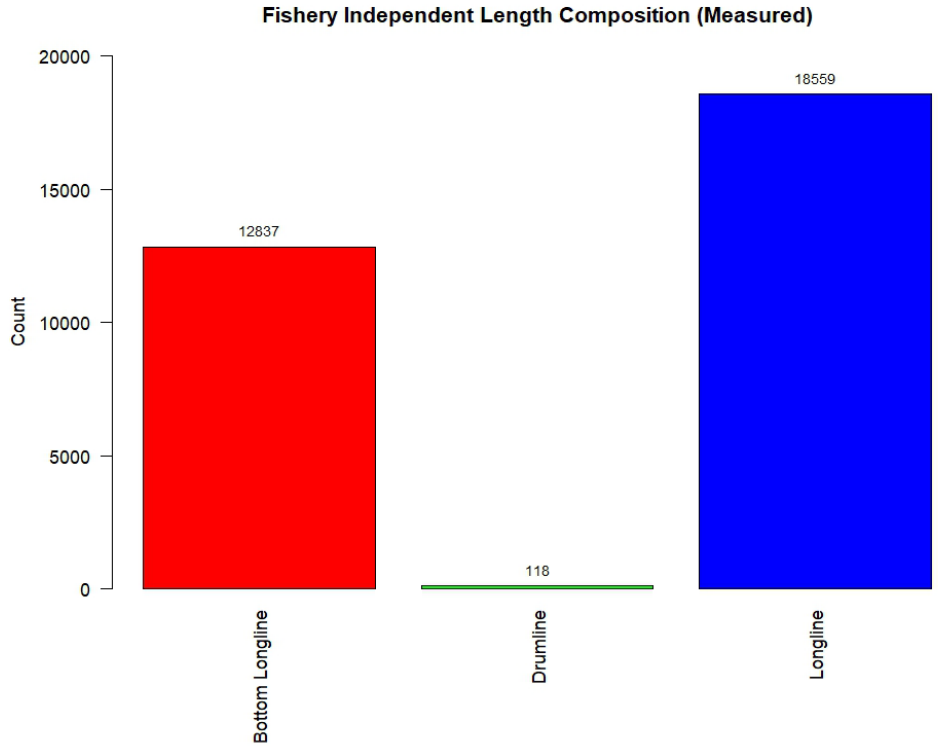


Figure 2. Comparison of sample size by gear type for sandbar sharks from fishery-independent data sources where lengths were directly measured (not estimated). Gear types are combined for the Atlantic Ocean and Gulf of America regions.

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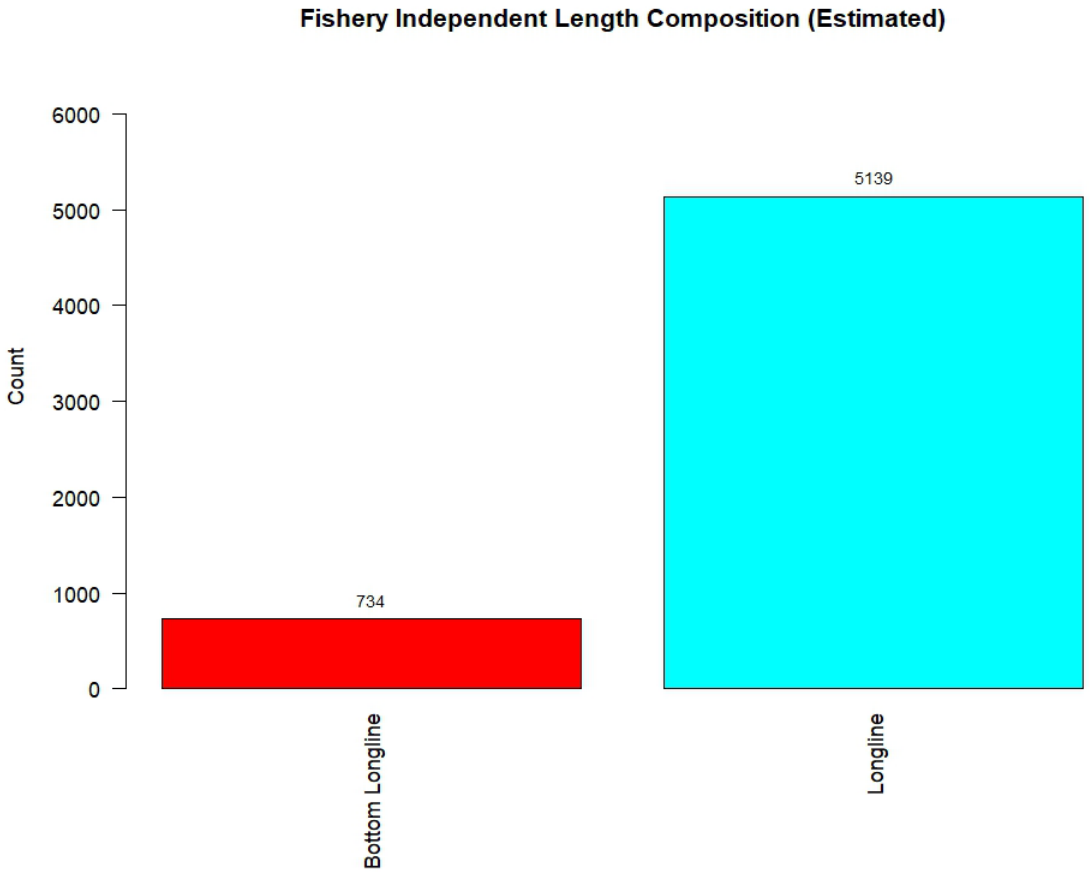


Figure 2a. Comparison of sample size by gear type for sandbar sharks from fishery-independent data sources where lengths were estimated. Gear types are combined for the Atlantic Ocean and Gulf of America regions.

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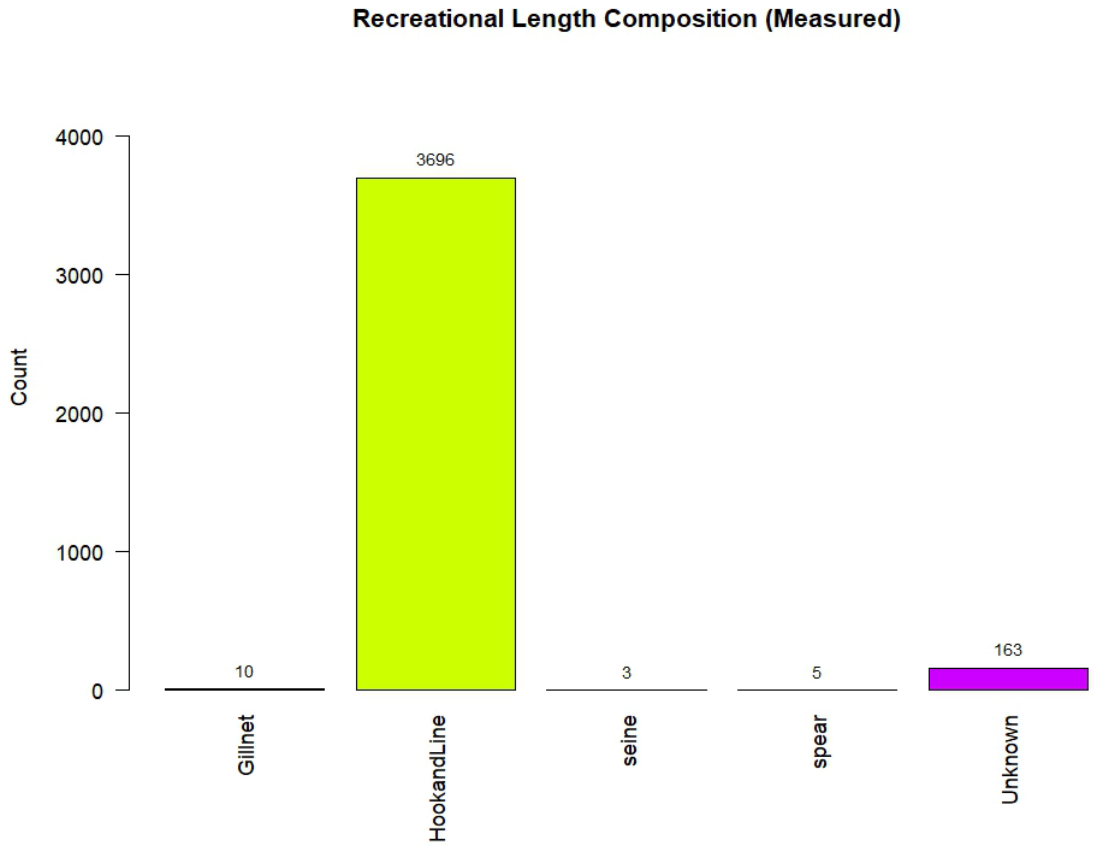


Figure 3. Comparison of sample size by gear type for sandbar shark recreational data sources where lengths were directly measured (not estimated). Gear types are combined for the Atlantic Ocean and Gulf of America regions.

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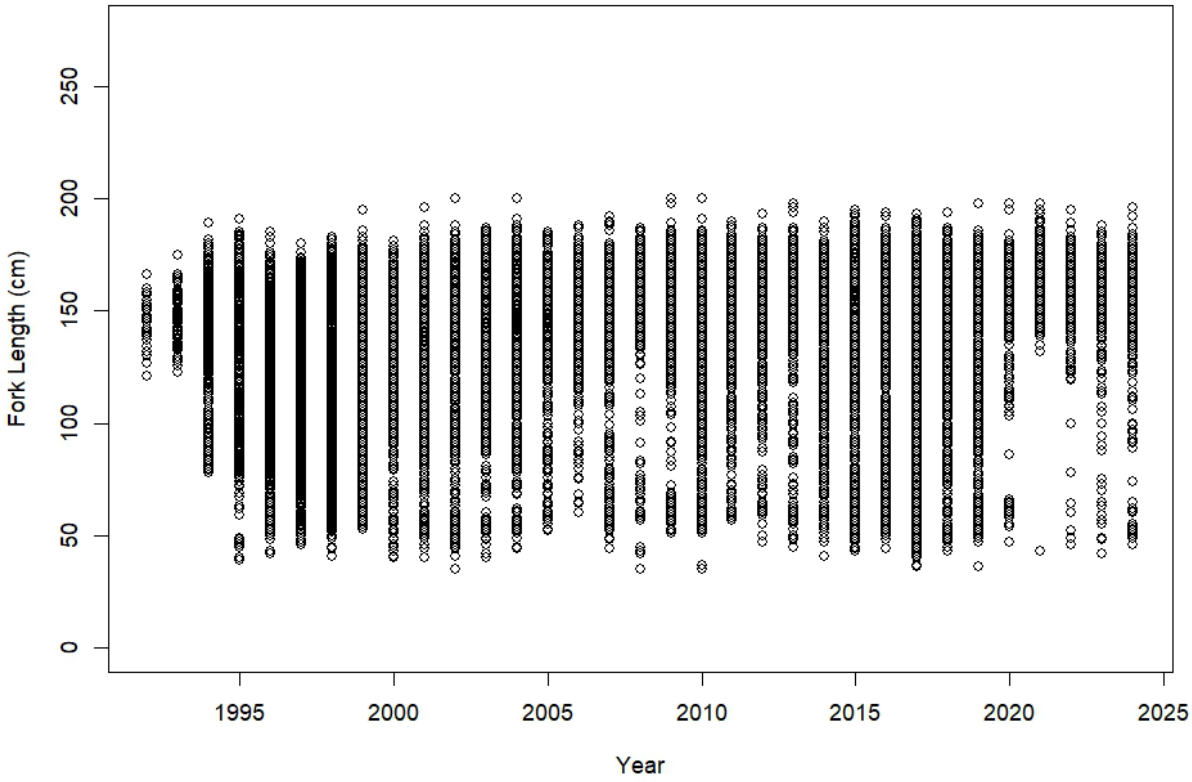


Figure 4. Length composition for Fishery-dependent sandbar shark samples across available years where lengths were directly measured (not estimated) for potential use in assessment.

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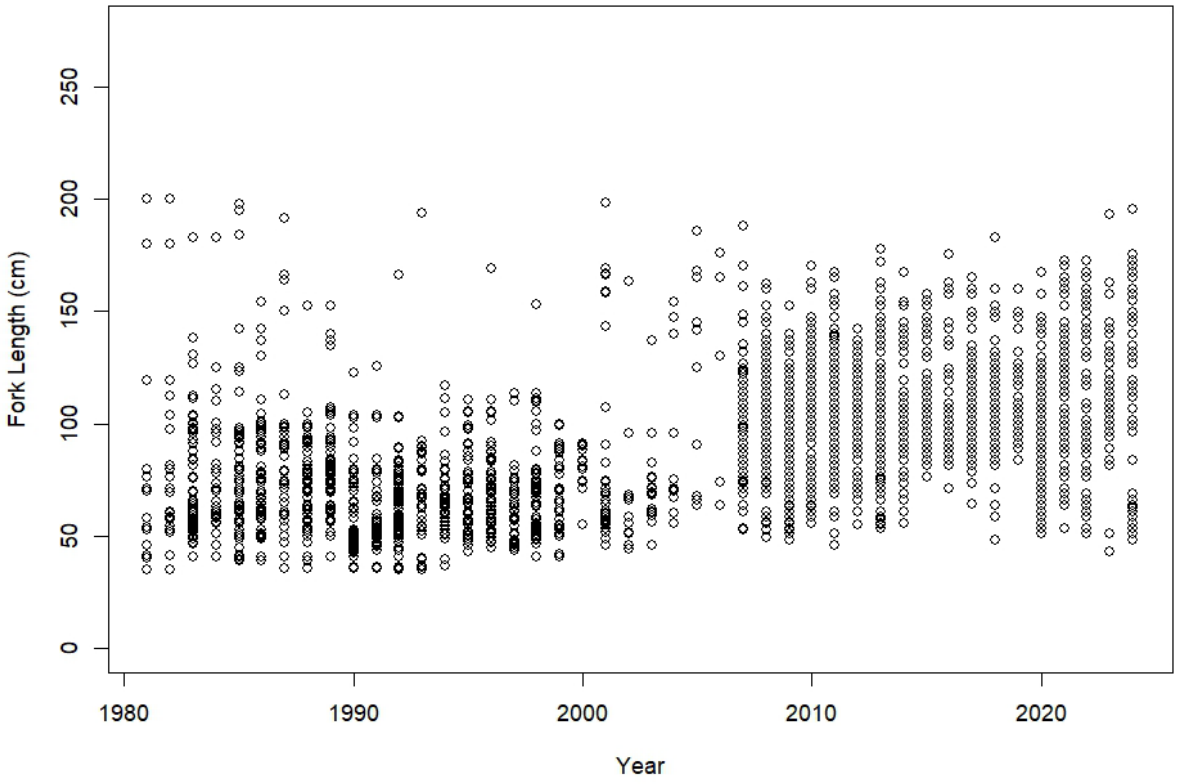


Figure 5. Length composition for fishery-independent sandbar shark samples across available years where lengths were directly measured (not estimated) for potential use in the assessment.

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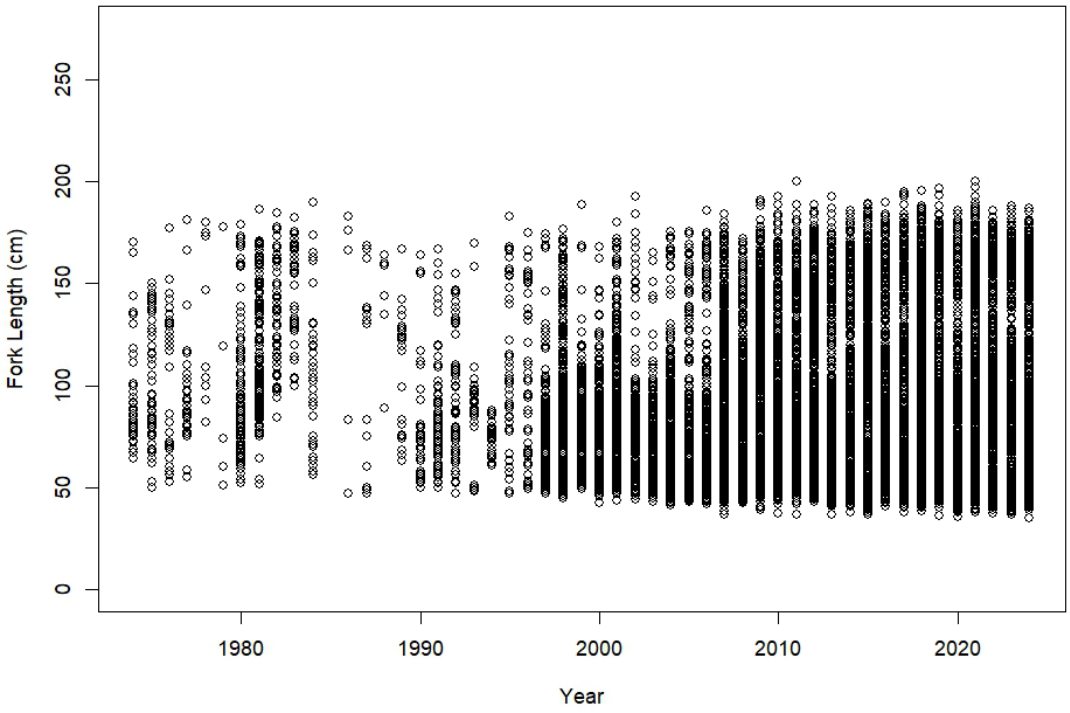


Figure 6. Length composition for recreational sandbar shark samples across available years where lengths were directly measured (not estimated) for potential use in the assessment.

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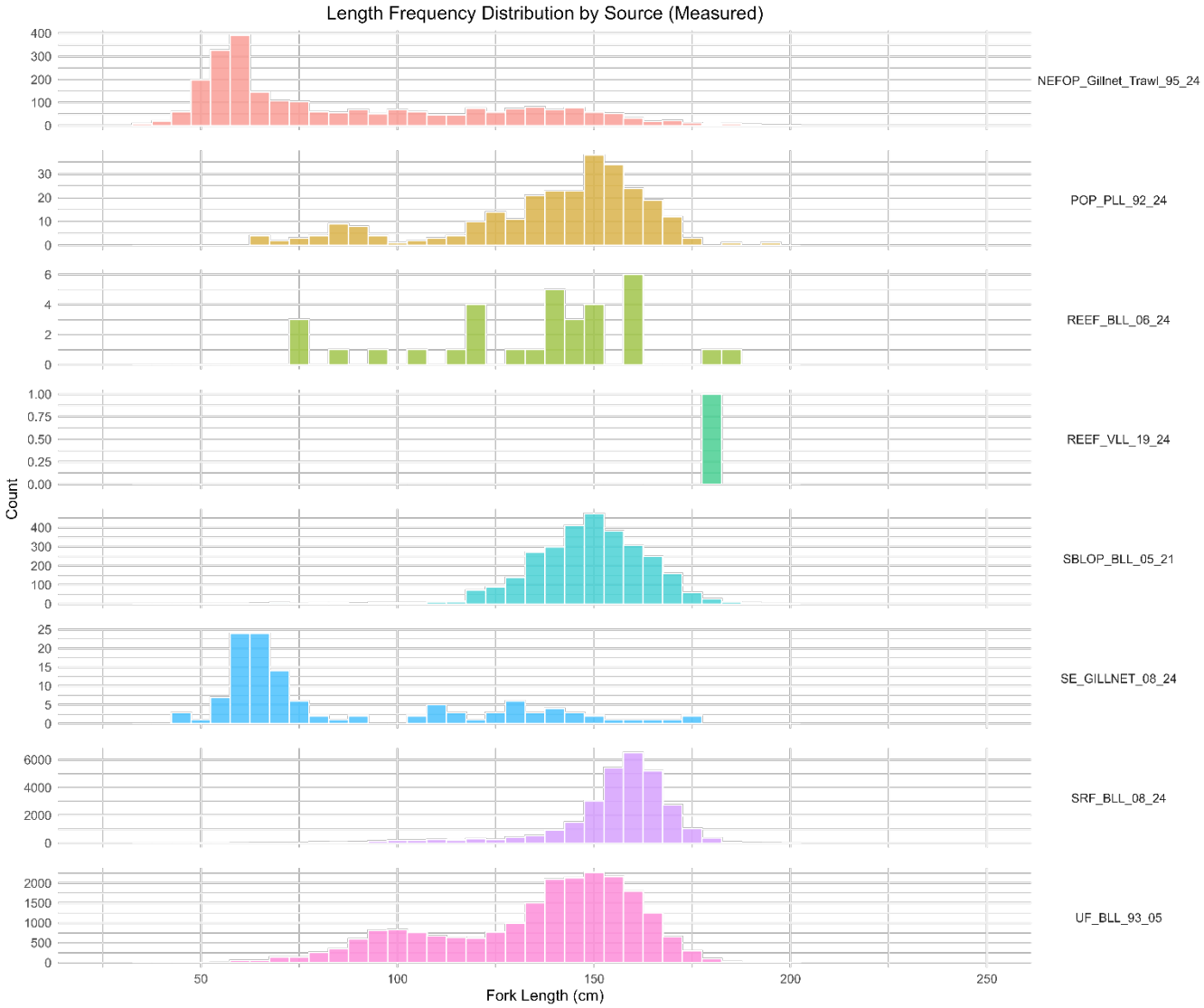


Figure 7. Length composition of sandbar shark from fishery-dependent data sources. Stacked histogram showing the counts of measured (not estimated) fork length measurements. The y-axis is scaled to total count per bin to allow for comparison across different total counts.

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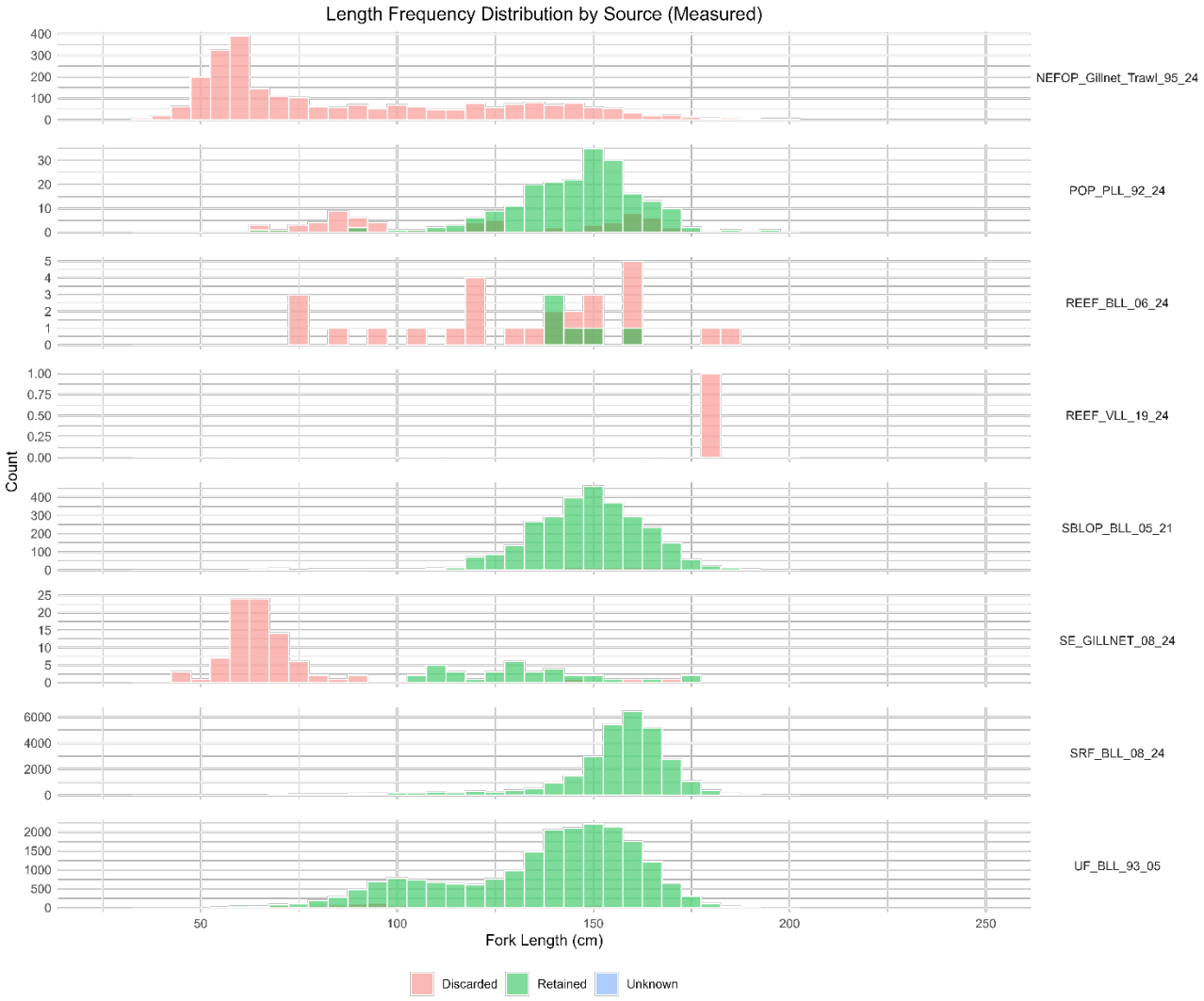


Figure 7a. Length composition of sandbar shark from fishery-dependent data sources. Stacked histogram showing the counts of measured (not estimated) fork length measurements colored by retention status: red indicates discarded fish, green denotes retained fish, and blue signifies an unknown status. The y-axis is scaled to total count per bin to allow for comparison across different total counts.

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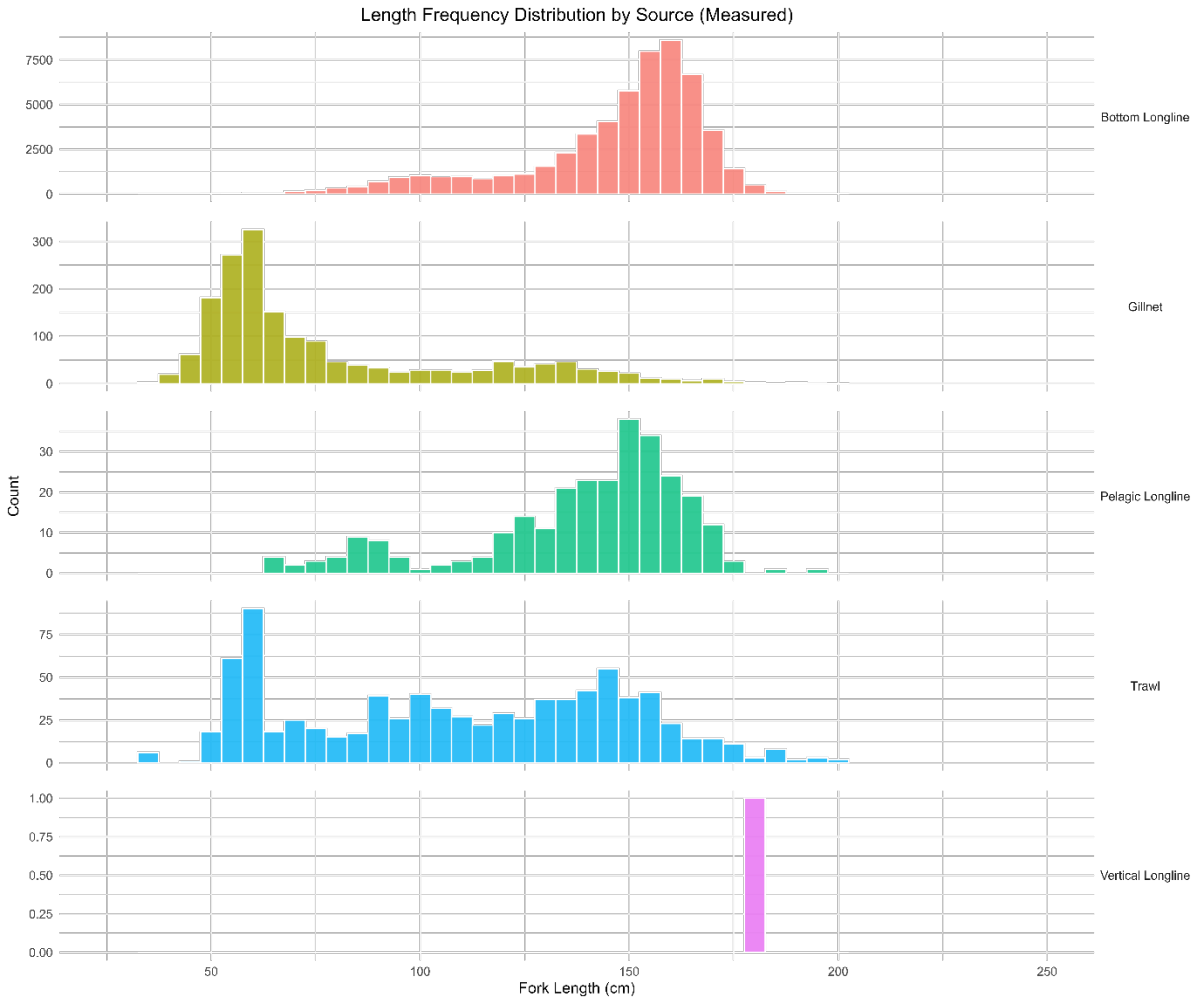


Figure 8. Length composition of sandbar shark from fishery-dependent samples grouped by gear type. Stacked histogram showing the counts of measured (not estimated) fork length measurements. The y-axis is scaled to total count per bin to allow for comparison across different total counts.

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Figure 8a. Length composition of sandbar shark from fishery-dependent samples grouped by gear type. Stacked histogram showing the counts of measured (not estimated) fork length measurements; colored by retention status: red indicates discarded fish, green denotes retained fish, and blue signifies an unknown status. The y-axis is scaled to total count per bin to allow for comparison across different total counts.

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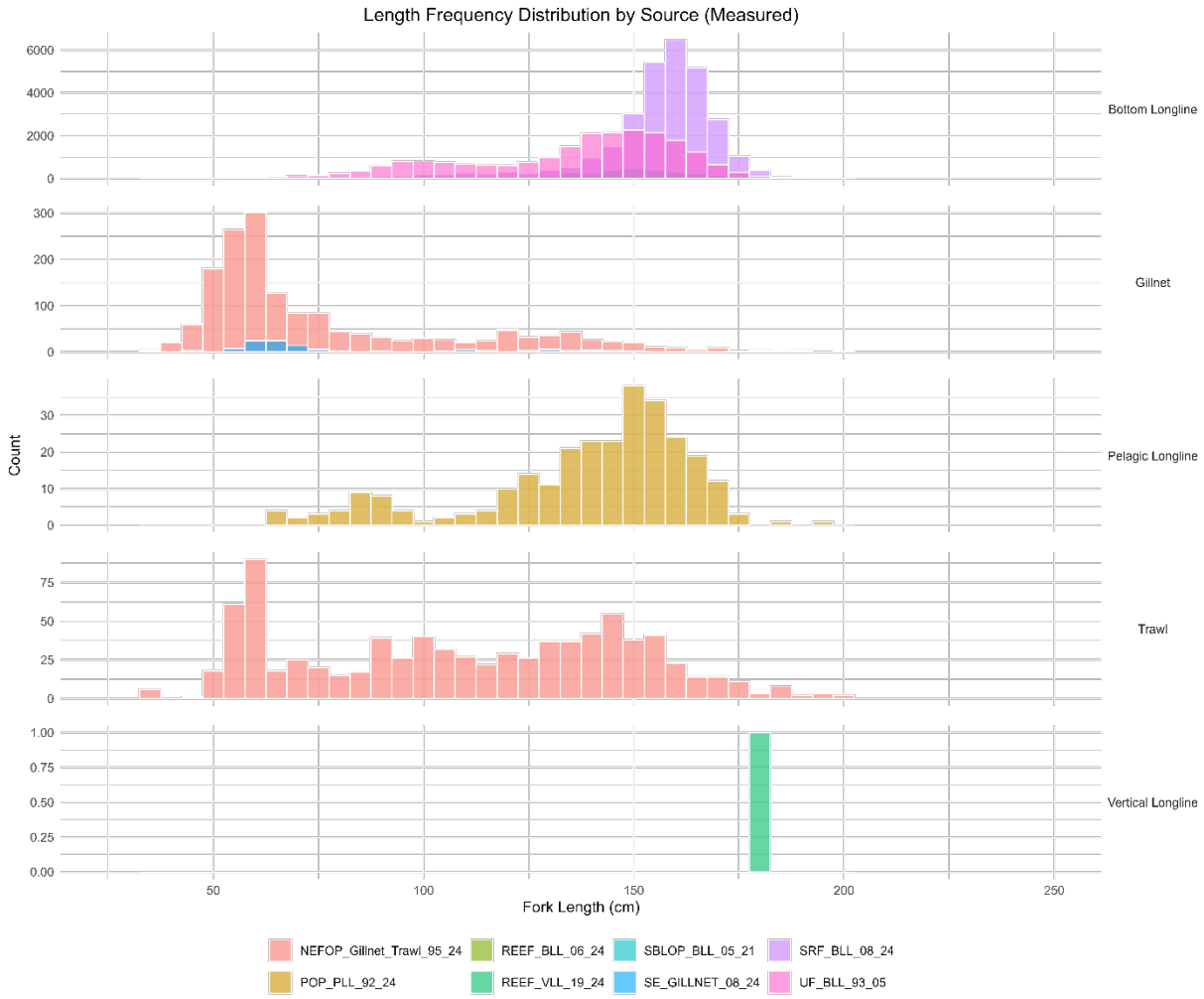


Figure 8b. Sandbar shark length composition from fishery-dependent samples, categorized by gear type. This stacked histogram displays the counts of measured (not estimated) fork length measurements, color-coded by data source to show which sources utilize each gear type. To facilitate comparison across different sample sizes, the y-axis is scaled to the total count per bin.

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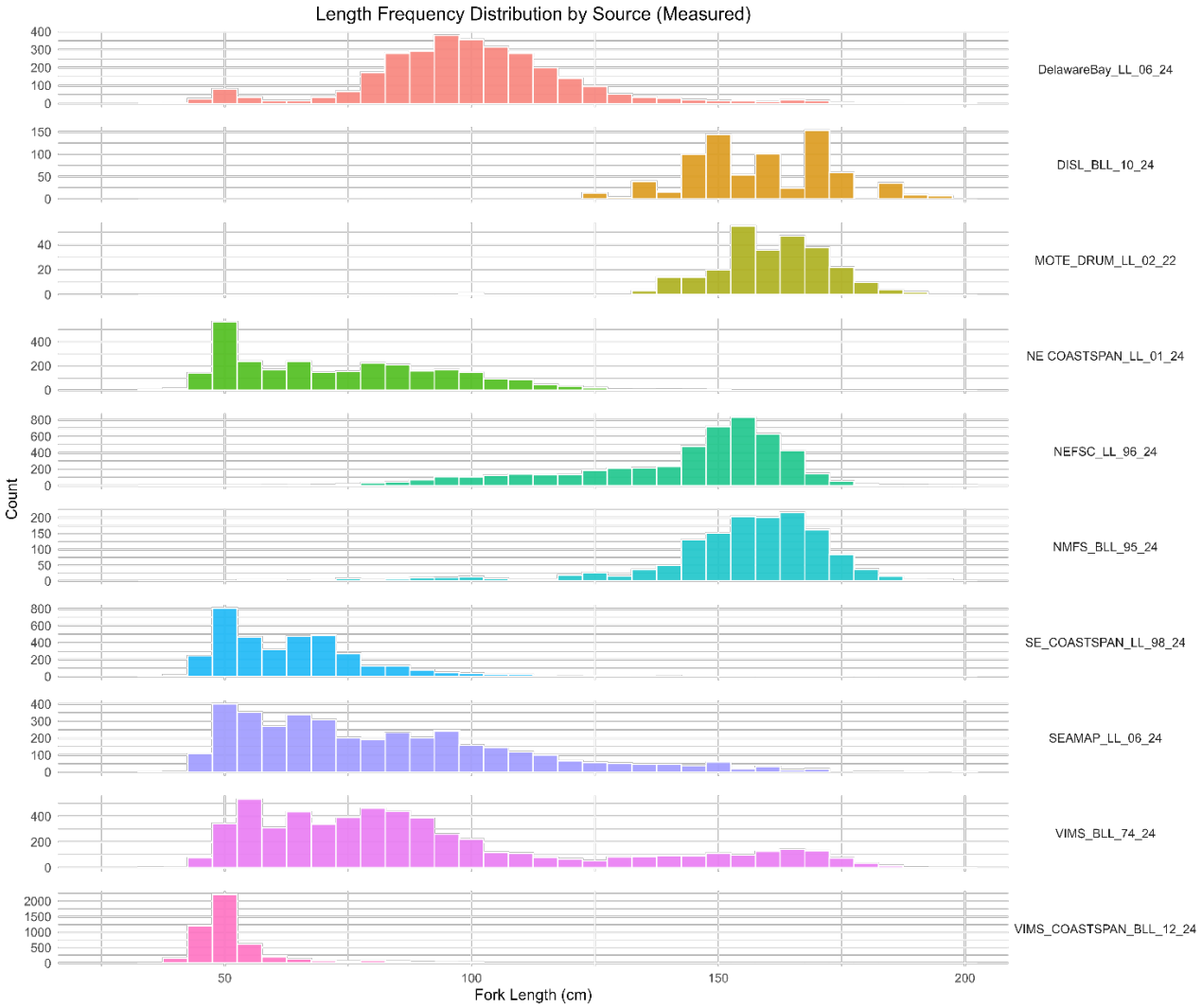


Figure 9. Length composition of sandbar shark from fishery-independent data sources. Stacked histogram showing the counts of measured (not estimated) fork length measurements. The y-axis is scaled to total count per bin to allow for comparison across different total counts.

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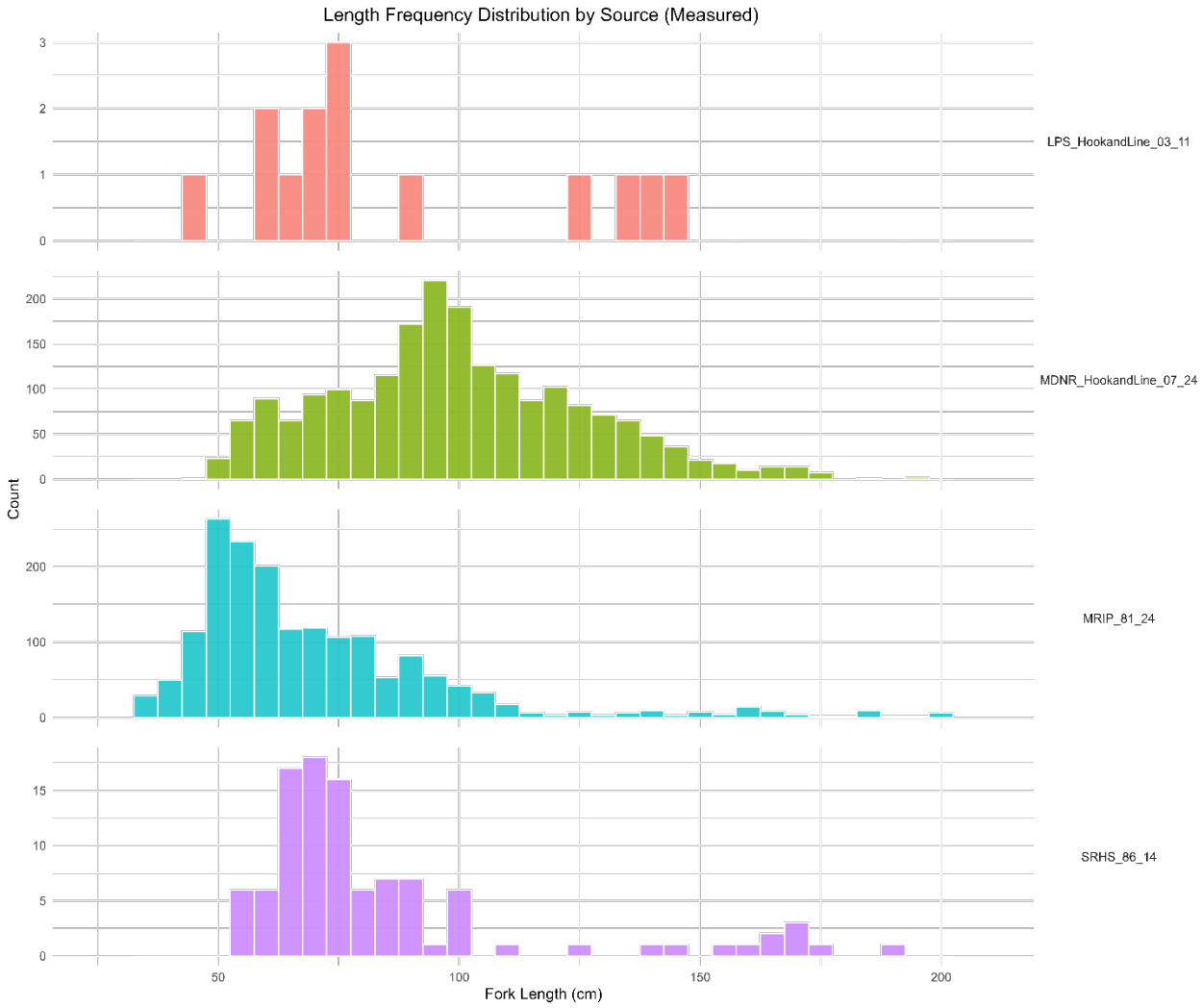


Figure 10. Length composition of sandbar shark from recreational data sources. Stacked histogram showing the counts of measured (not estimated) fork length measurements. The y-axis is scaled to total count per bin to allow for comparison across different total counts.

07/21/26: Updated document to separate composition data by disposition (discarded vs. retained).
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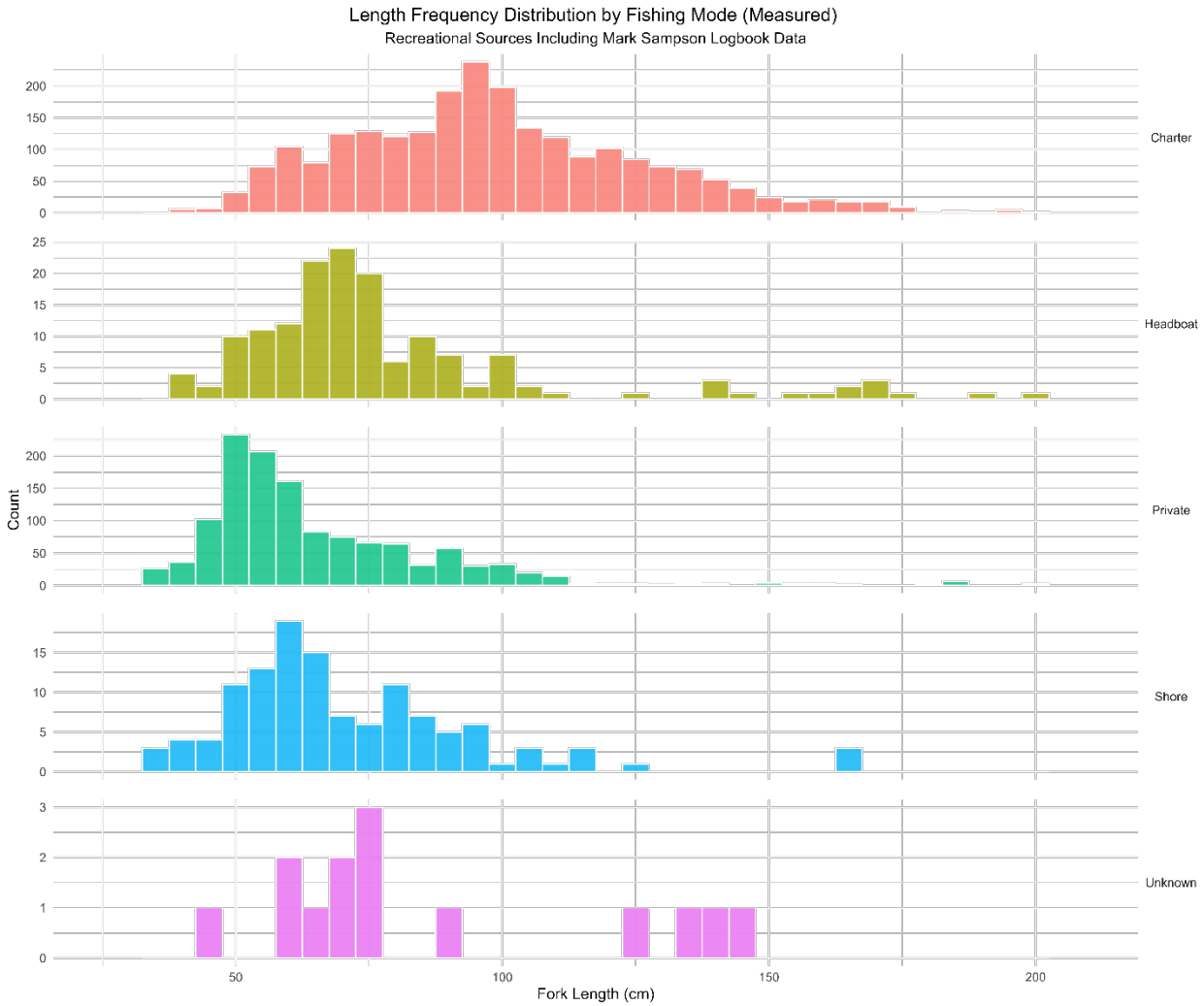


Figure 11. Length composition of sandbar shark from recreational data sources organized by fishing mode. Stacked histogram showing the counts of measured (not estimated) fork length measurements. The y-axis is scaled to total count per bin to allow for comparison across different total counts.

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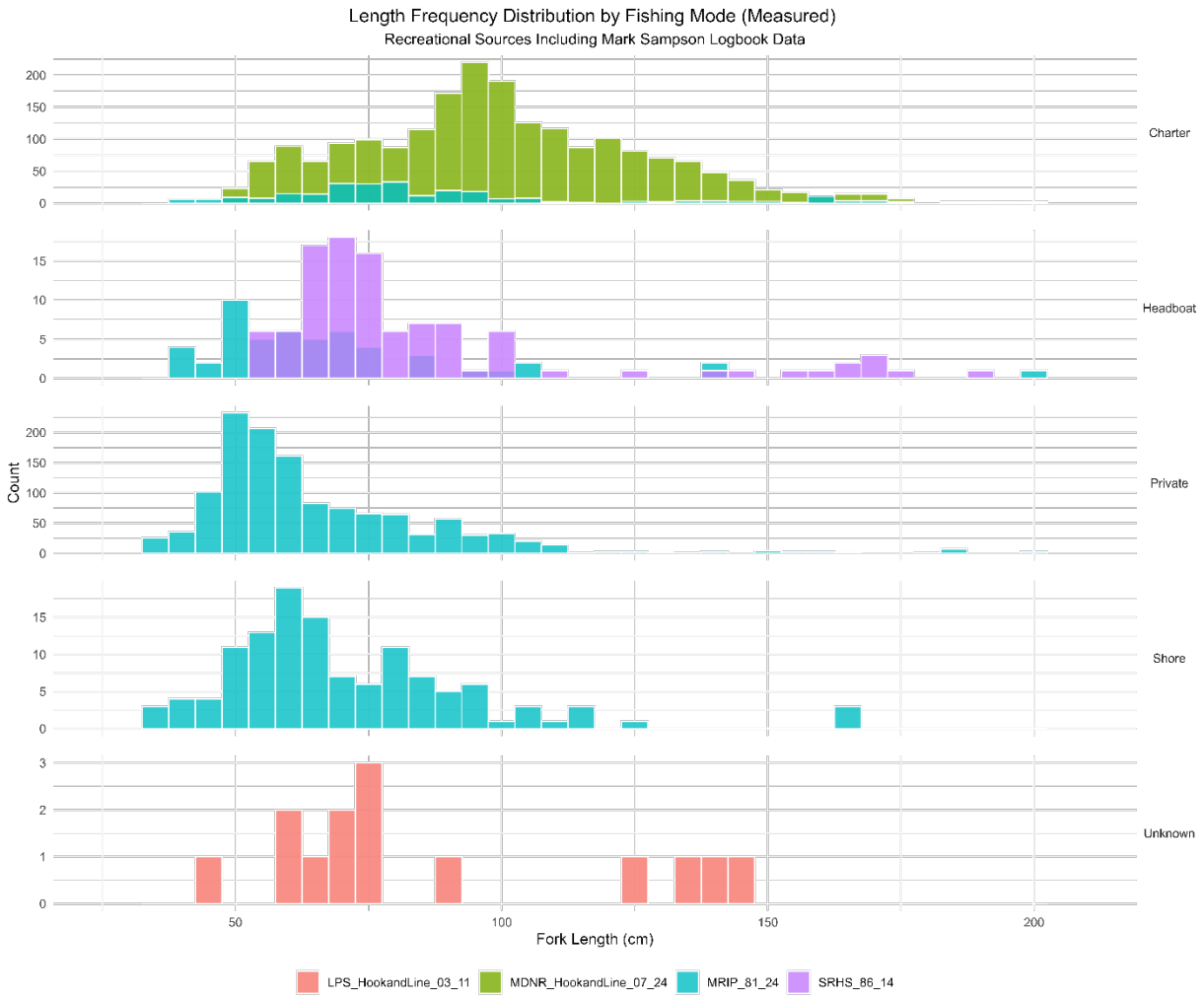


Figure 11a. Length composition of sandbar shark from recreational data sources organized by fishing mode. This stacked histogram displays the counts of measured (not estimated) fork length measurements, color-coded by data source to show which sources utilize each fishing mode. The y-axis is scaled to total count per bin to allow for comparison across different total counts.

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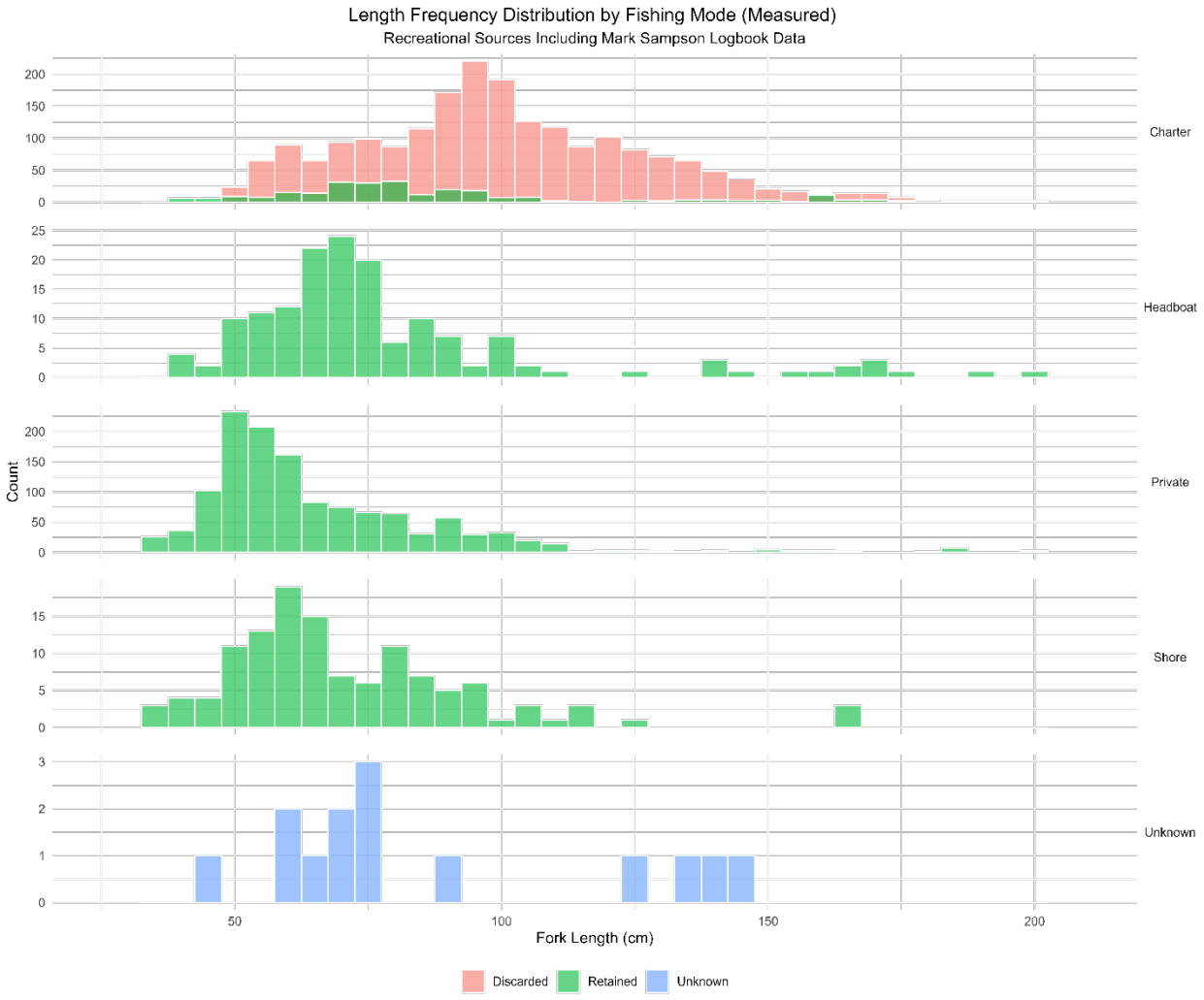


Figure 11b. Length composition of sandbar shark from recreational data sources organized by fishing mode. This stacked histogram displays the counts of measured (not estimated) fork length measurements, colored by retention status: red indicates discarded fish, green denotes retained fish, and blue signifies an unknown status. The y-axis is scaled to total count per bin to allow for comparison across different total counts.

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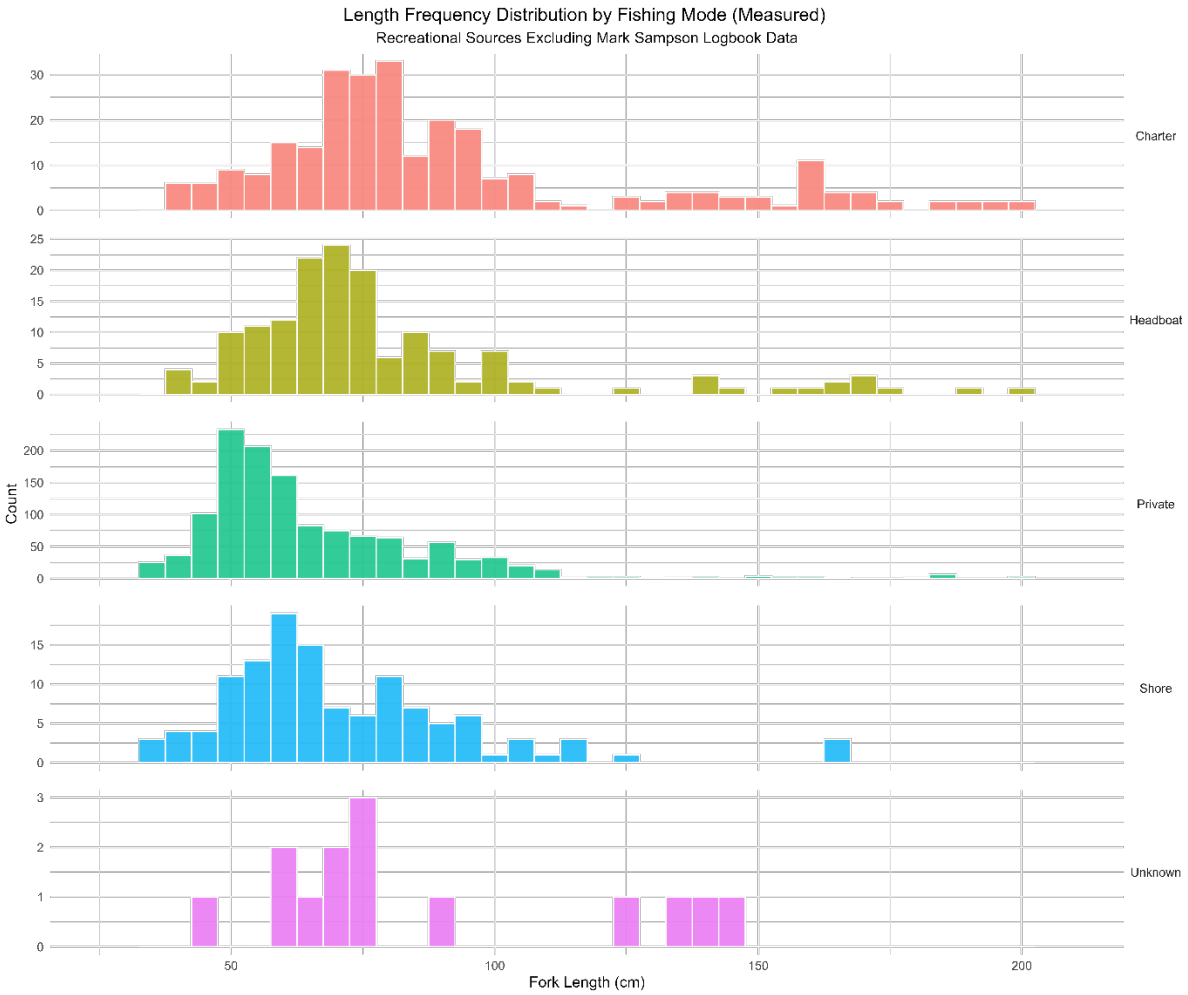


Figure 12. Length composition of sandbar shark from recreational data sources organized by fishing mode excluding Mark Sampson Logbook data provided by MDNR. Stacked histogram showing the counts of measured (not estimated) fork length measurements. The y-axis is scaled to total count per bin to allow for comparison across different total counts.

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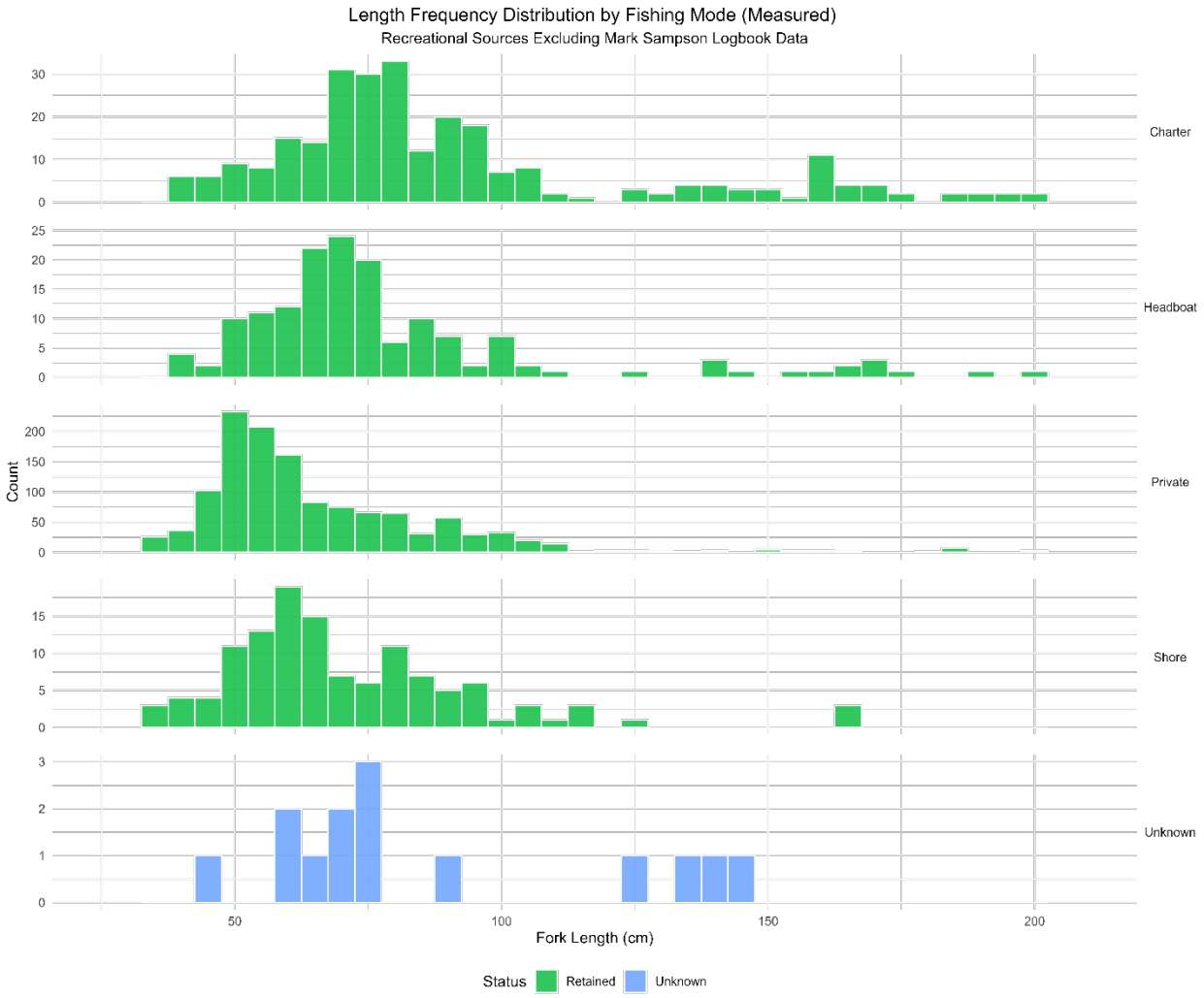


Figure 12a. Length composition of sandbar shark from recreational data sources organized by fishing mode excluding Mark Sampson Logbook data provided by MDNR. This stacked histogram displays the counts of measured (not estimated) fork length measurements, colored by retention status: red indicates discarded fish, green denotes retained fish, and blue signifies an unknown status. The y-axis is scaled to total count per bin to allow for comparison across different total counts.

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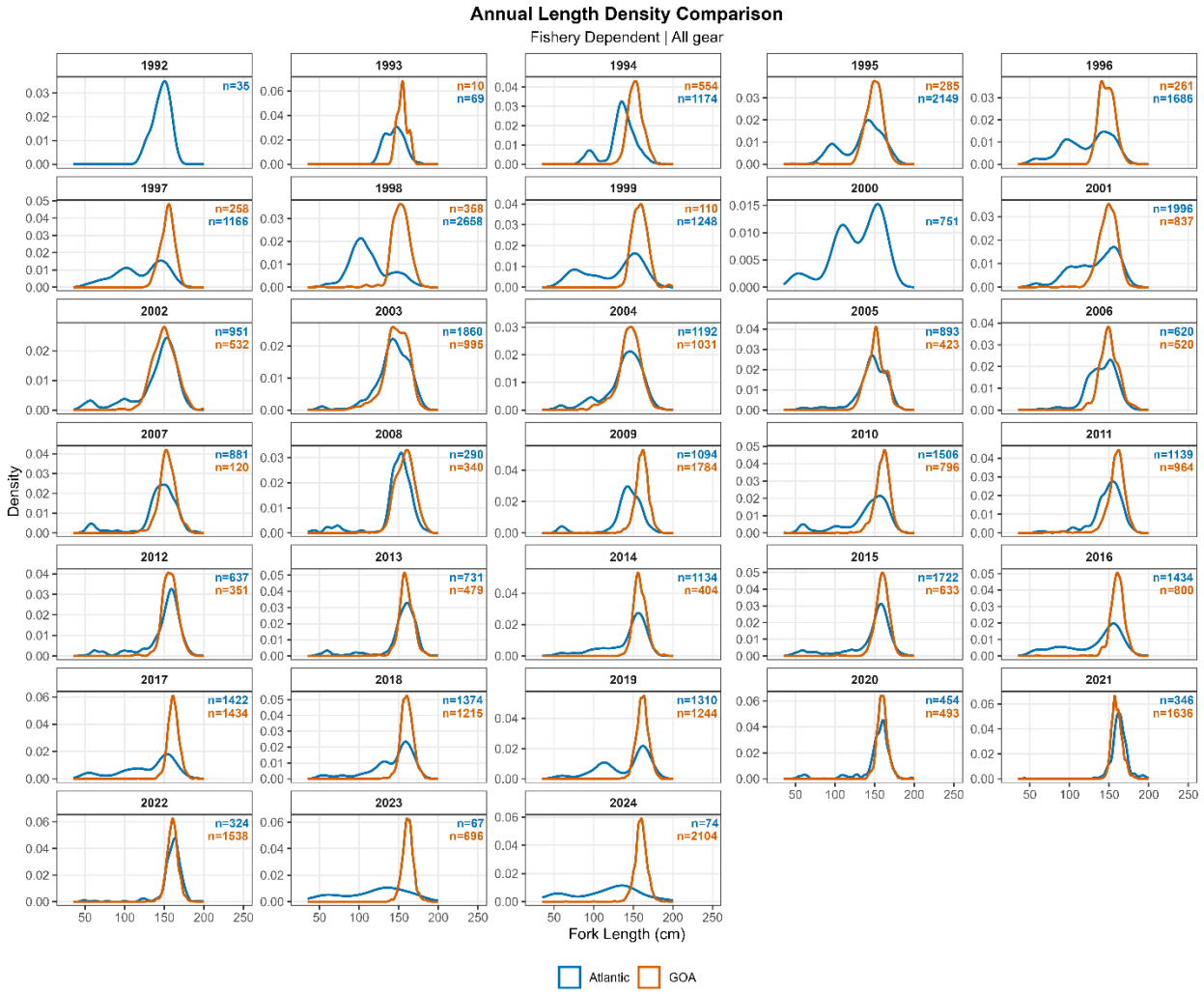


Figure 13**.** Yearly length-density curves for Fishery Dependent data. Color and sample sizes indicates sampling region (Atlantic vs. Gulf). Data are faceted by year to illustrate shifts in the size structure of the catch over time.

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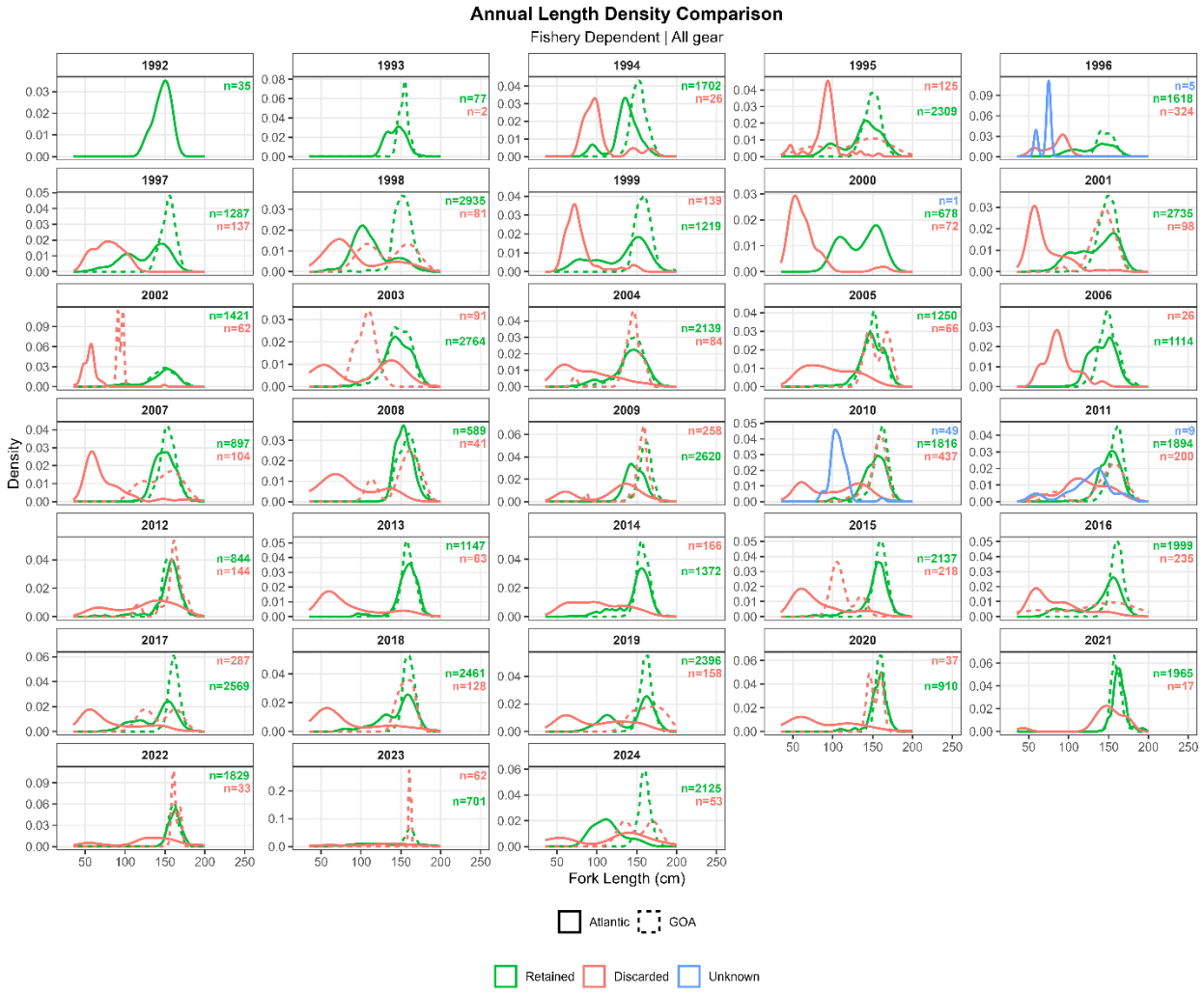


Figure 13a**.** Yearly length-density curves for Fishery Dependent data. Color and sample sizes indicates retention status while line type indicates sampling region. Data are faceted by year to illustrate shifts in the size structure of the catch over time.

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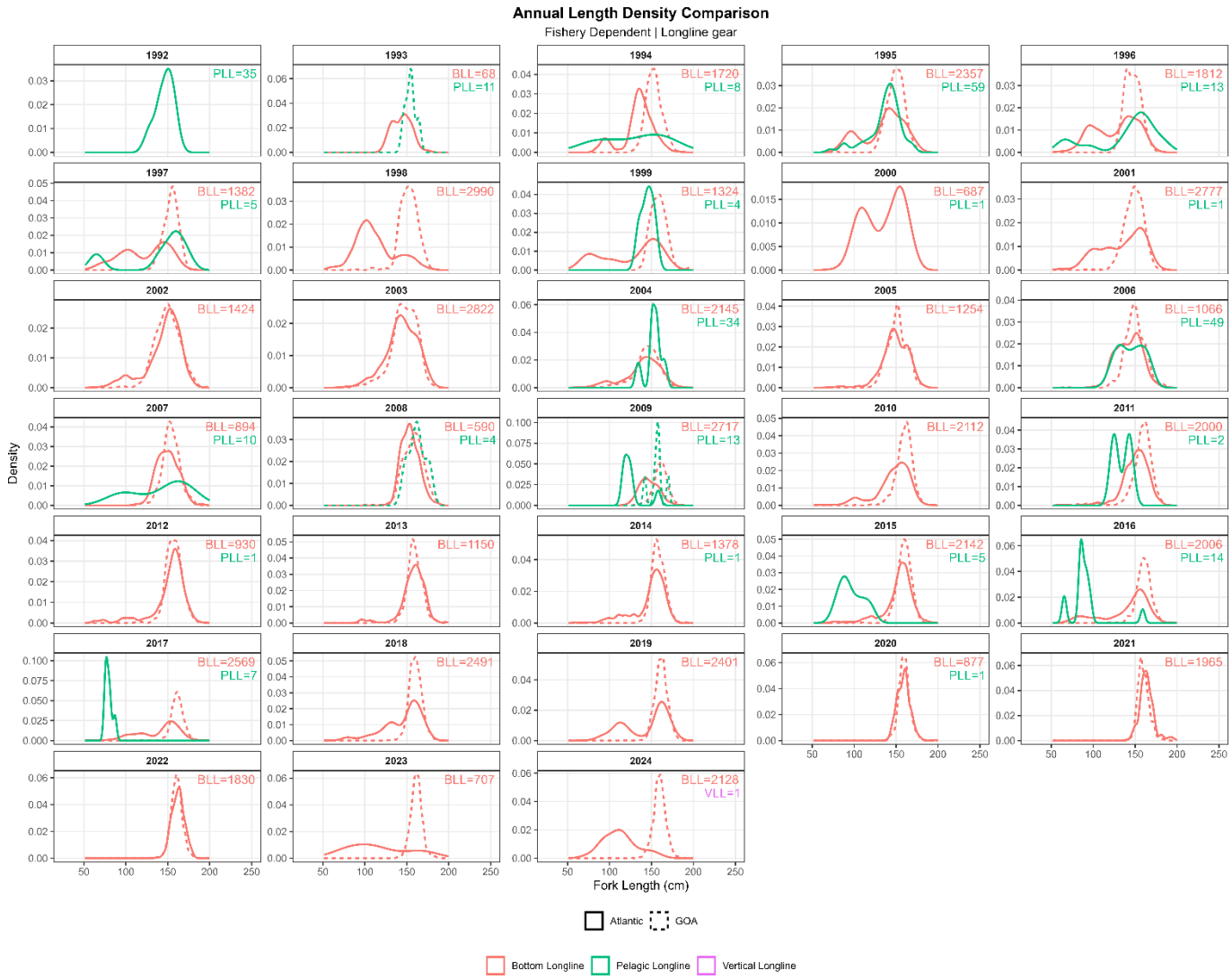


Figure14. Yearly length-density curves for fishery dependent longline gear. Color and sample sizes indicates gear type and line type indicates sampling region. Data are faceted by year to illustrate shifts in the size structure of the catch over time.

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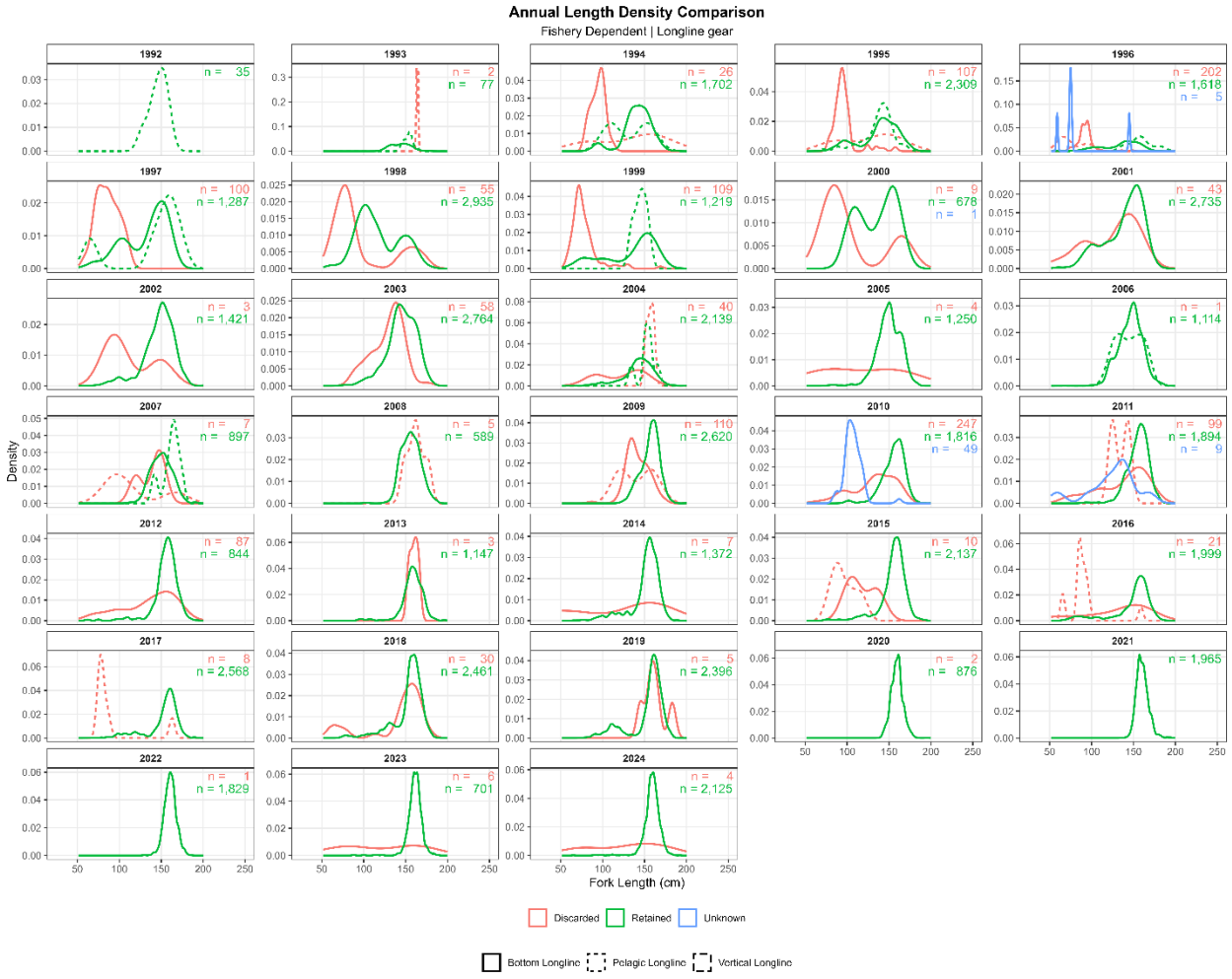


Figure14a. Yearly length-density curves for fishery dependent longline gear. Color and sample sizes indicates retention status and line type indicates longline gear type. Data are faceted by year to illustrate shifts in the size structure of the catch over time.

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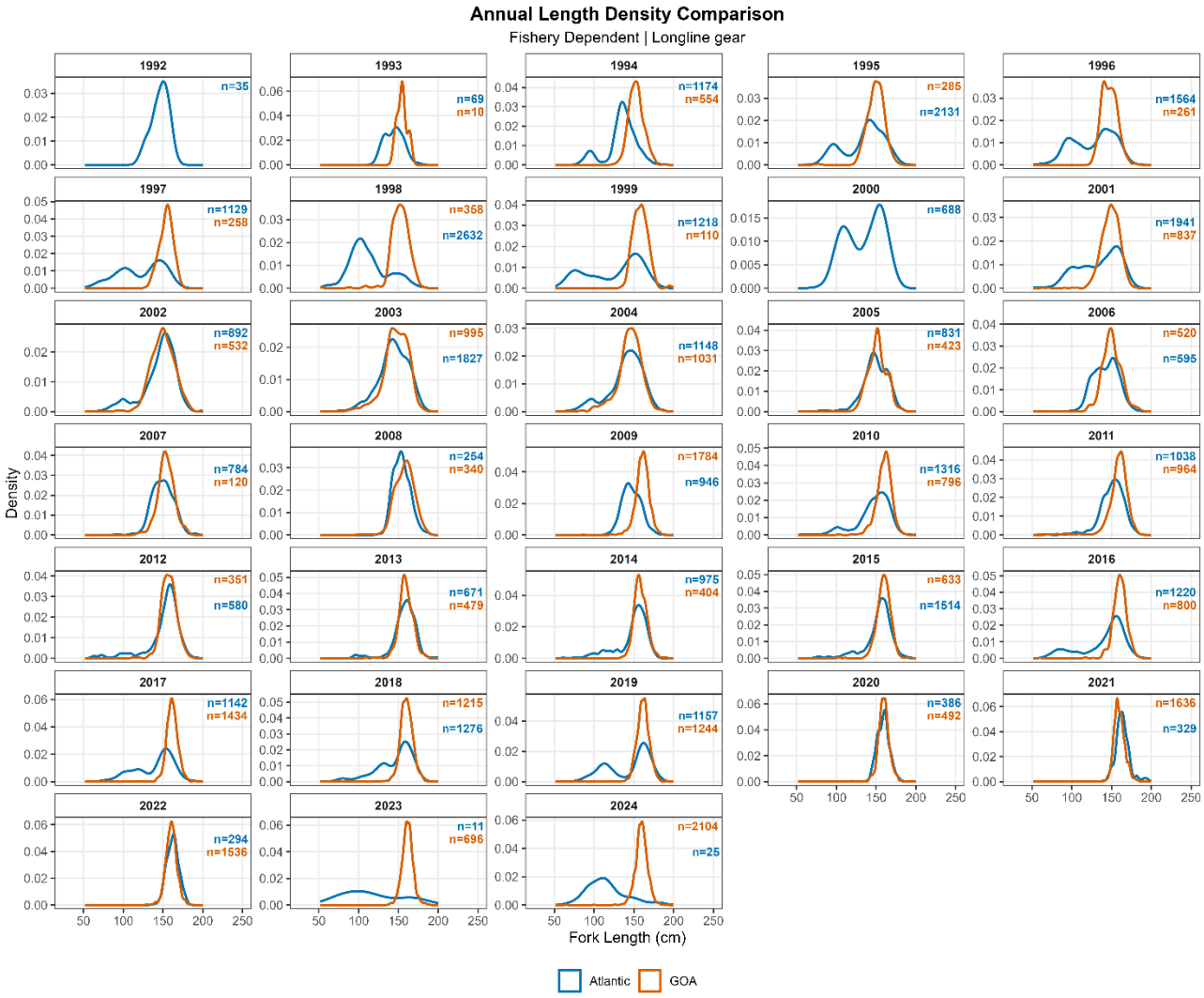


Figure 15. Yearly length-density curves for fishery dependent longline gears combined. Color and sample sizes indicate sampling region (Atlantic vs. Gulf). Data are faceted by year to illustrate shifts in the size structure of the catch over time.

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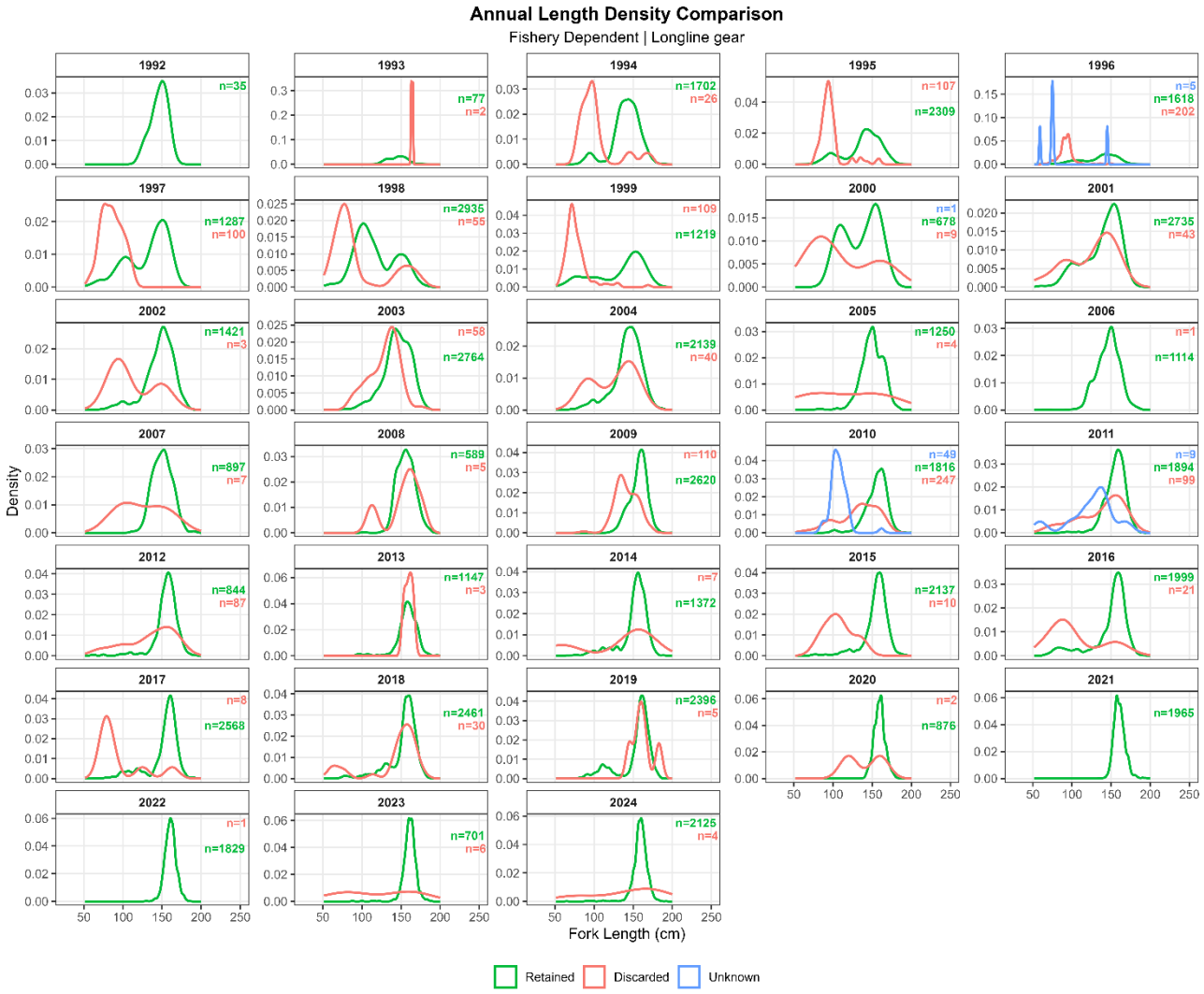


Figure15a. Yearly length-density curves for fishery dependent longline gears combined. Color and sample sizes indicate retention status. Data are faceted by year to illustrate shifts in the size structure of the catch over time.

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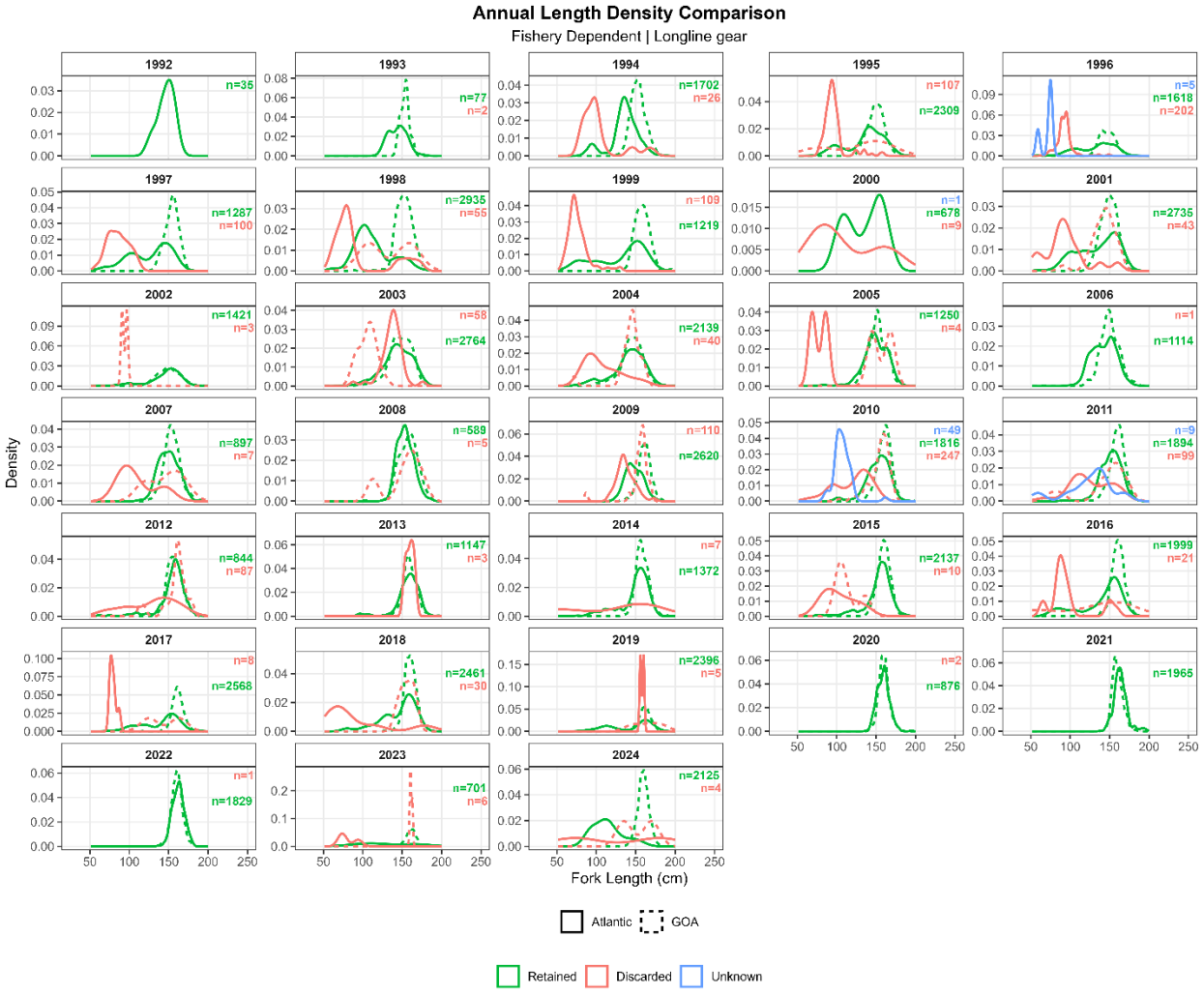


Figure15b. Yearly length-density curves for fishery dependent longline gears combined. Color and sample sizes indicate retention status and line type indicates region. Data are faceted by year to illustrate shifts in the size structure of the catch over time.

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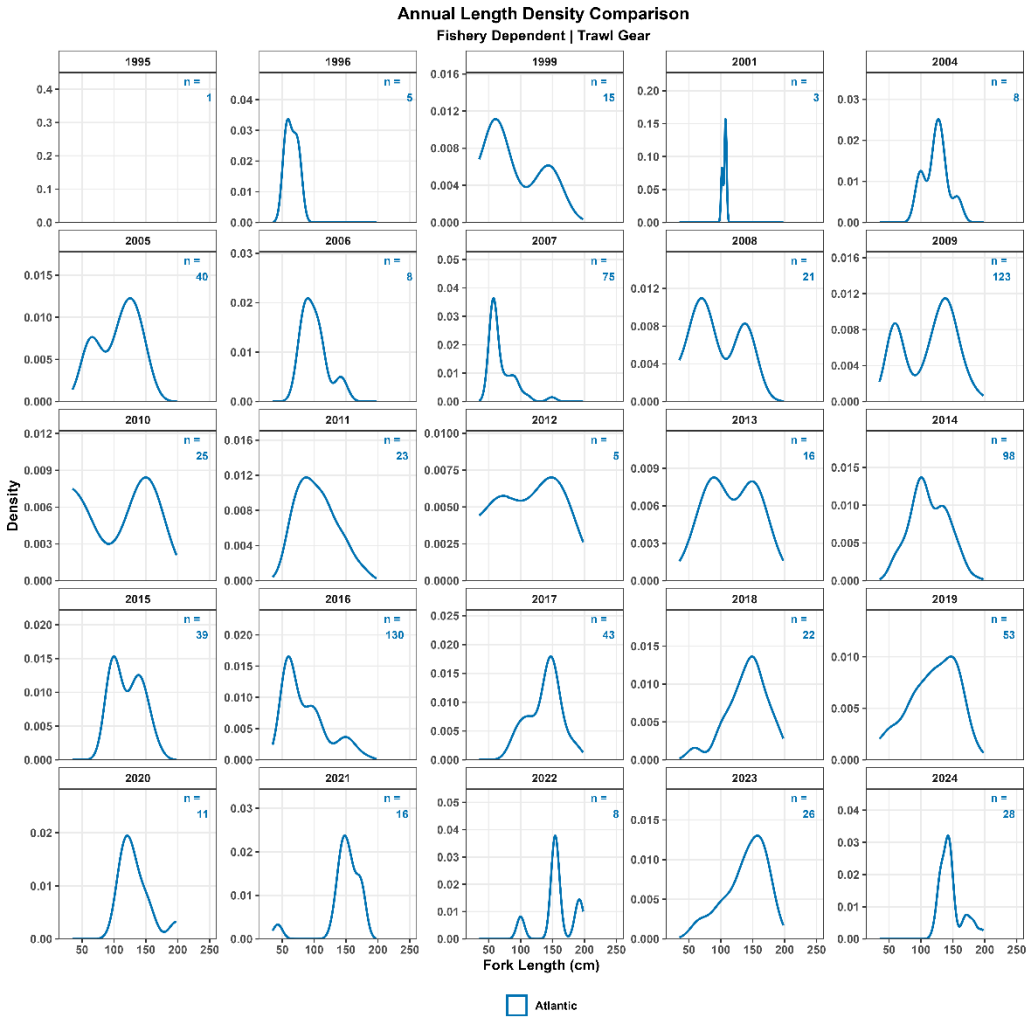


Figure 16. Yearly length-density curves for fishery dependent trawl Gear. Color and sample sizes indicates sampling region (Atlantic vs. Gulf). Data are faceted by year to illustrate shifts in the size structure of the catch over time.

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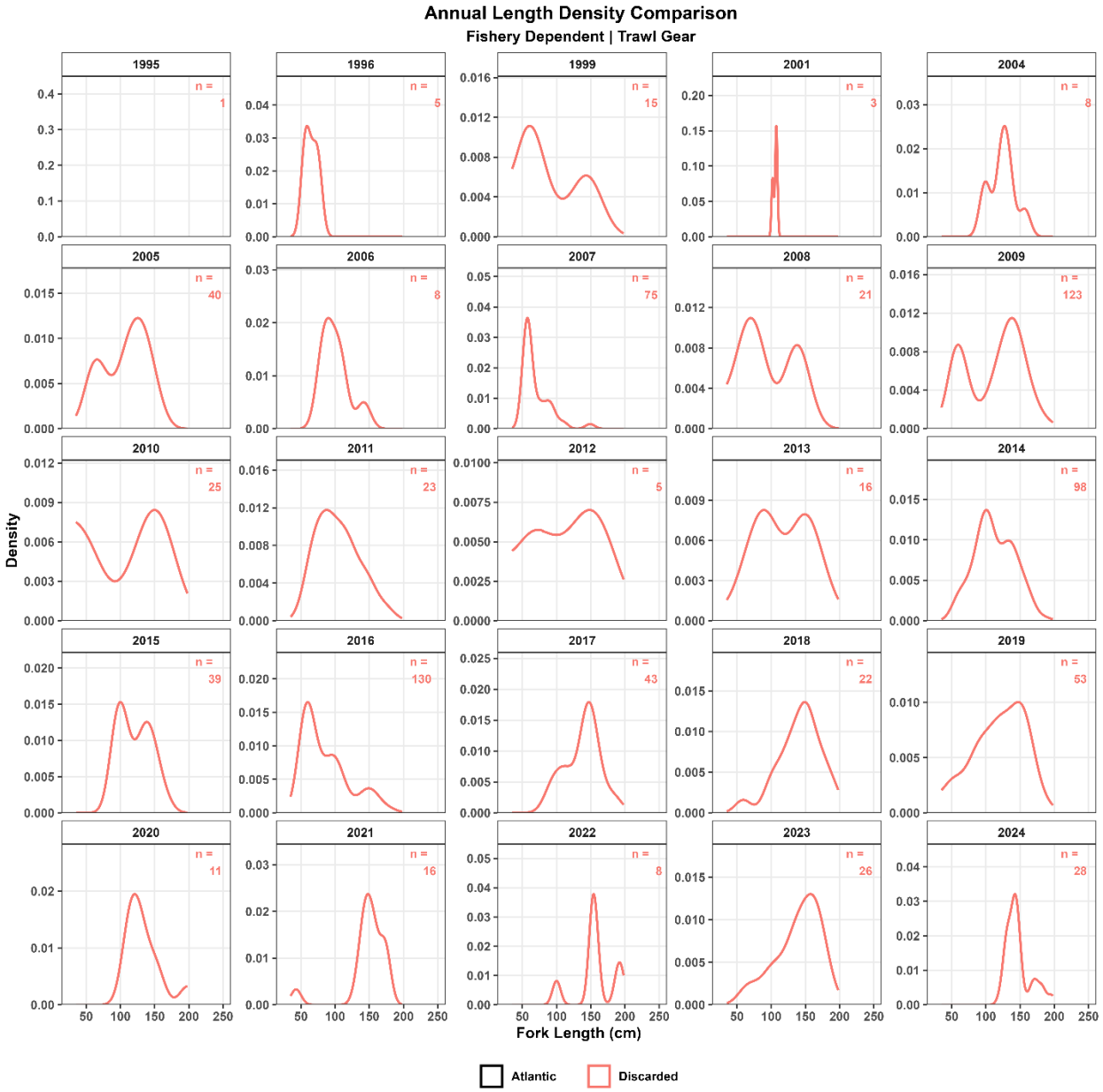


Figure 16a. Yearly length-density curves for Trawl Gear. Color indicates sampling region (Atlantic vs. Gulf) and line type indicates retention status. Data are faceted by year to illustrate shifts in the size structure of the catch over time.

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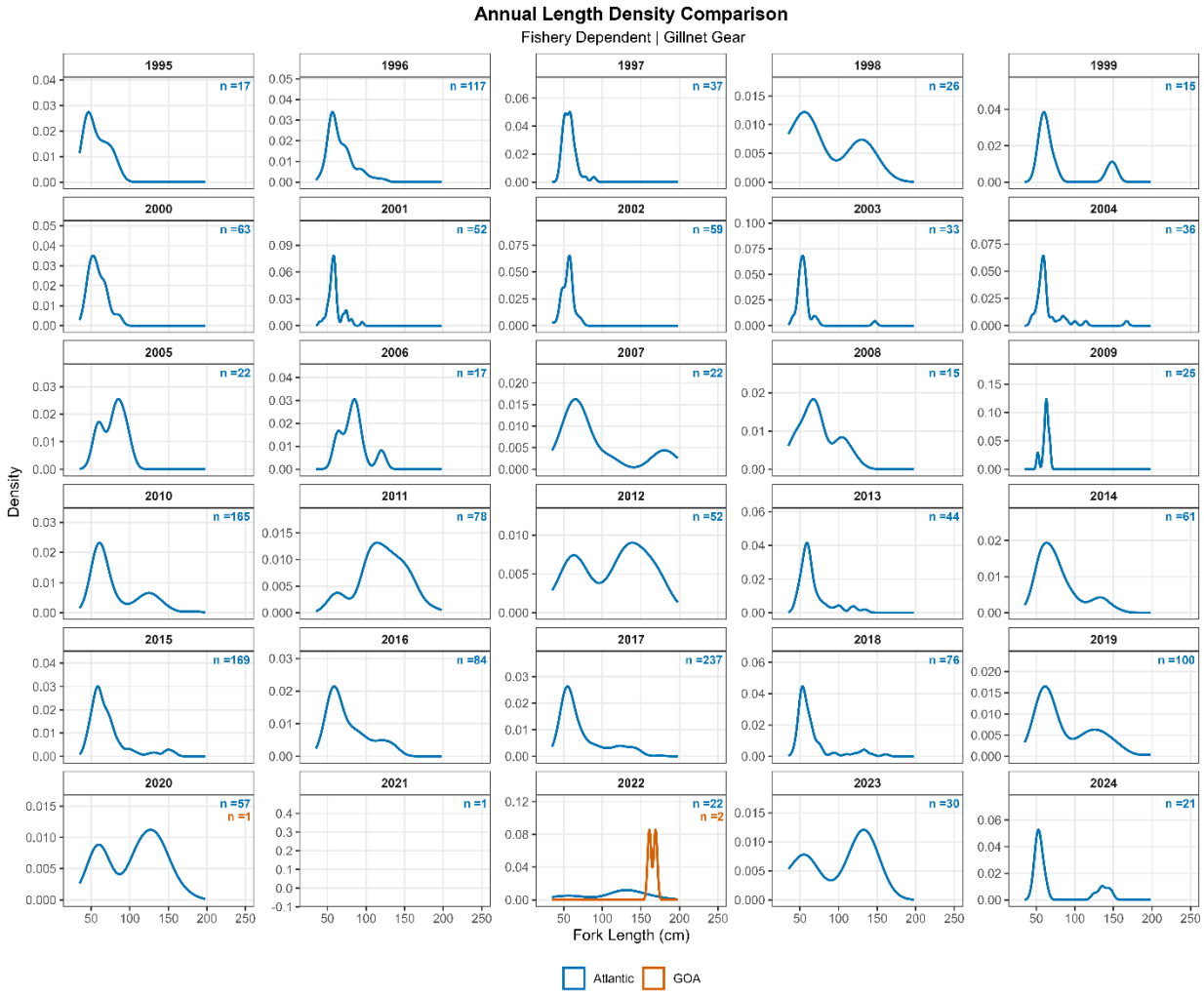


Figure 17. Yearly length-density curves for fishery dependent gillnet Gear. Color and sample sizes indicate sampling region (Atlantic vs. Gulf). Data are faceted by year to illustrate shifts in the size structure of the catch over time.

07/21/26: Updated document to separate composition data by disposition (discarded vs. retained).
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Figure 17a. Yearly length-density curves for fishery dependent gillnet Gear. Color and sample sizes indicate retention status while line type indicates sampling region. Data are faceted by year to illustrate shifts in the size structure of the catch over time.

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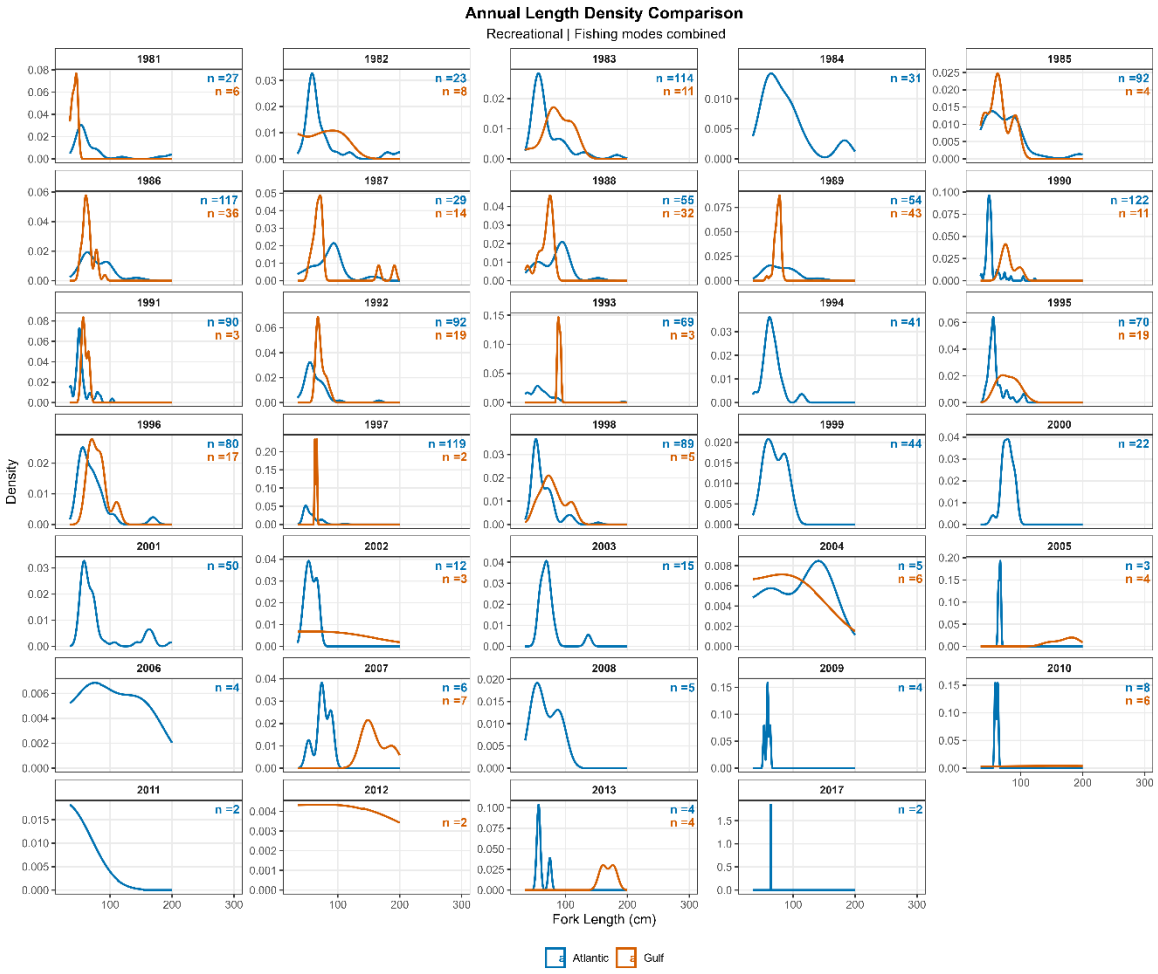


Figure 18. Yearly length-density curves for the recreational fishery, excluding Mark Sampson logbook data. Color indicates sampling region (Atlantic vs. Gulf) sampling modes are combined. Data are faceted by year to illustrate shifts in the size structure of the catch over time.

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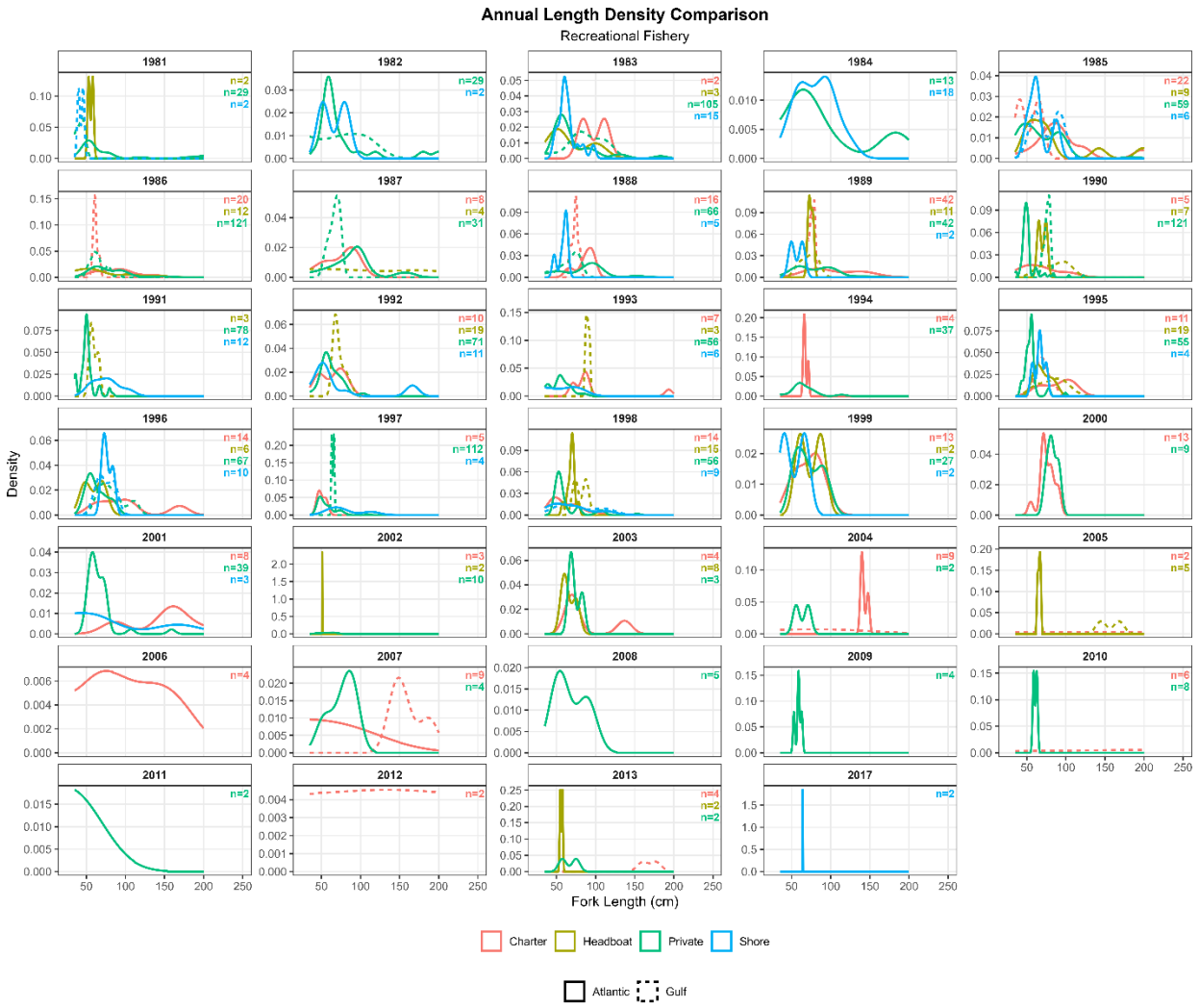


Figure 18a. Yearly length-density curves for the recreational fishery excluding Mark Sampson logbook data. Line type indicates sampling region (Atlantic vs. Gulf) and color indicates sampling mode. Data are faceted by year to illustrate shifts in the size structure of the catch over time.

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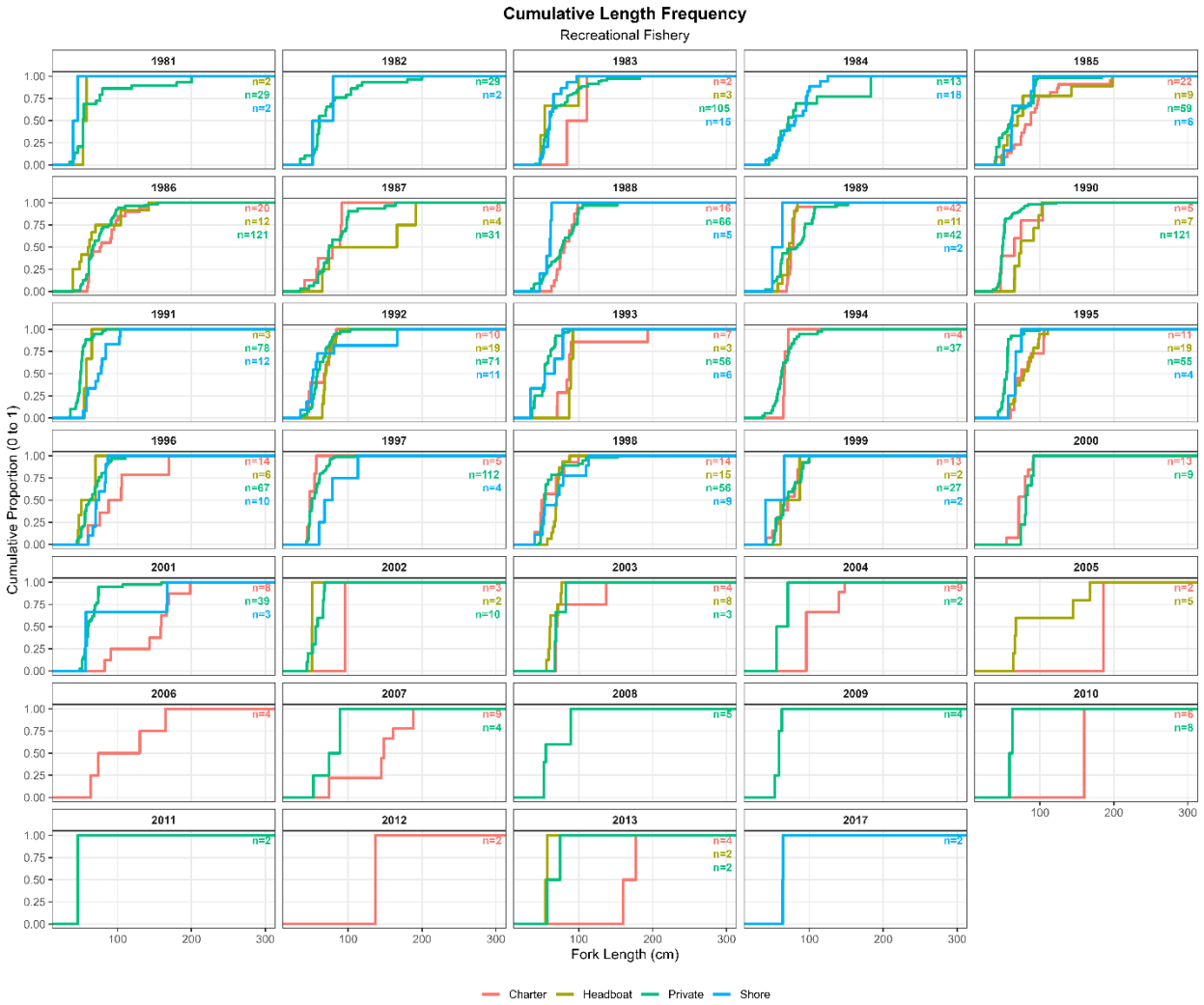


Figure 19. Yearly cumulative size distributions for the recreational fishery (excluding Mark Sampson logbook data) by mode. Color and sample sizes indicate sampling mode. Data are faceted by year to illustrate shifts in the size structure of the catch over time.

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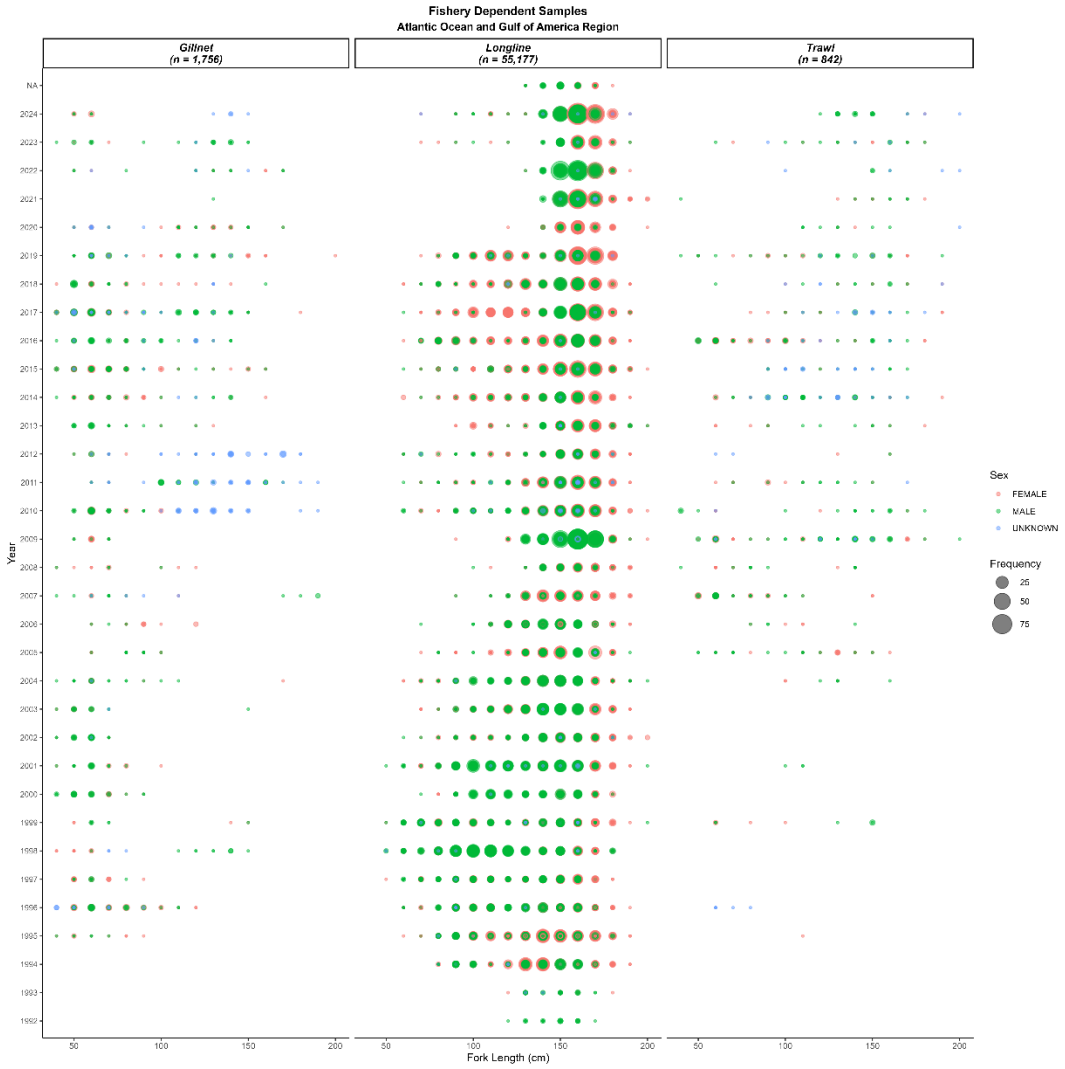


Figure 20. Annual distribution of fishery-dependent sample volume by gear type (1992–2024) for the Atlantic Ocean and Gulf of America regions combined. Points represent annual collection frequency, with bubble size proportional to total sample count. Counts represent measured (not estimated) fork lengths. Colors indicate sex (pink = female, green = male, blue = unknown). Longline gear types (bottom, pelagic, and vertical) were combined into one longline category.

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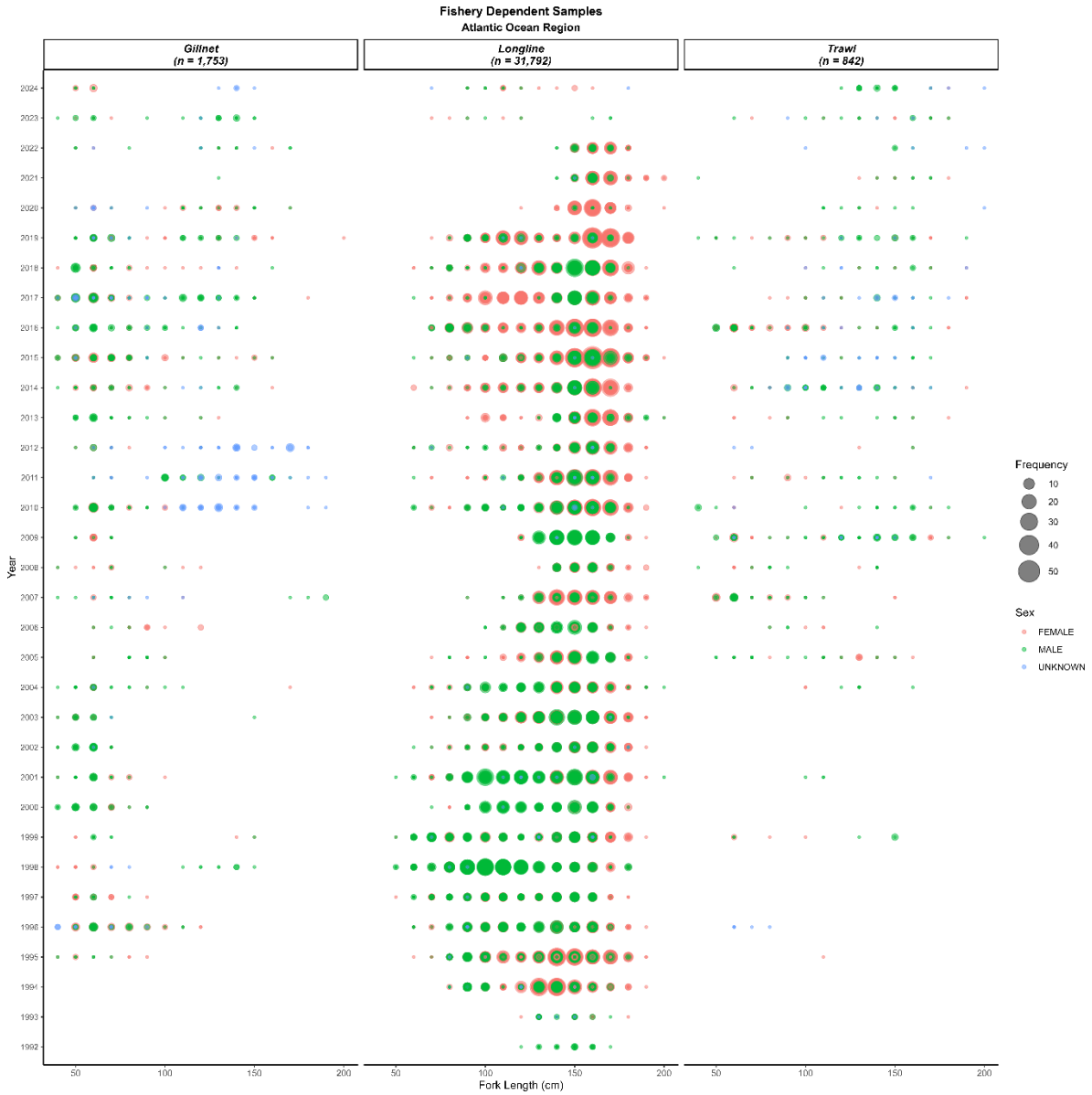


Figure 20a. Annual distribution of fishery-dependent sample volume by gear type (1992–2024) for the Atlantic Ocean region. Points represent annual collection frequency, with bubble size proportional to total sample count. Counts represent measured (not estimated) fork lengths. Colors indicate sex (pink = female, green = male, blue = unknown). Longline gear types (bottom, pelagic, and vertical) were combined into one longline category.

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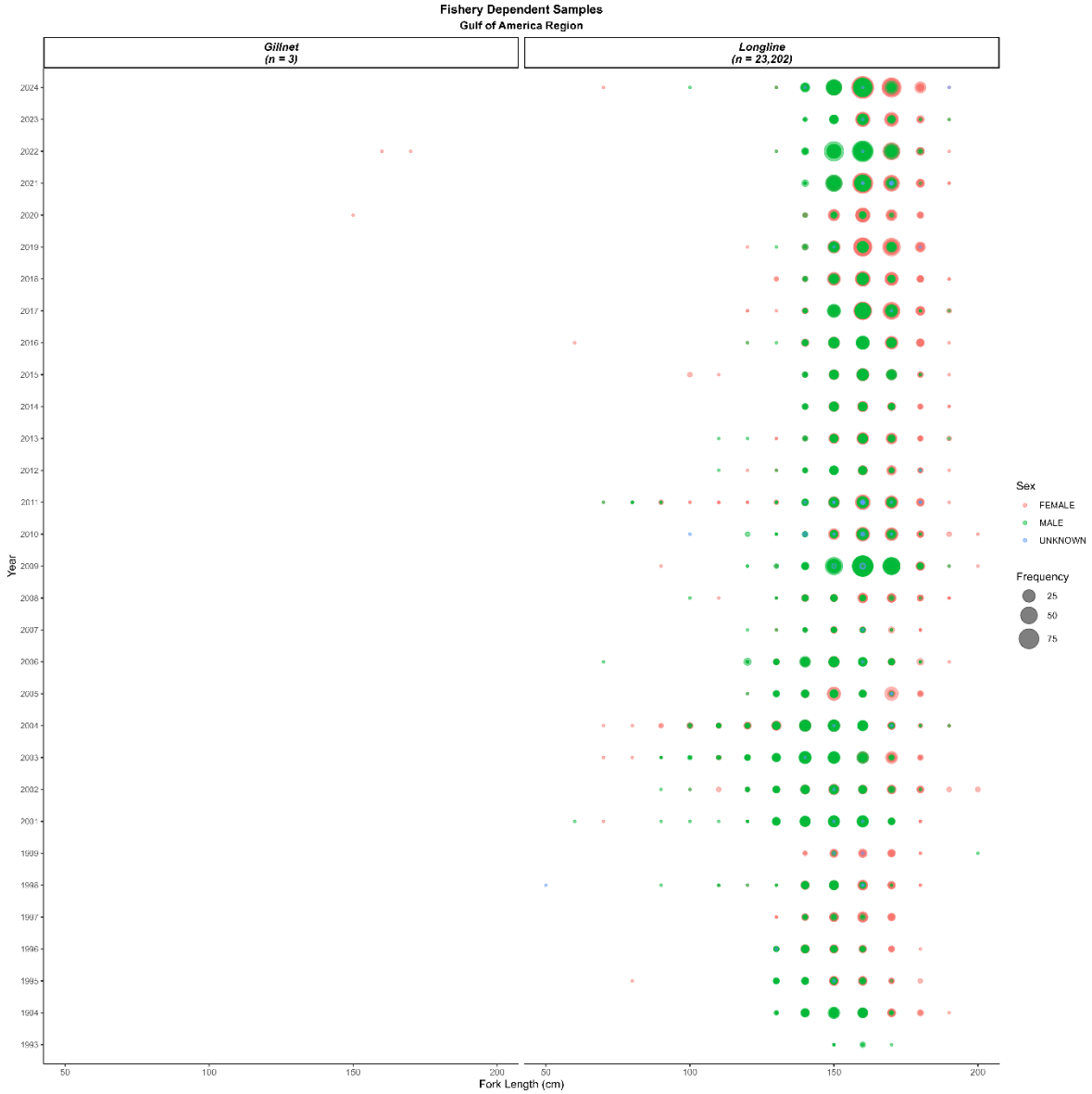


Figure 20b. Annual distribution of fishery-dependent sample volume by gear type (1992–2024) for the Gulf of America region. Points represent annual collection frequency, with bubble size proportional to total sample count. Counts represent measured (not estimated) fork lengths. Colors indicate sex (pink = female, green = male, blue = unknown). Longline gear types (bottom, pelagic, and vertical) were combined into one longline category.

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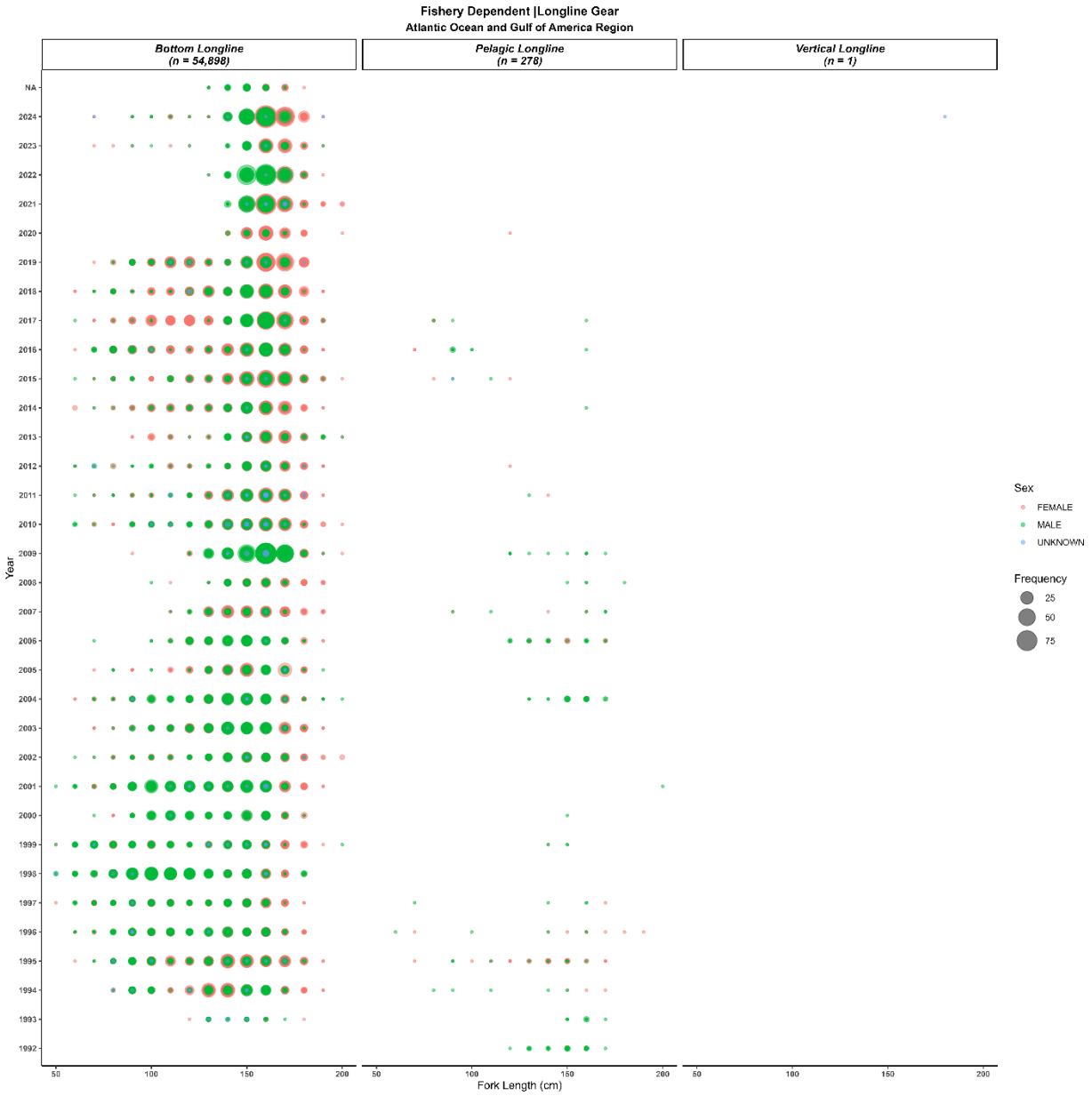


Figure 21. Annual distribution of fishery-dependent sample volume captured in longline gear types (1992–2024) for the Atlantic Ocean and Gulf of America regions combined. Points represent annual collection frequency, with bubble size proportional to total sample count. Counts represent measured (not estimated) fork lengths. Colors indicate sex (pink = female, green = male, blue = unknown).

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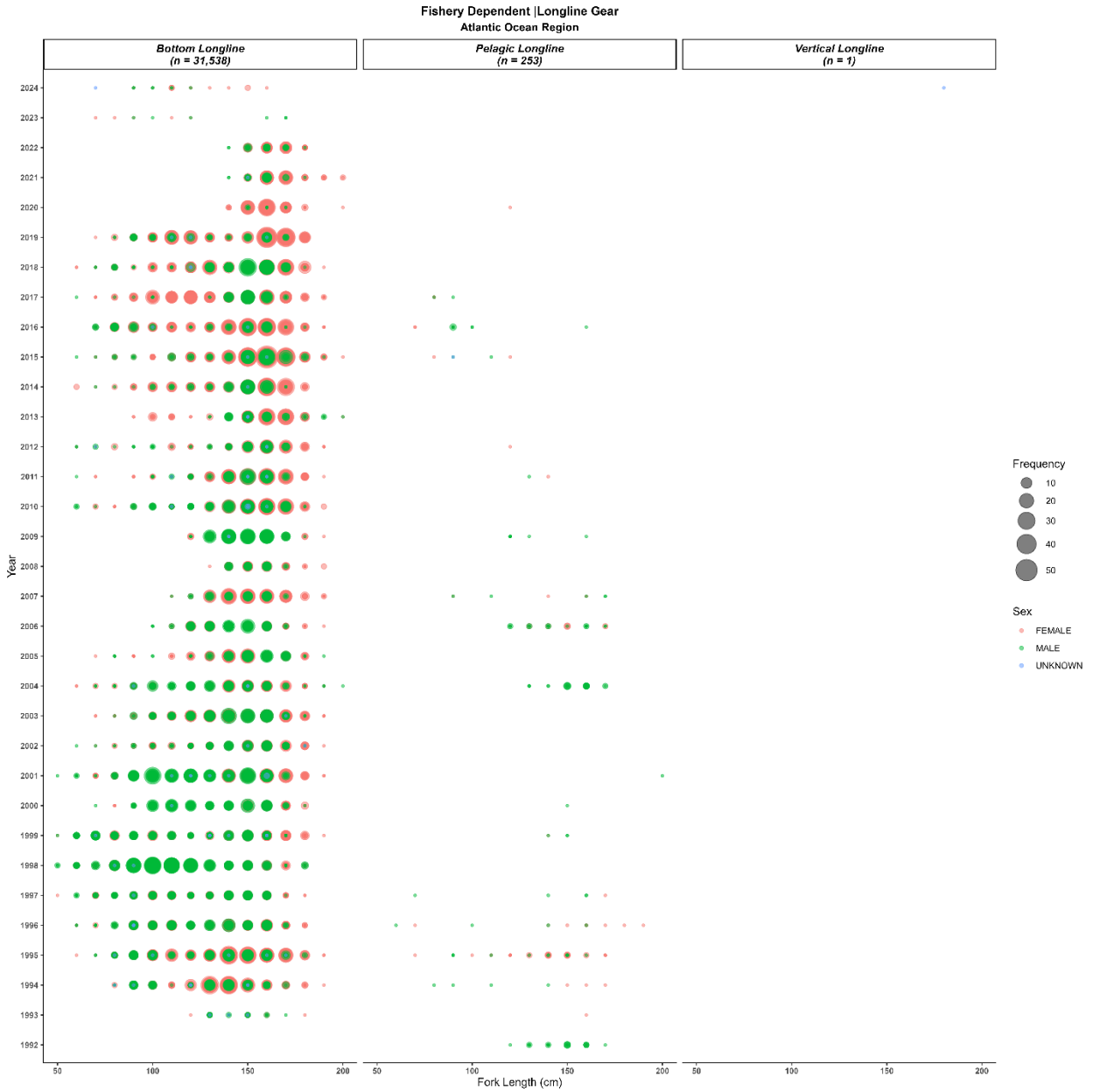


Figure 21a. Annual distribution of fishery-dependent sample volume captured in longline gear types (1992–2024) for the Atlantic Ocean region. Points represent annual collection frequency, with bubble size proportional to total sample count. Counts represent measured (not estimated) fork lengths. Colors indicate sex (pink = female, green = male, blue = unknown).

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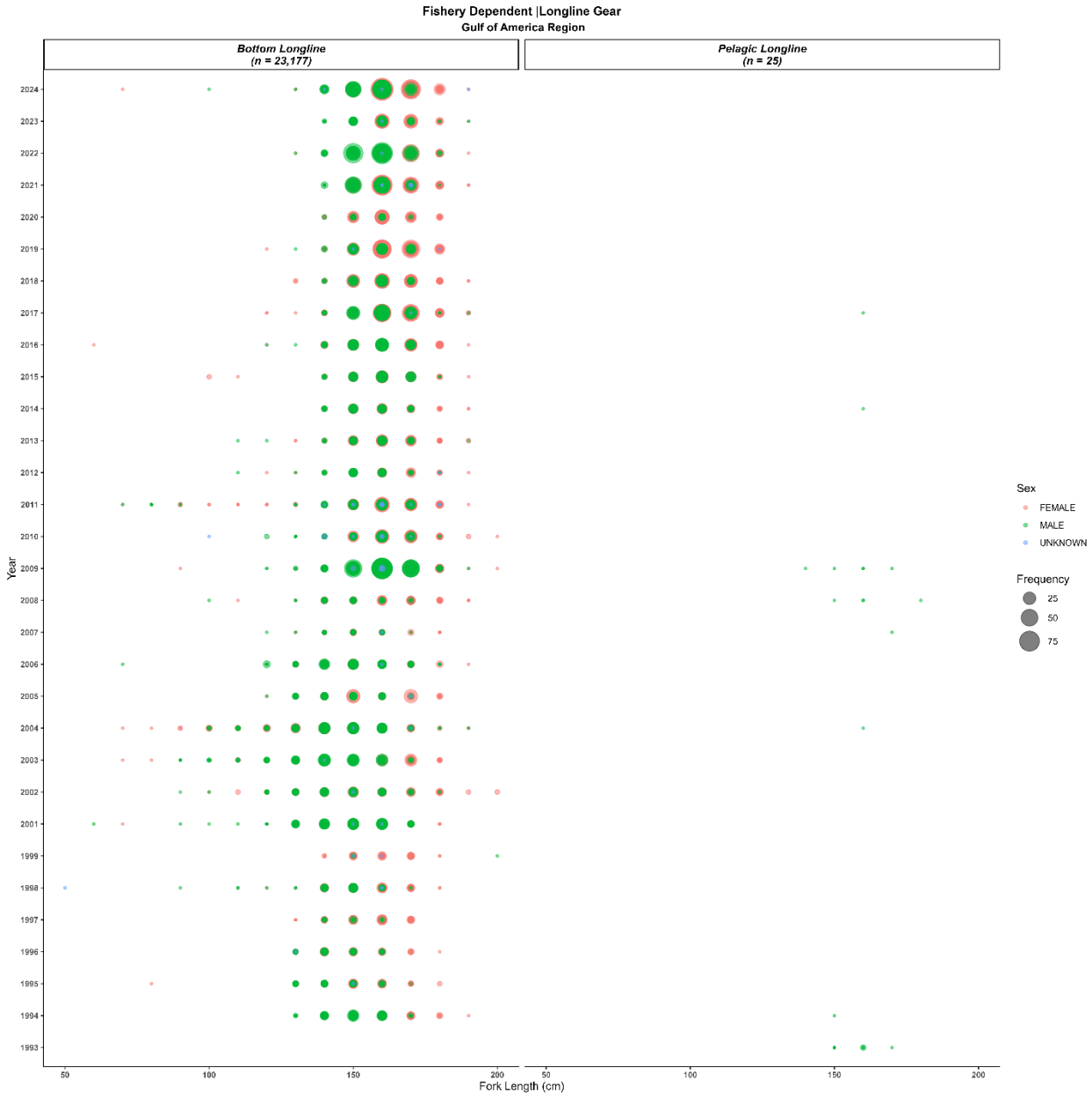


Figure 21b. Annual distribution of fishery-dependent sample volume captured in longline gear types (1992–2024) for the Gulf of America region. Points represent annual collection frequency, with bubble size proportional to total sample count. Counts represent measured (not estimated) fork lengths. Colors indicate sex (pink = female, green = male, blue = unknown).

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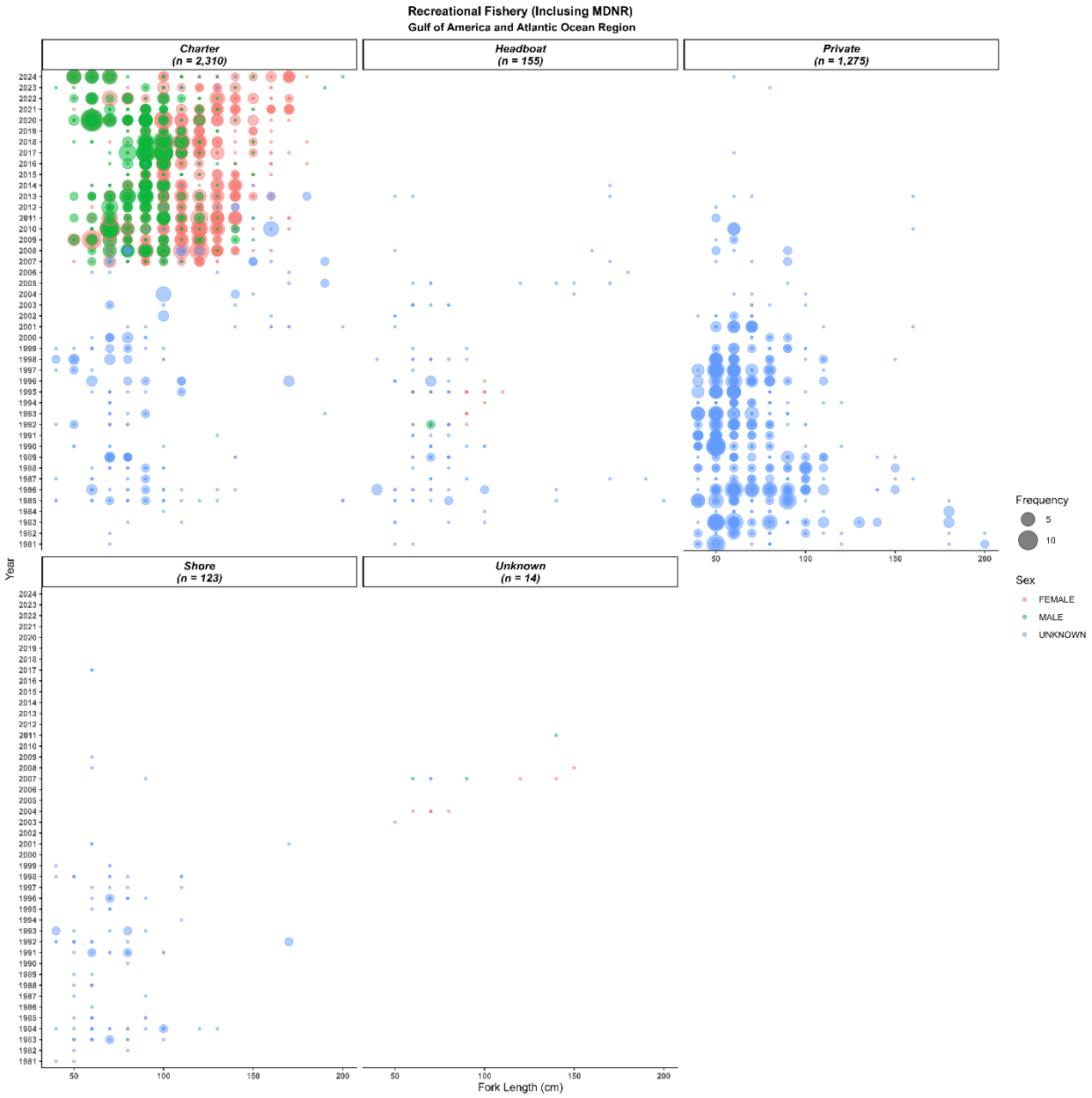


Figure 22. Annual distribution of recreational sample volume by fishing mode (1981-2024) for the Atlantic Ocean and Gulf of America regions combined including Mark Sampson logbook data provided by MDNR. Points represent annual collection frequency, with bubble size proportional to total sample count. Counts represent measured (not estimated) fork lengths. Colors indicate sex (pink = female, green = male, blue = unknown). Note: 14 unknown values come from the Lage Pelagic Survey (LPS) where fishing mode is either private or charter.

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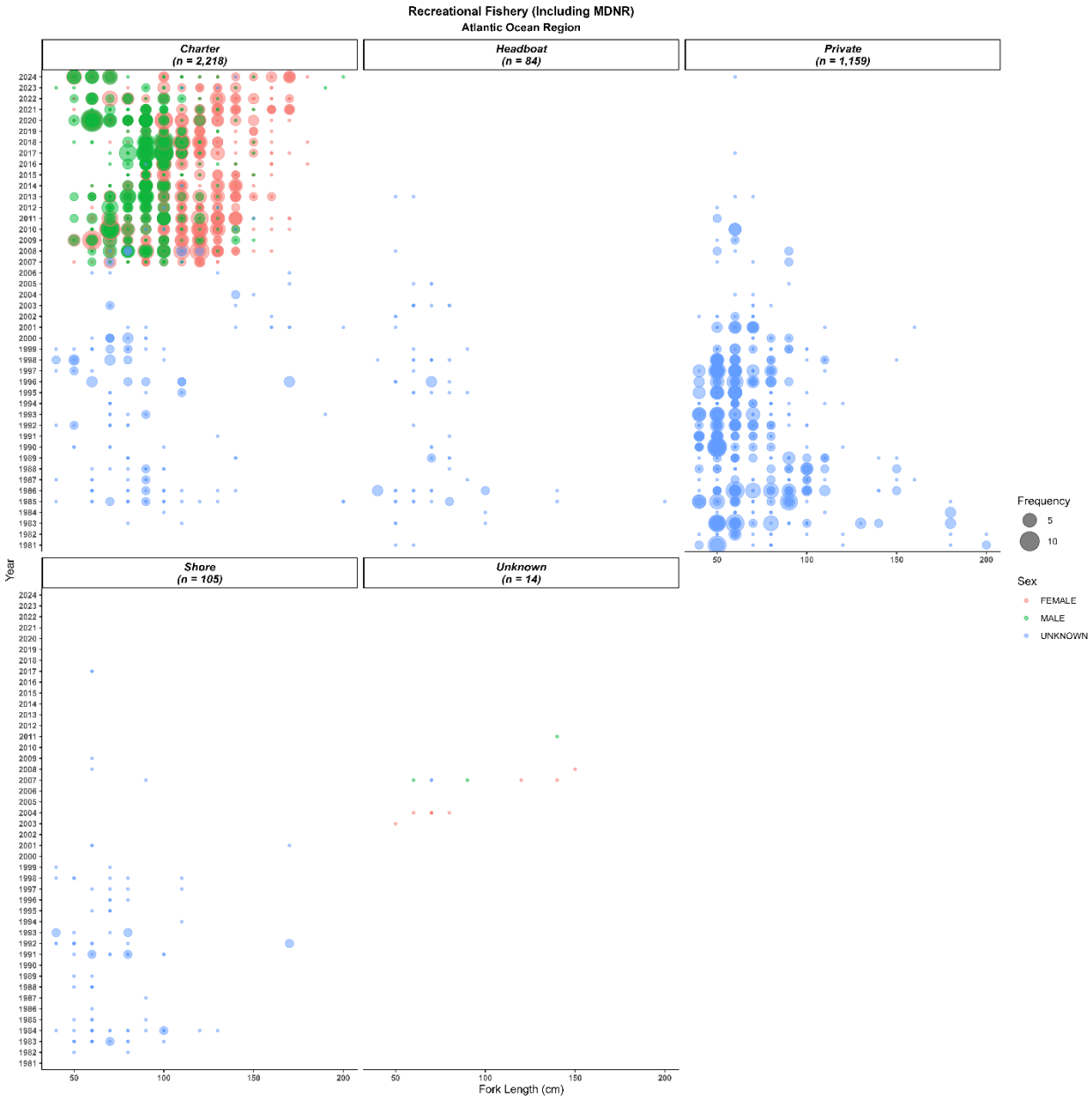


Figure 22a. Annual distribution of recreational sample volume by fishing mode (1981-2024) for the Atlantic Ocean region including Mark Sampson logbook data provided by MDNR. Points represent annual collection frequency, with bubble size proportional to total sample count. Counts represent measured (not estimated) fork lengths. Colors indicate sex (pink = female, green = male, blue = unknown). Note: 7 unknown values come from the Lage Pelagic Survey (LPS) where fishing mode is either private or charter.

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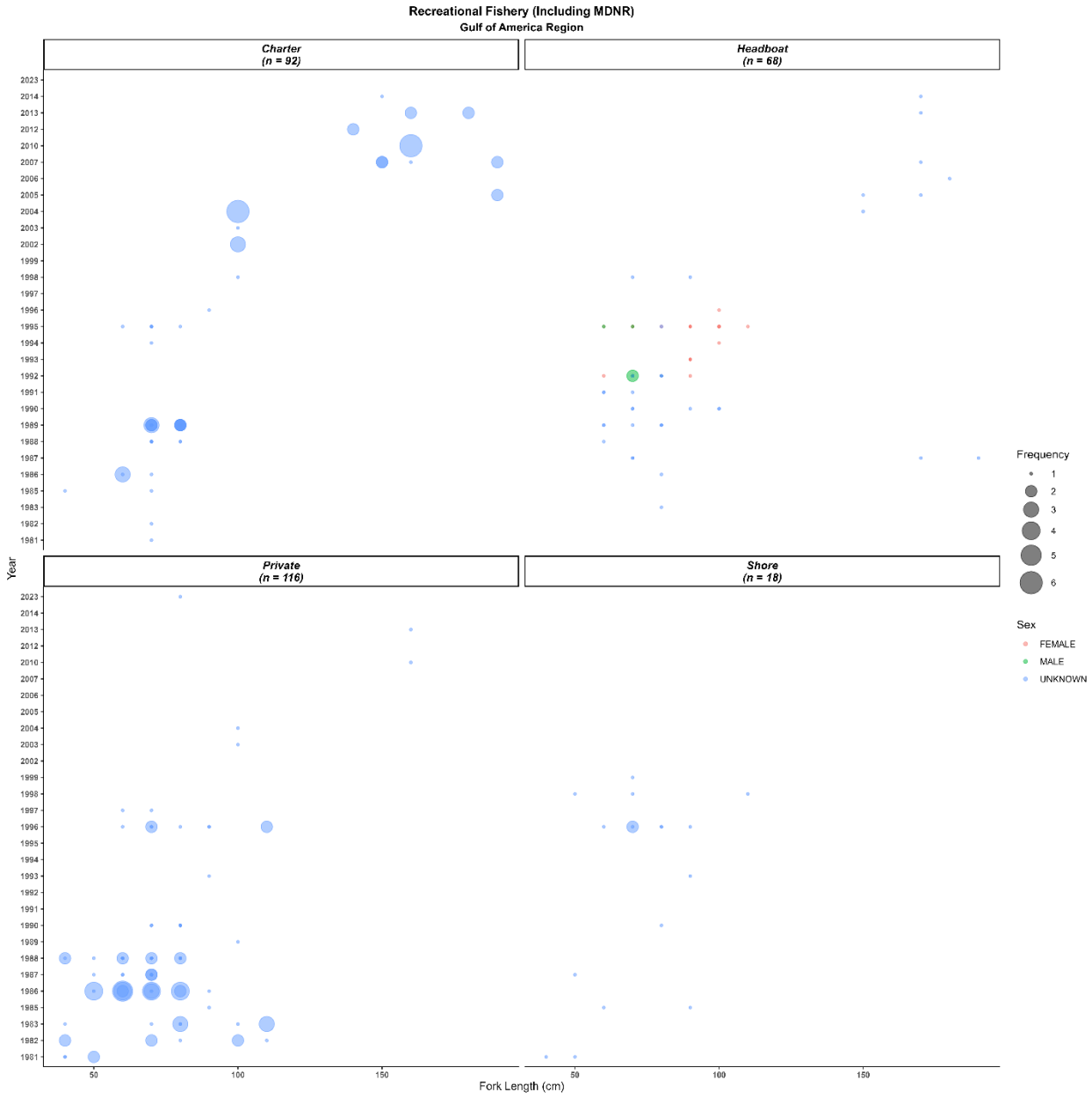


Figure 22b. Annual distribution of recreational sample volume by fishing mode (1981-2024) for the Gulf of America region including Mark Sampson logbook data provided by MDNR. Points represent annual collection frequency, with bubble size proportional to total sample count. Counts represent measured (not estimated) fork lengths. Colors indicate sex (pink = female, green = male, blue = unknown). Note: 7 unknown values come from the Lage Pelagic Survey (LPS) where fishing mode is either private or charter.

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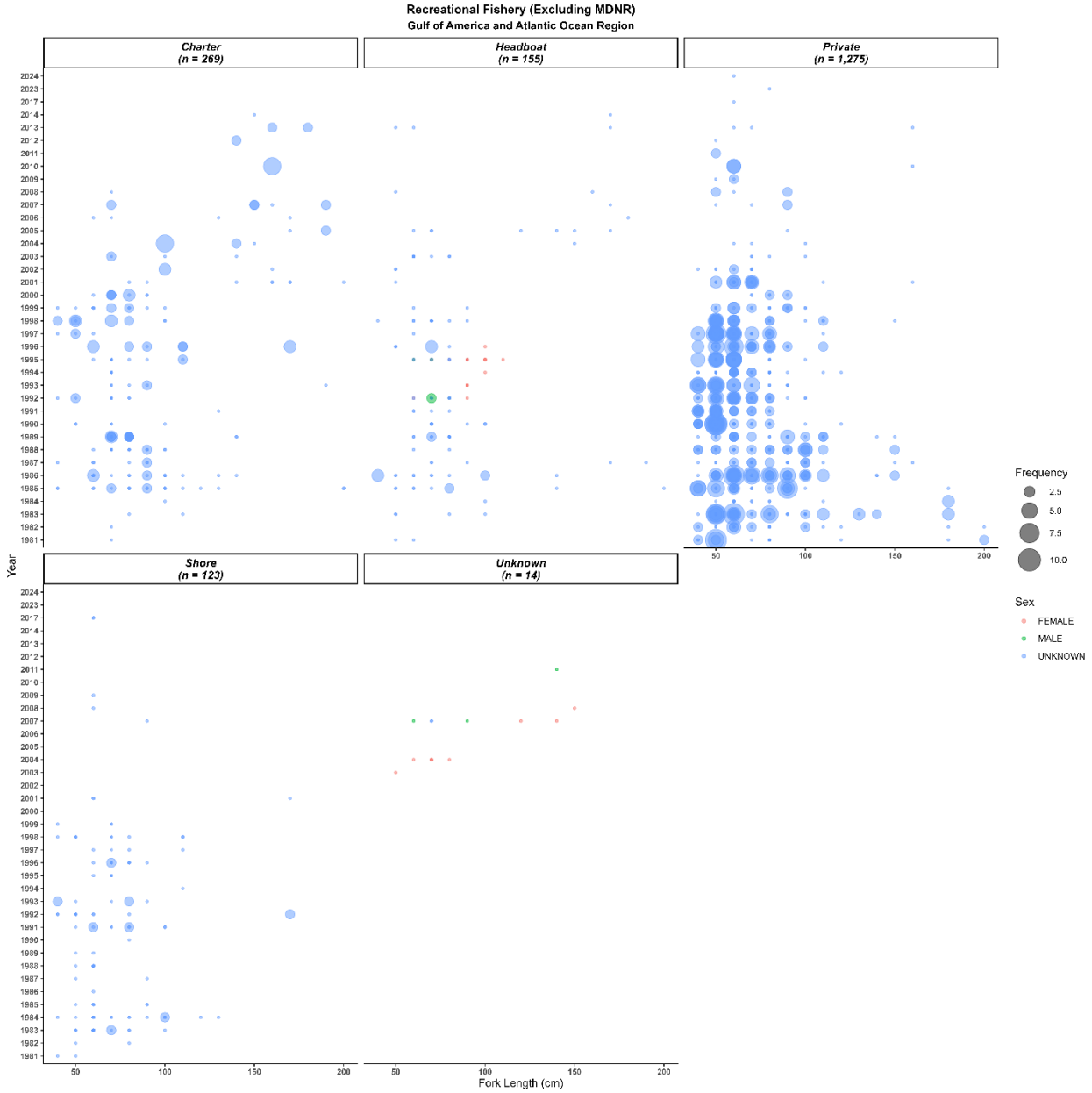


Figure 23. Annual distribution of recreational sample volume by gear type (1981-2024) for the Gulf of America and Atlantic Ocean regions combined excluding Mark Sampson logbook data provided by MDNR. Points represent annual collection frequency, with bubble size proportional to total sample count. Counts represent measured (not estimated) fork lengths. Colors indicate sex (pink = female, green = male, blue = unknown sex).

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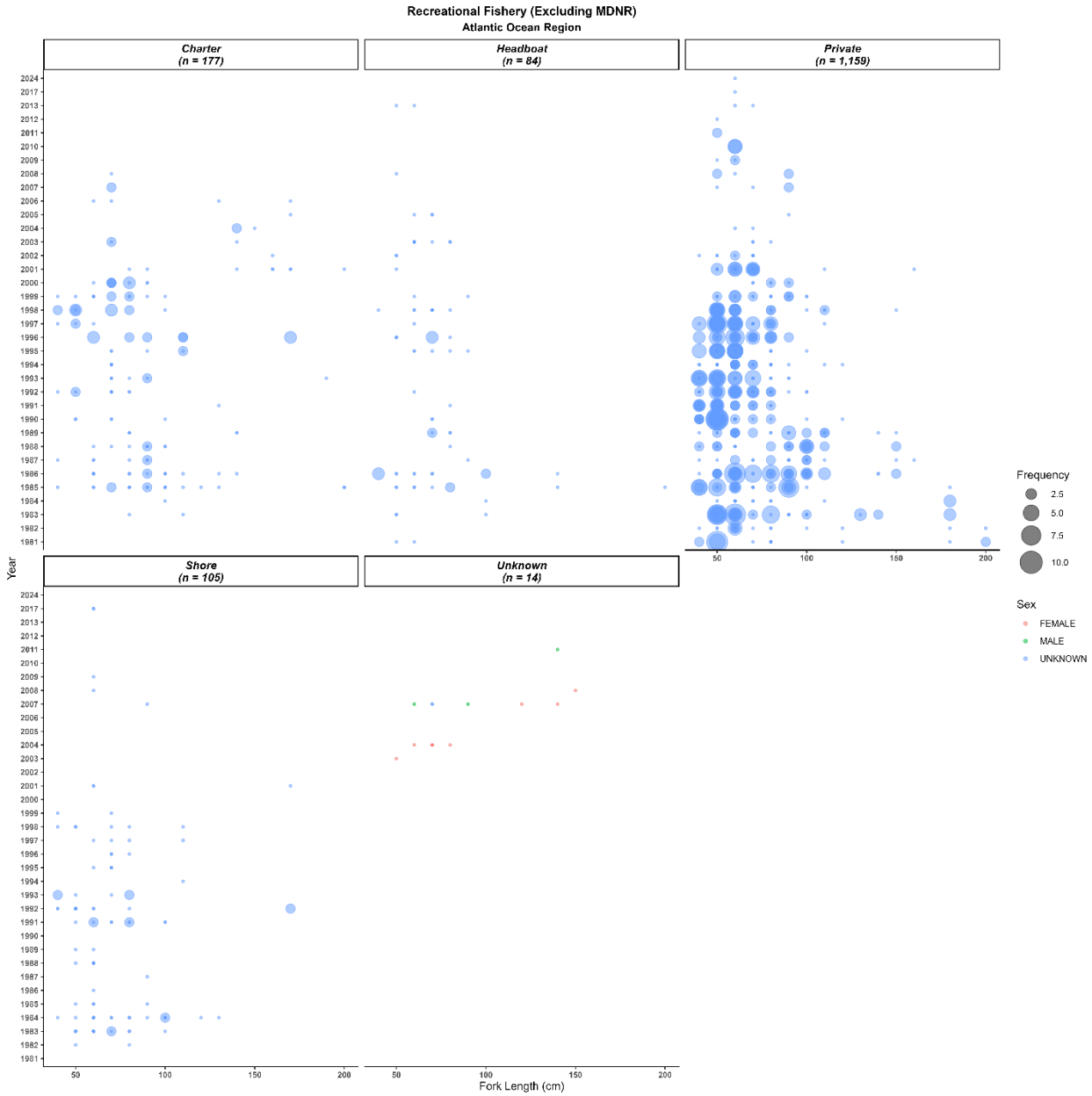


Figure 23a. Annual distribution of recreational sample volume by gear type (1981-2024) for the Atlantic Ocean region excluding Mark Sampson logbook data provided by MDNR. Points represent annual collection frequency, with bubble size proportional to total sample count. Counts represent measured (not estimated) fork lengths. Colors indicate sex (pink = female, green = male, blue = unknown sex).

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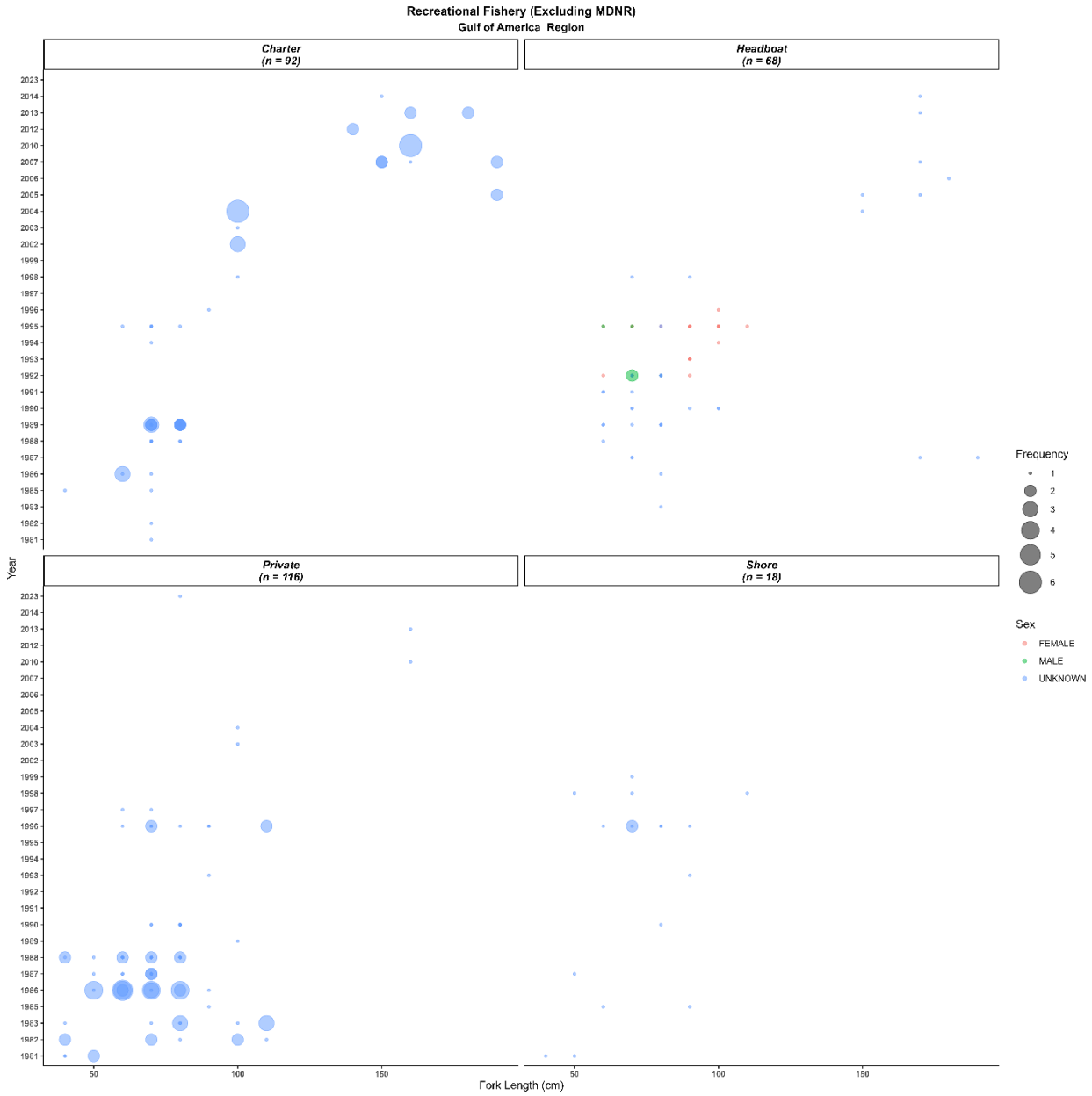


Figure 23b. Annual distribution of recreational sample volume by gear type (1981-2024) for the Gulf of America region excluding Mark Sampson logbook data provided by MDNR. Points represent annual collection frequency, with bubble size proportional to total sample count. Counts represent measured (not estimated) fork lengths. Colors indicate sex (pink = female, green = male, blue = unknown sex).

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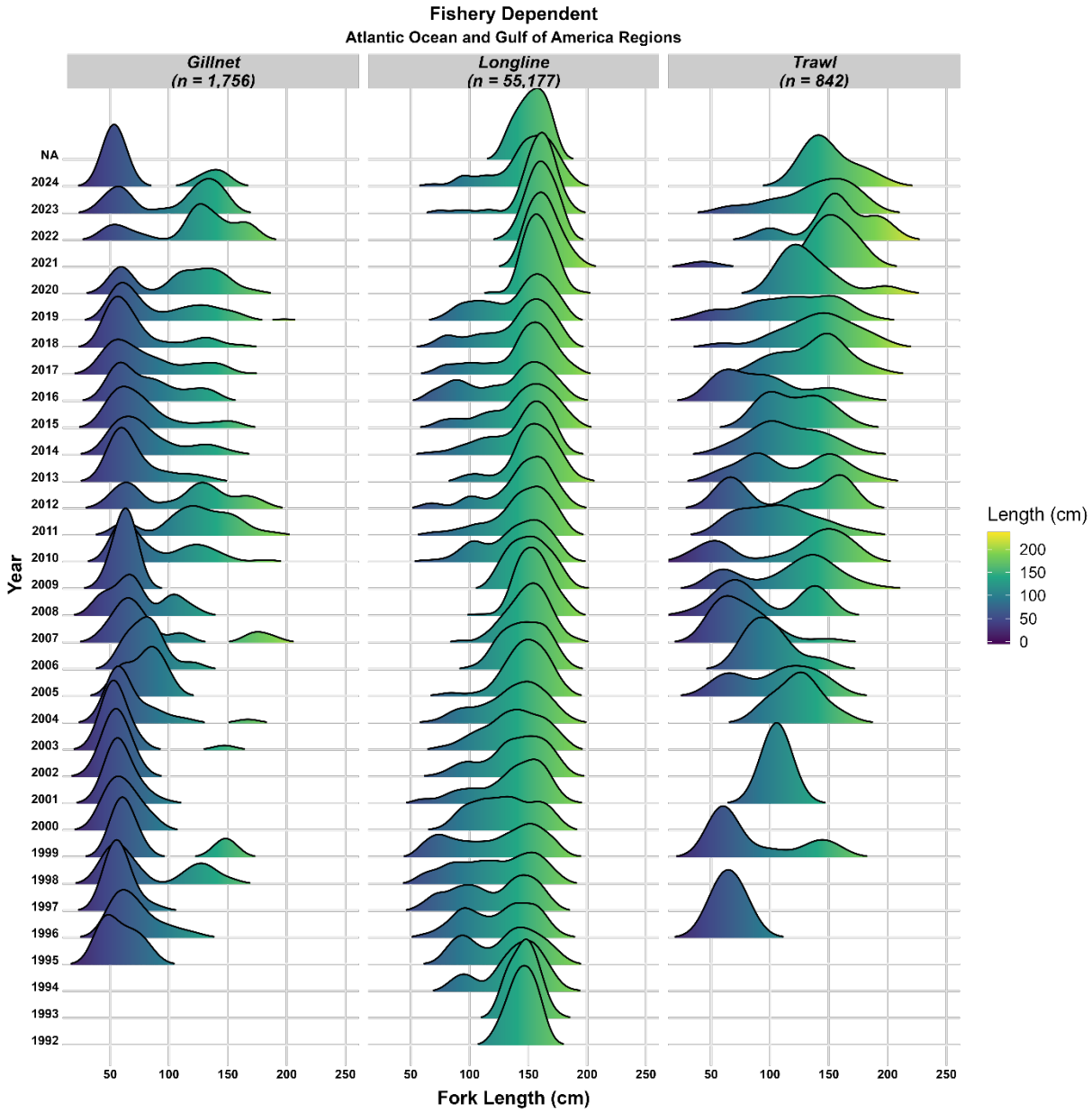


Figure 24. Annual length-frequency distributions of fishery-dependent samples by gear type (1992–2024) for the Atlantic Ocean and Gulf of America regions combined. Longline gear types (bottom, pelagic, and vertical) were combined into one "longline category". Ridges represent the probability density of fork length (cm) for each year, with color gradients indicating length (purple to green). Fork lengths included were measured (not estimated).

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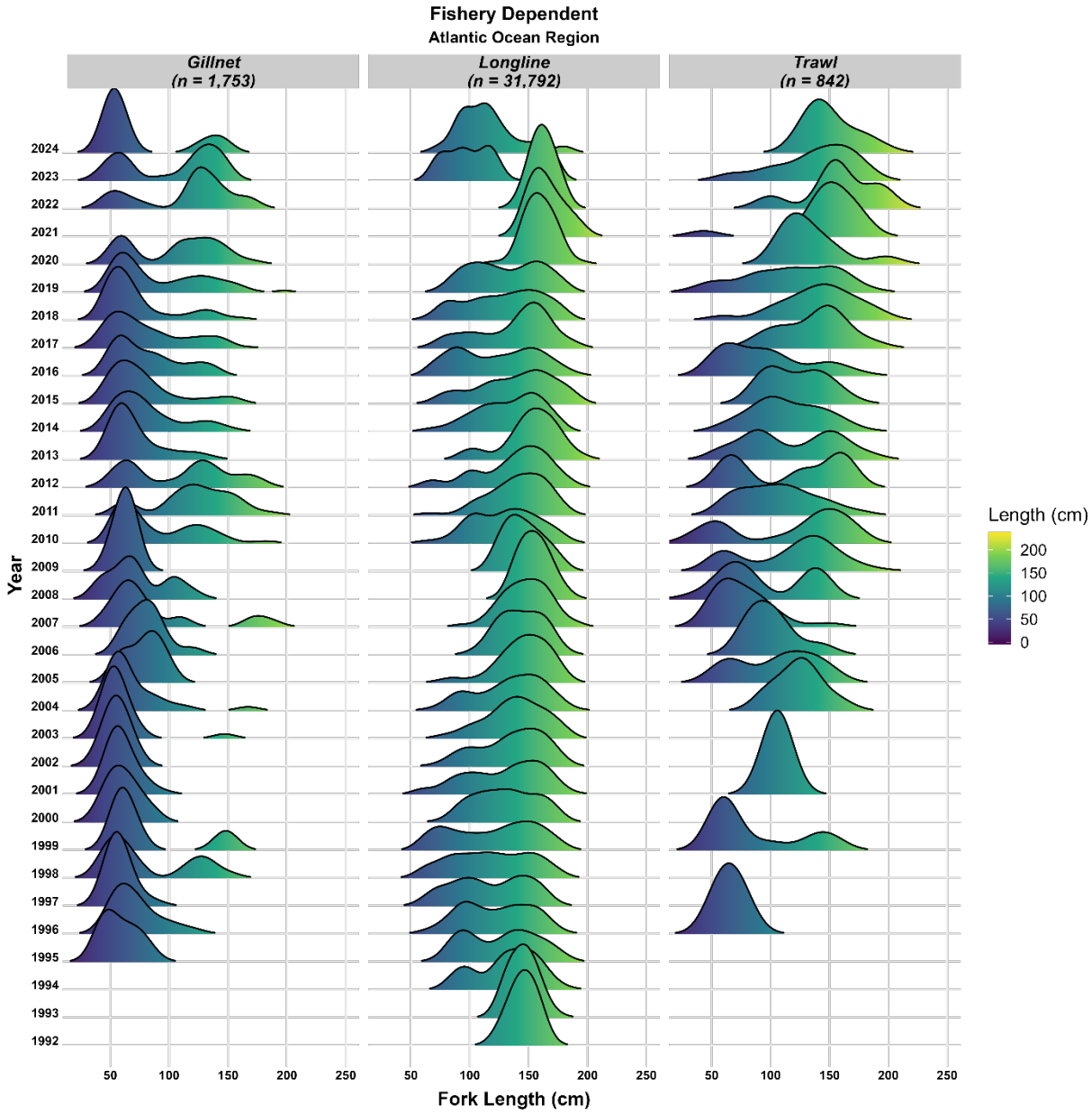


Figure 24a. Annual length-frequency distributions of fishery-dependent samples by gear type (1992–2024) for the Atlantic Ocean region. Longline gear types (bottom, pelagic, and vertical) were combined into one "longline category". Ridges represent the probability density of fork length (cm) for each year, with color gradients indicating length (purple to green). Fork lengths included were measured (not estimated).

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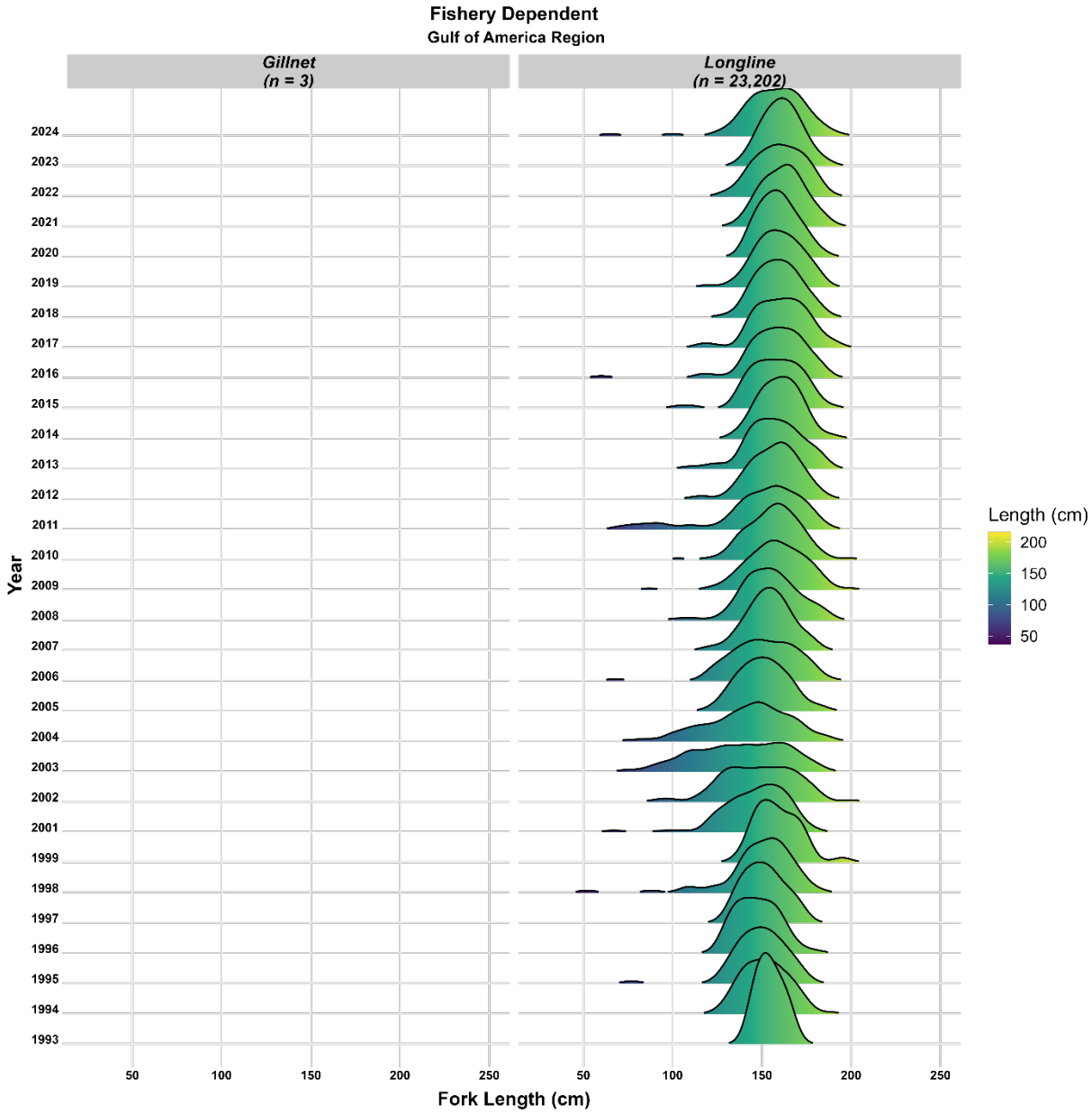


Figure 24b. Annual length-frequency distributions of fishery-dependent samples by gear type (1992–2024) for the Gulf of America region. Longline gear types (bottom, pelagic, and vertical) were combined into one "longline category". Ridges represent the probability density of fork length (cm) for each year, with color gradients indicating length (purple to green). Fork lengths included were measured (not estimated).

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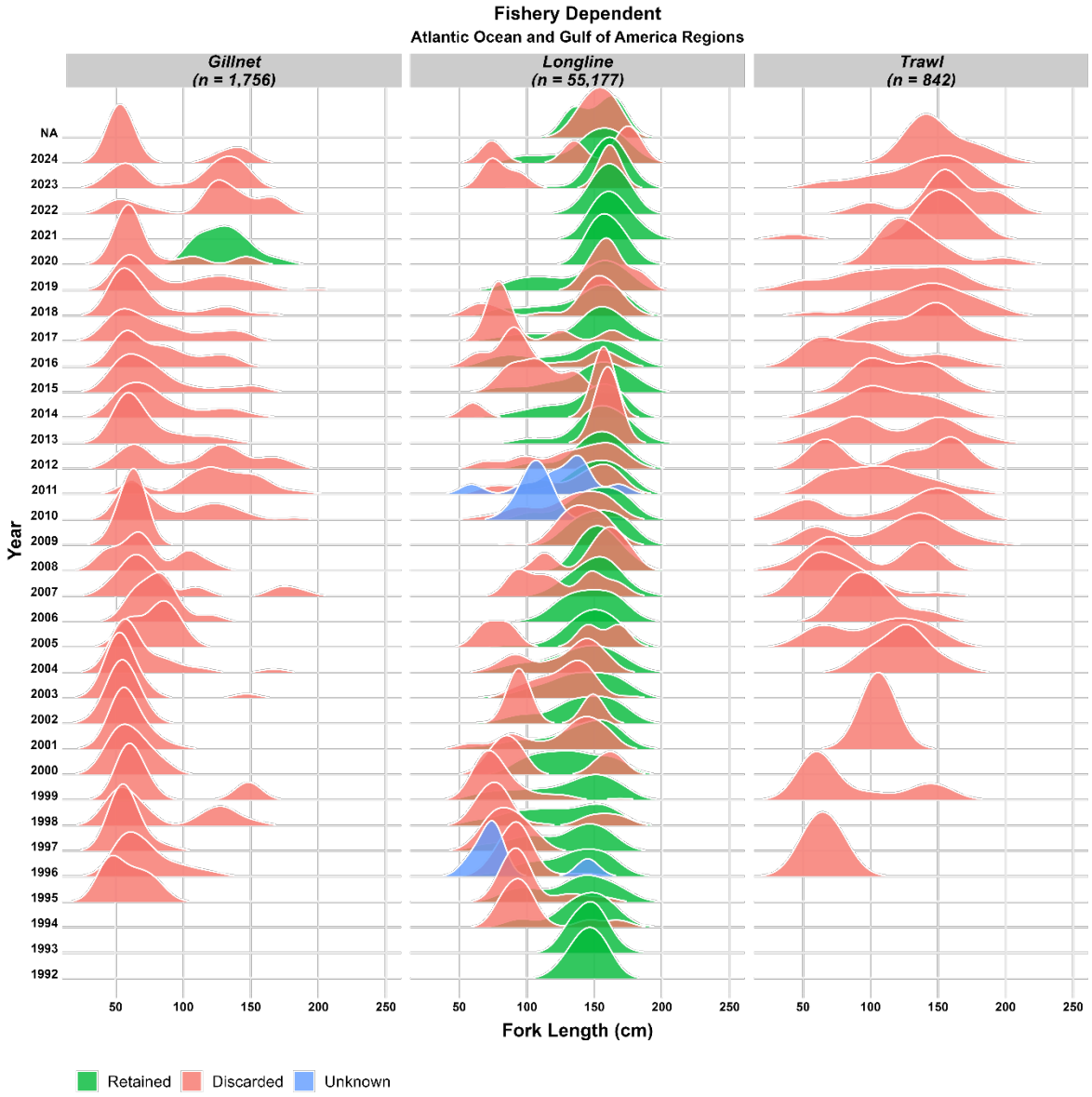


Figure 24c. Annual length-frequency distributions of fishery-dependent samples by gear type (1992–2024) for the Atlantic Ocean and Gulf of America regions combined. Longline gear types (bottom, pelagic, and vertical) were combined into one “longline category”. Ridges represent the probability density of fork length (cm) for each year, with color indicating retention status. Fork lengths included were measured (not estimated).

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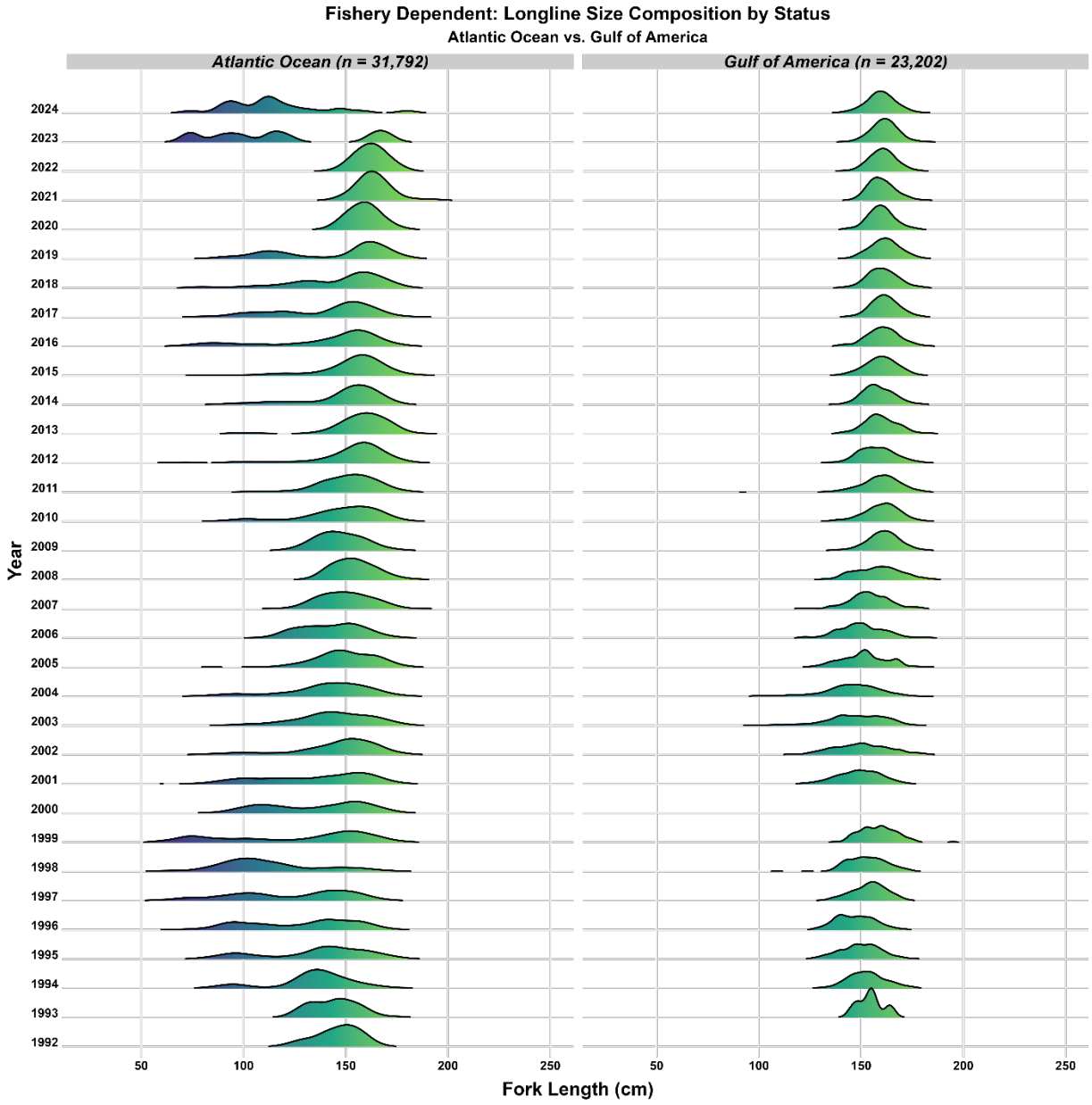


Figure 25. Annual length-frequency distributions of fishery-dependent samples for longline gear (1992–2024) with the Atlantic Ocean region and Gulf of America region side-by-side for comparison. Ridges represent the probability density of fork length (cm) for each year, with color gradients indicating length (purple to green). Fork lengths included were measured (not estimated).

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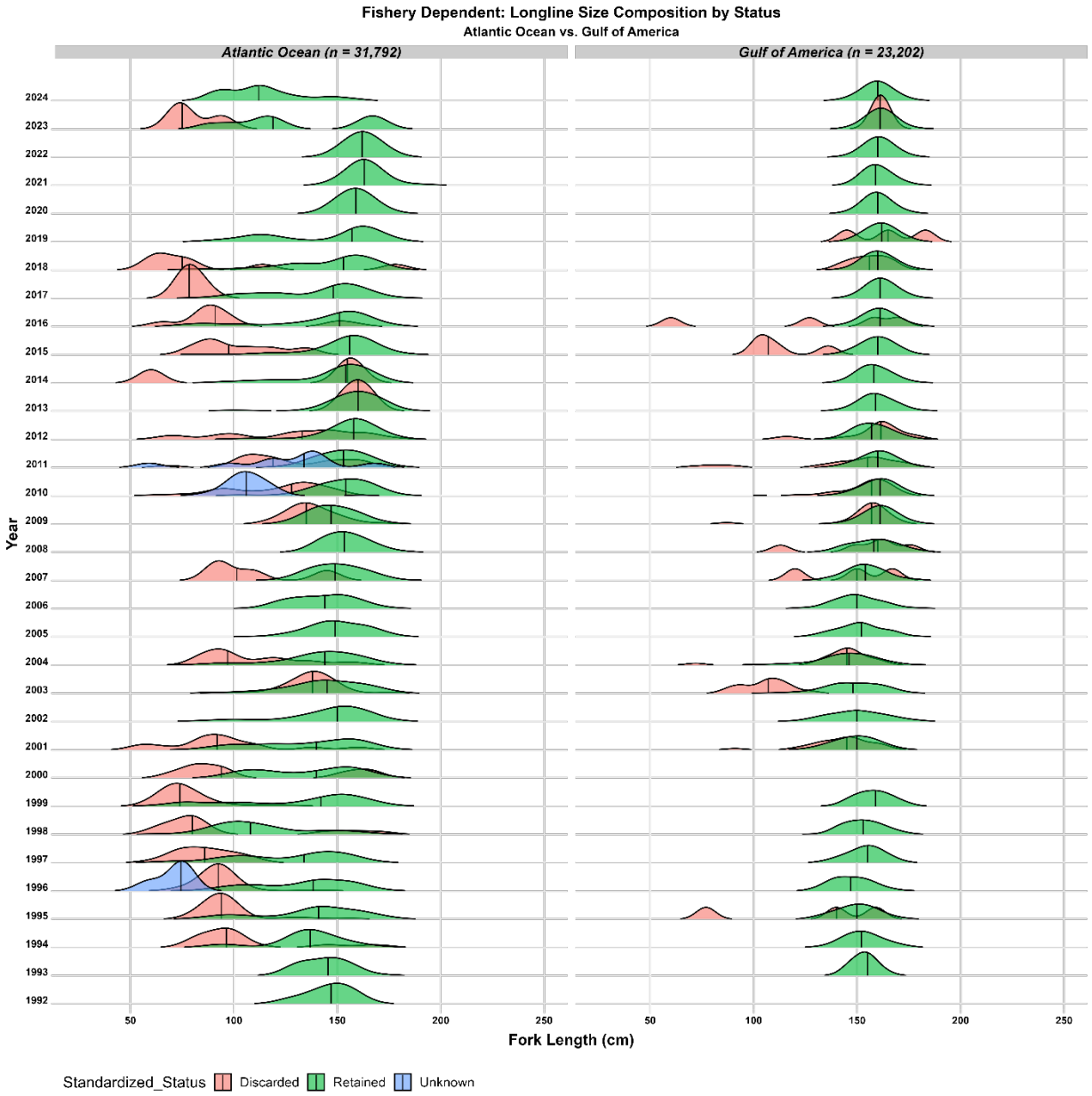


Figure 25a. Annual length-frequency distributions of fishery-dependent samples for longline gear (1992–2024) with the Atlantic Ocean region and Gulf of America region side-by-side for comparison. Ridges represent the probability density of fork length (cm) for each year, with color indicating retention status. Fork lengths included were measured (not estimated).

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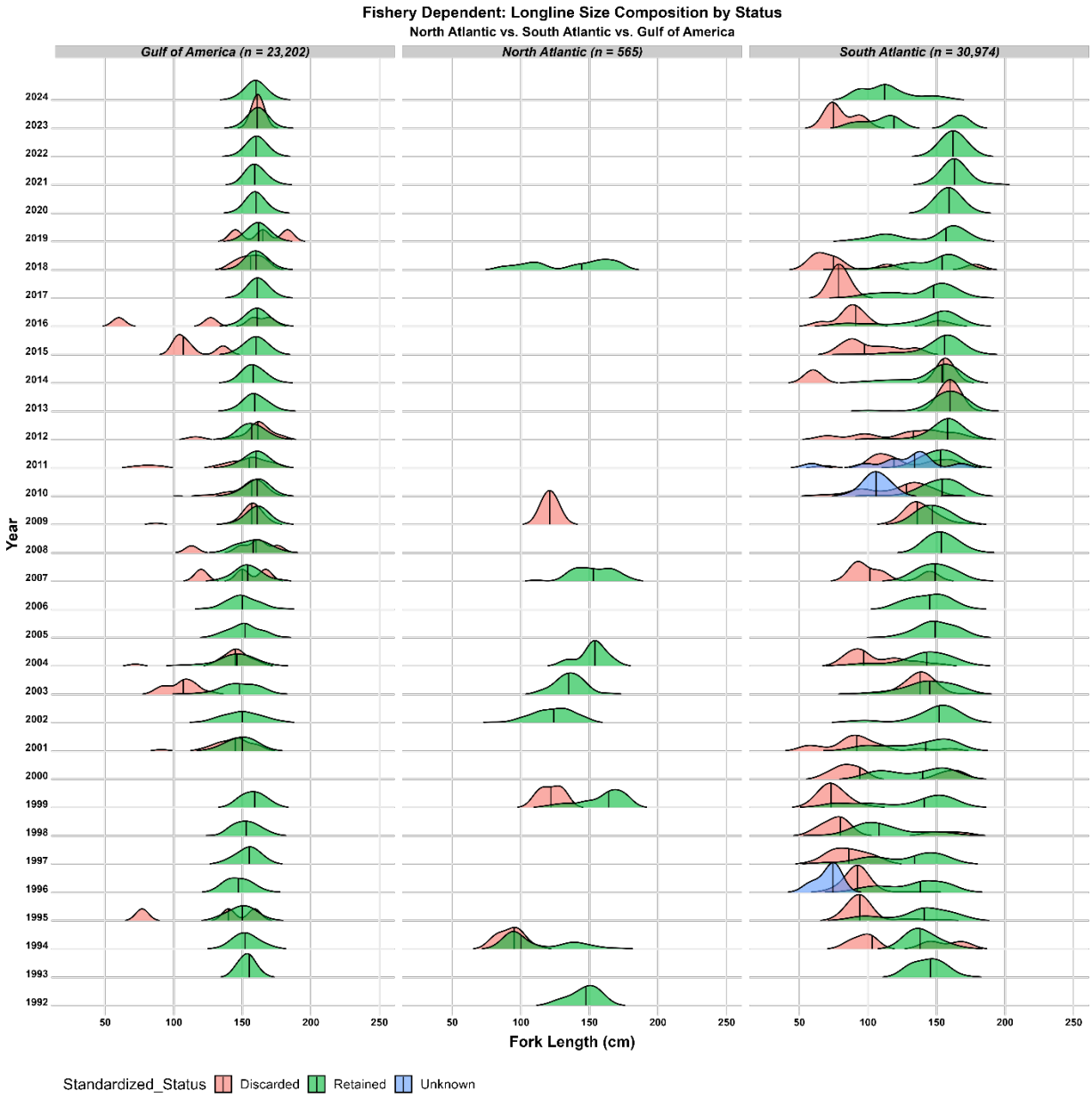


Figure 25b. Annual length-frequency distributions of fishery-dependent samples for longline gear (1992–2024) for the Atlantic Ocean and Gulf of America. Atlantic Ocean samples are broken up by the north Atlantic and south Atlantic with the NA/VA border acting as the demarcation line. Ridges represent the probability density of fork length (cm) for each year, with color indicating retention status. Fork lengths included were measured (not estimated).

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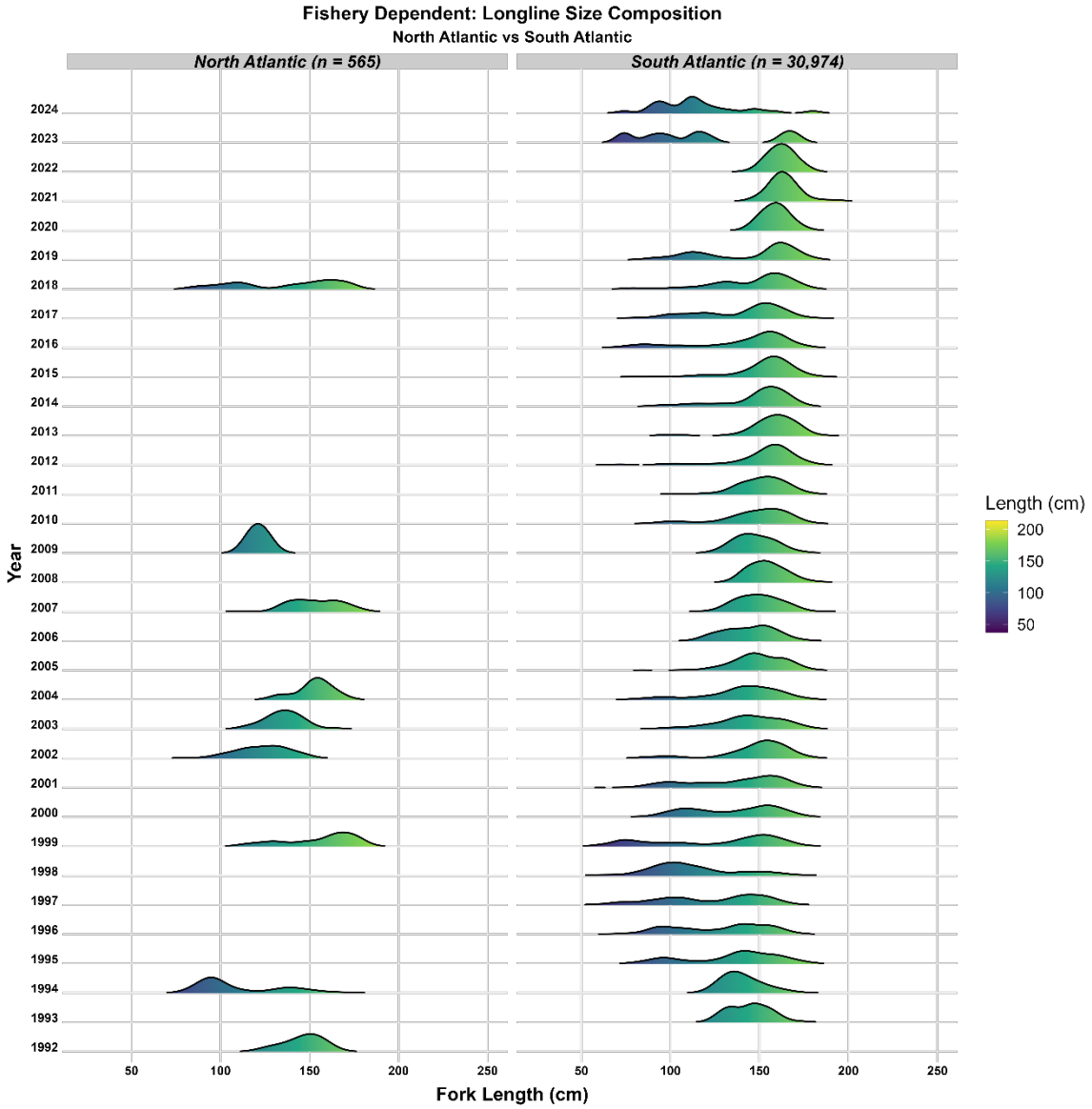


Figure 26. Annual length-frequency distributions of fishery-dependent samples for longline gear (1992–2024) for the Atlantic Ocean. Samples are broken up by the north Atlantic and South Atlantic with the NC/VA border acting as the demarcation line. Ridges represent the probability density of fork length (cm) for each year, with color gradients indicating length (purple to green). Fork lengths included were measured (not estimated).

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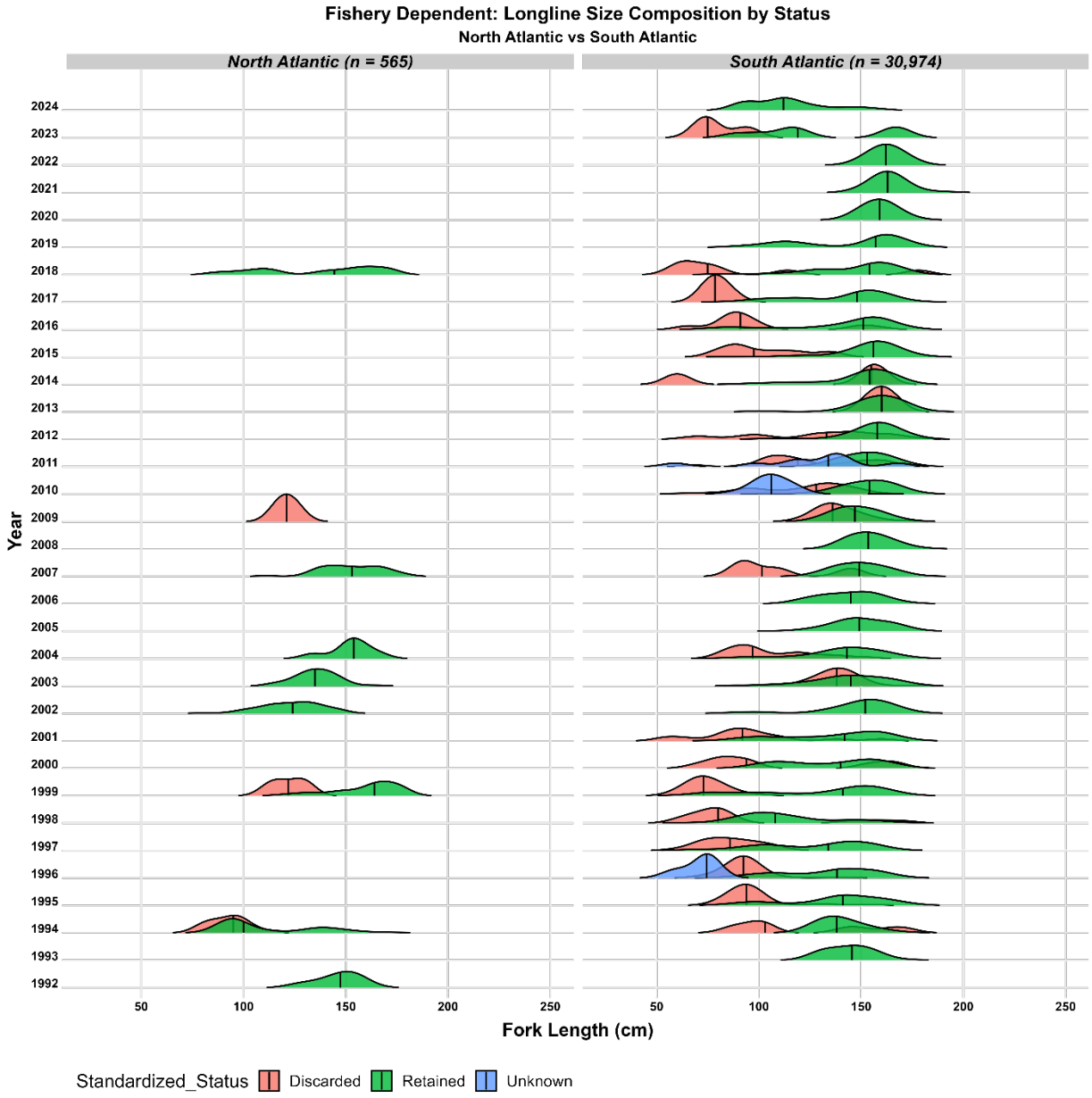


Figure 26a. Annual length-frequency distributions of fishery-dependent samples for longline gear (1992–2024) for the Atlantic Ocean. Samples are broken up by the north Atlantic and South Atlantic with the NA/VA border acting as the demarcation line. Ridges represent the probability density of fork length (cm) for each year, with color indicating retention status. Fork lengths included were measured (not estimated).

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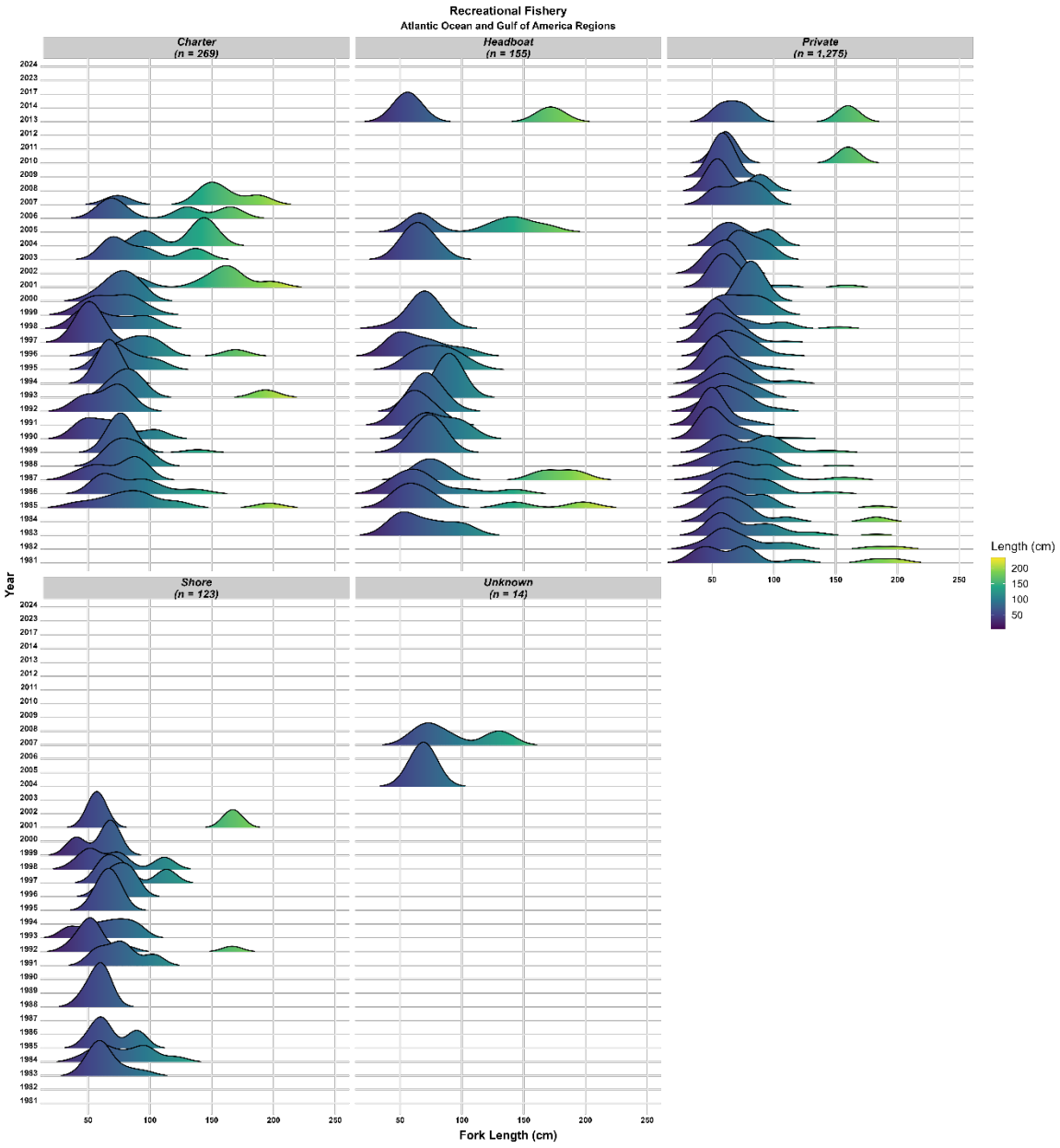


Figure 27. Annual length-frequency distributions of recreational samples by fishing mode (1981–2024) for the Atlantic Ocean and Gulf of America regions combined excluding Mark Sampson logbook data. Ridges represent the probability density of fork length (cm) for each year, with color gradients indicating length (purple to green). Fork lengths included were measured (not estimated).

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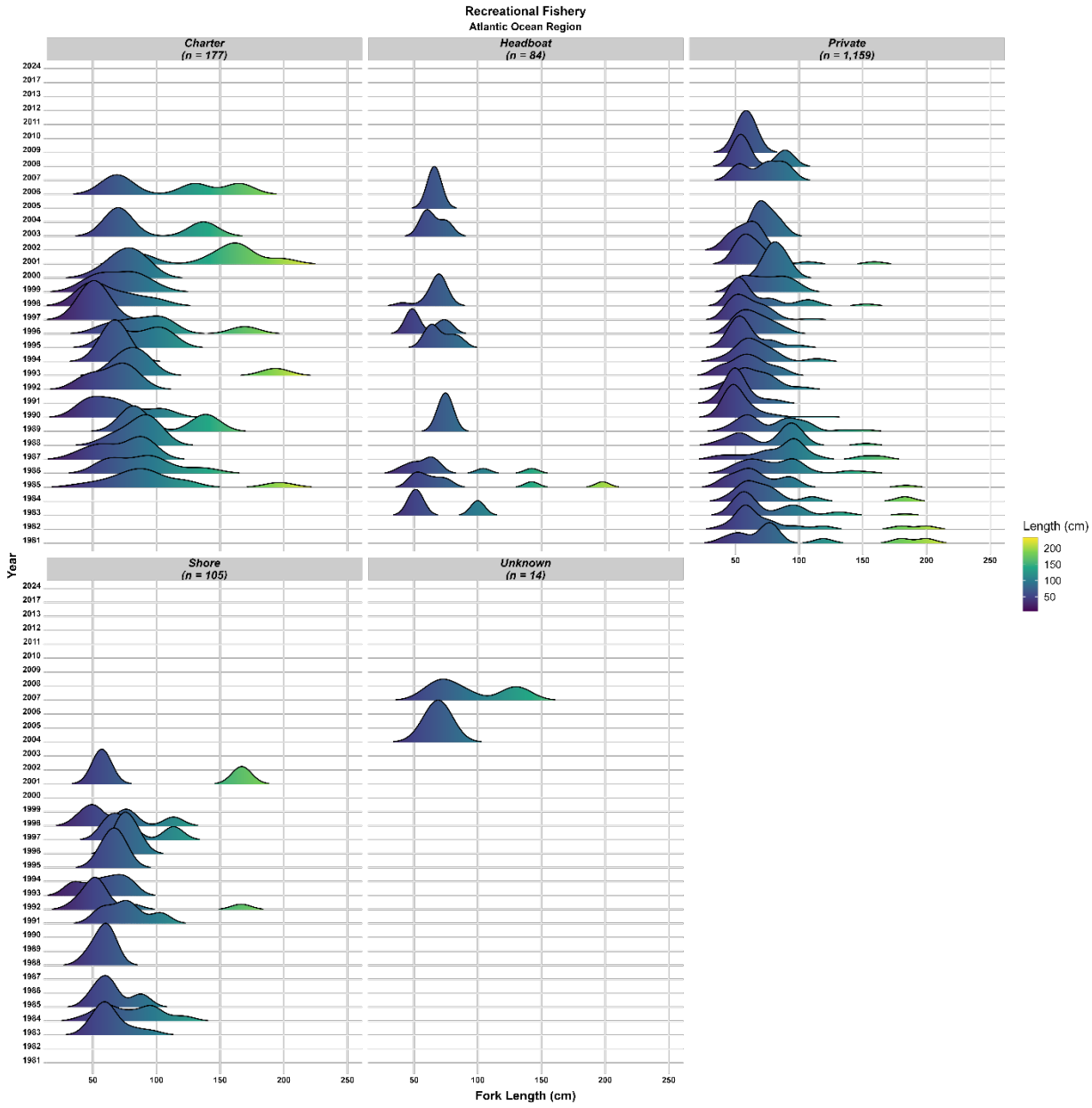


Figure 27a. Annual length-frequency distributions of recreational samples by fishing mode (1981–2024) for the Atlantic Ocean region excluding Mark Sampson logbook data. Ridges represent the probability density of fork length (cm) for each year, with color gradients indicating length (purple to green). Fork lengths included were measured (not estimated).

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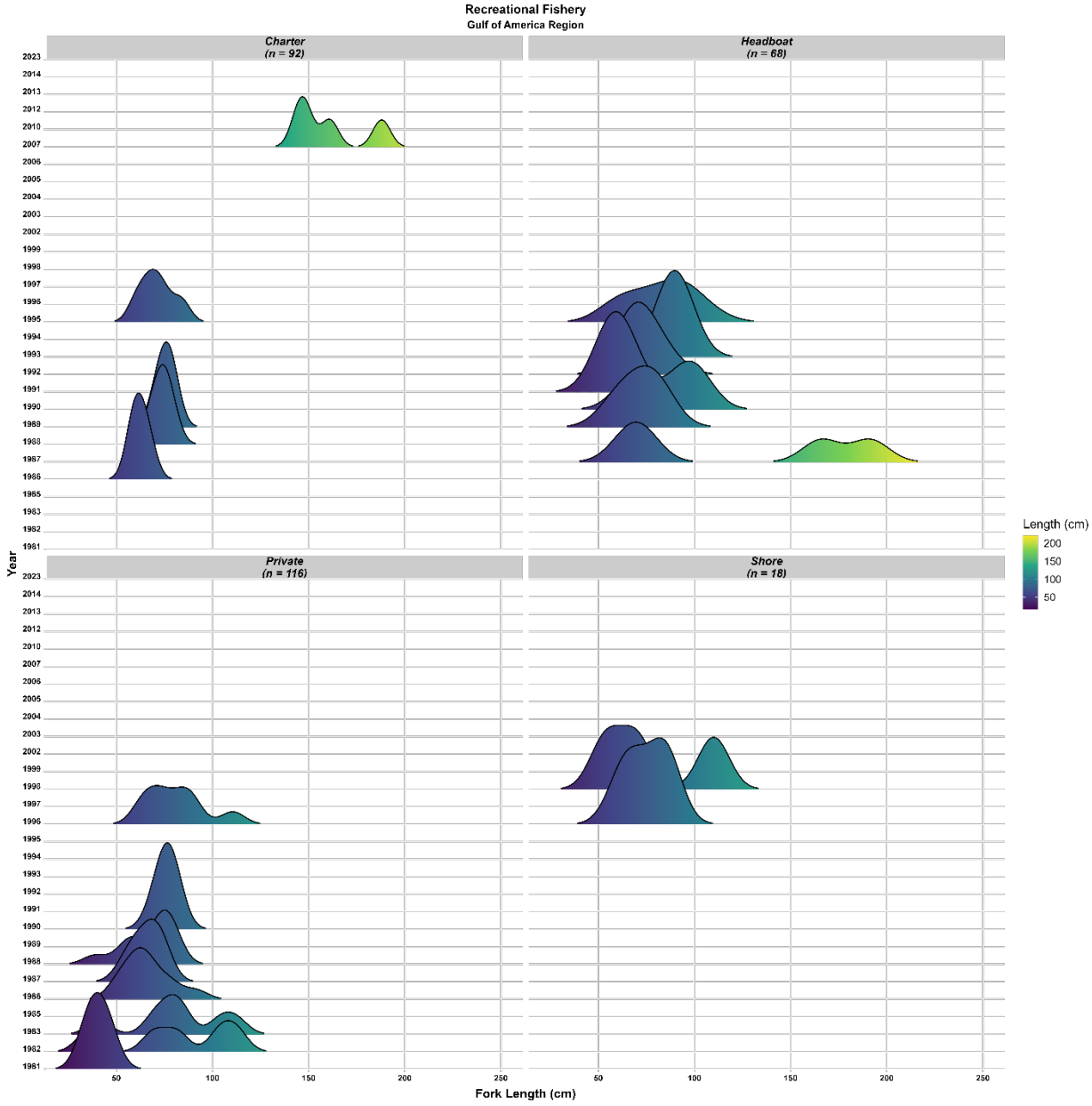


Figure 27b. Annual length-frequency distributions of recreational samples by fishing mode (1981–2024) for the Gulf of America region excluding Mark Sampson logbook data. Ridges represent the probability density of fork length (cm) for each year, with color gradients indicating length (purple to green). Fork lengths included were measured (not estimated).

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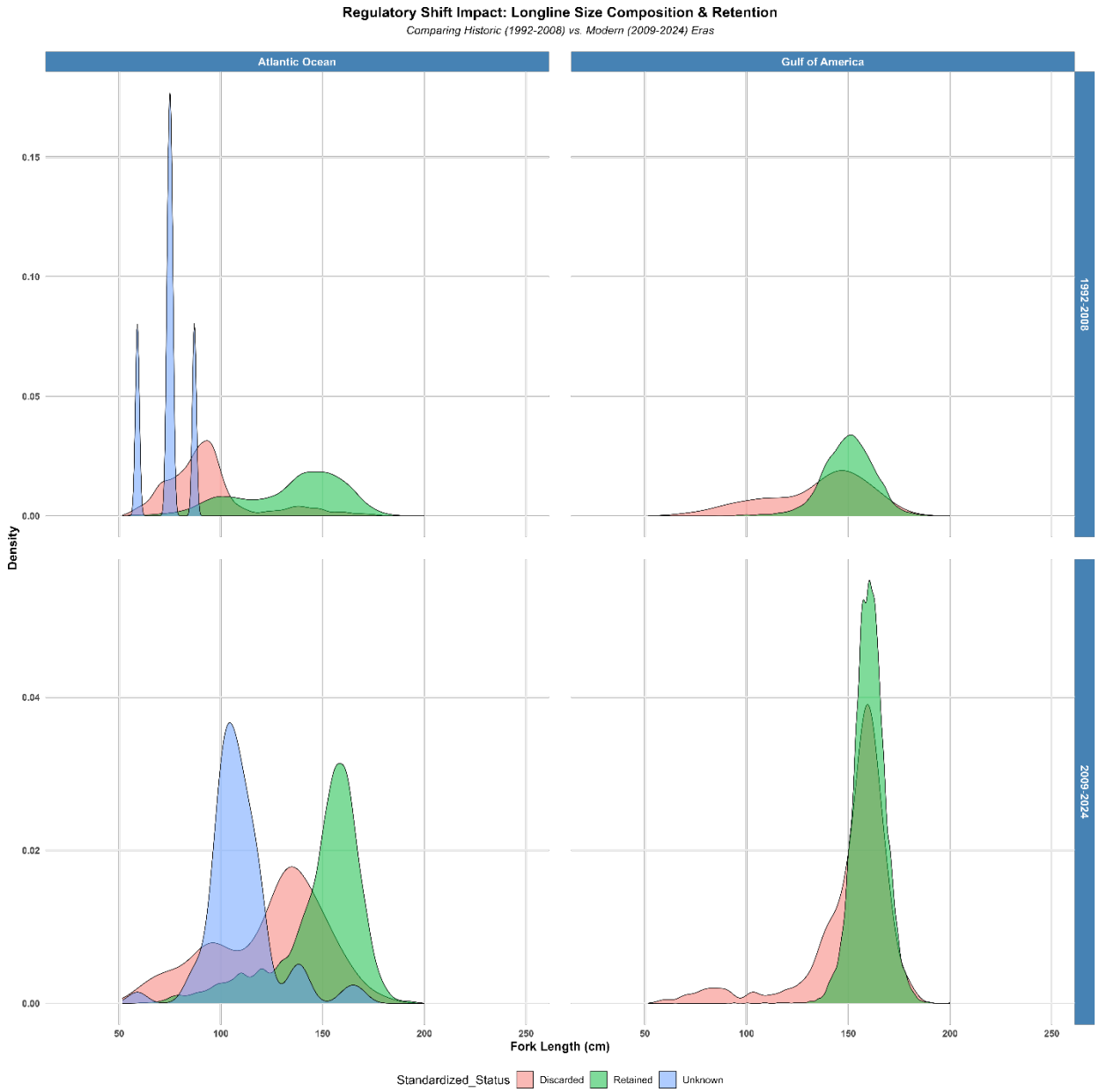


Figure 28. Fork length density distributions of longline catch by regulatory era and region. Facets compare the Historic Era (1992–2008) and Modern Regulatory Era (2009–2024) across Atlantic and gulf. Colors represent final retention status (Discarded, Retained, Unknown).

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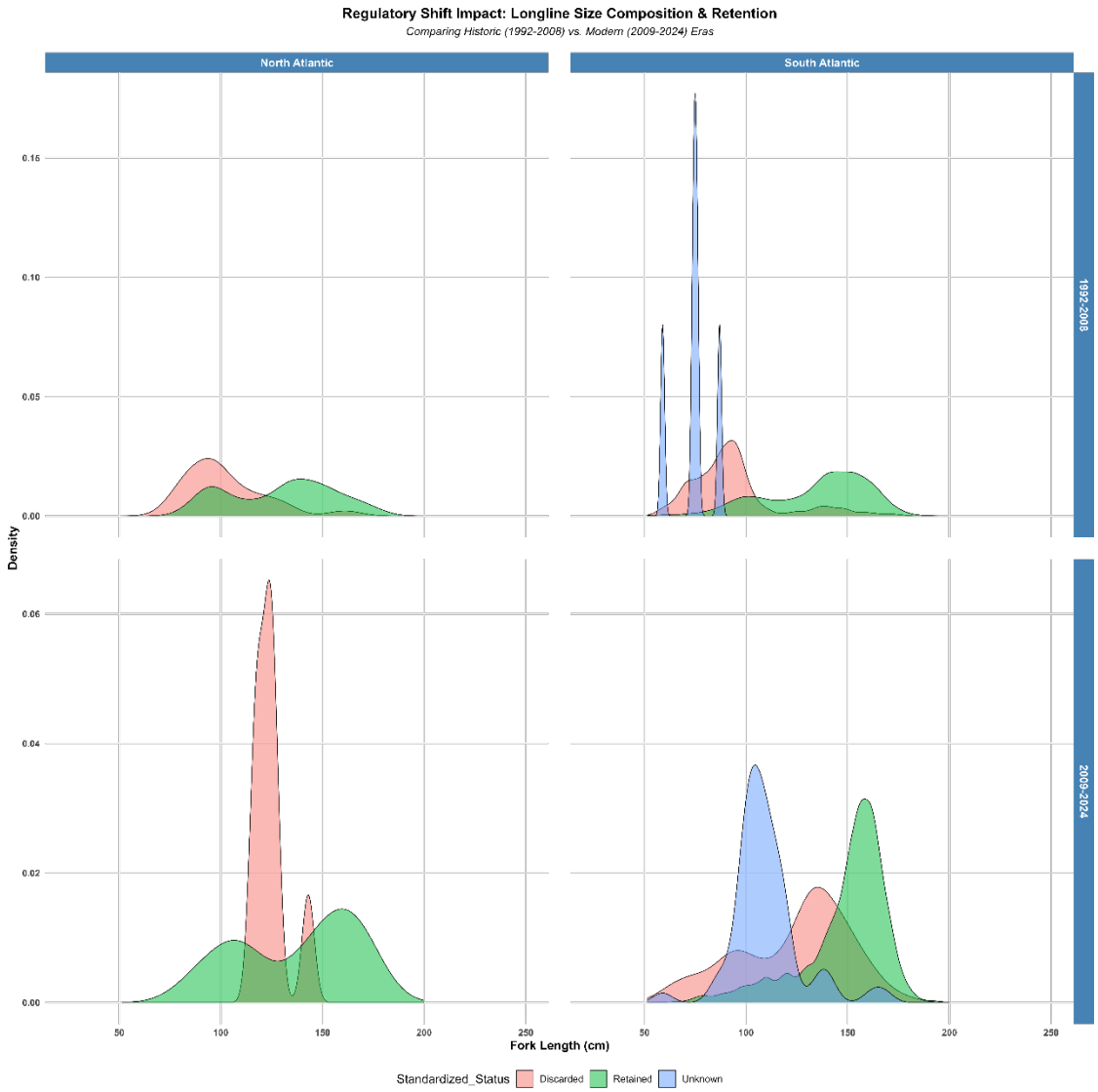


Figure 29. Fork length density distributions of longline catch by regulatory era and region. Facets compare the Historic Era (1992–2008) and Modern Regulatory Era (2009–2024) across the North and South Atlantic. Colors represent final retention status (Discarded, Retained, Unknown).

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