NOAA TECHNICAL MEMORANDUM

NMFS-SEFSC-315

SPECIES COMPOSITION AND SIZE CLASS DISTRIBUTION OF MARINE TURTLE STRANDINGS ON THE GULF OF MEXICO AND SOUTHEAST UNITED STATES COASTS, 1985 - 1991

by

Wendy G. Teas

January 1993

U.S. Department of Commerce
National Oceanic and Atmospheric Administration
National Marine Fisheries Service
Southeast Fisheries Science Center
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The Sea Turtle Stranding and Salvage Network (STSSN) was formally established by the National Marine Fisheries Service (NMFS), Miami Laboratory in 1980 to collect information on and document strandings of marine turtles along the U.S. Gulf of Mexico and Atlantic coasts. The network encompasses the coastal areas of the eighteen state region from Maine through Texas, and includes portions of the U.S. Caribbean (Puerto Rico and the U.S. Virgin Islands). Data are compiled through the efforts of network participants who document marine turtle strandings in their respective areas and contribute those data to the centralized STSSN data base. Effort expended in the collection of stranding data varies both geographically and temporally, with coverage ranging from systematic daily or weekly sampling in some areas to opportunistic reporting in others. Thus, strandings documented through the efforts of the STSSN should be considered minimum stranding figures, because they are reported strandings only, and not necessarily all stranding events.

Locations of strandings reported to the STSSN are computerized by regions in order to examine geographic distribution. Four regions are defined as follows: U.S. Gulf of Mexico - Texas, Louisiana, Mississippi, Alabama and Florida Gulf coast; southeast U.S. Atlantic - Florida Atlantic coast, Georgia, South Carolina and North Carolina; northeast U.S. Atlantic - Virginia, Maryland, Delaware, New Jersey, New York, Connecticut, Rhode Island, Massachusetts, New Hampshire and Maine; Caribbean - Puerto Rico and U.S. Virgin Islands.

Regions are further broken down into statistical zones originally designed by the Bureau of Commercial Fisheries (now NMFS) for shrimp catch and effort data collection (Fig. 1). The actual coastal areas encompassed by each of the zones are not equal. There are 23 zones in the U.S. Gulf of Mexico. Zones 1 through 21 are numbered consecutively along the gulf coast from the Florida Keys to the Mexico border. Zones 24 and 25 are partial zones, shared with the southeast U.S. Atlantic region, and include the area west of longitude 80°30'. In the southeast U.S. Atlantic thirteen zones are defined based on the line of latitude which forms the southern boundary of the zone. Zones 24 and 25 are partial zones which include the area east of longitude 80°30'. Zone 36 is also a partial zone, ending at the North Carolina/Virginia border. Nine statistical zones are defined for the northeast U.S. Atlantic beginning with the Virginia portion of zone 36 and continuing north through zone 44, ending at the Canadian border.

Strandings within each zone are finally classified as inshore or offshore. Offshore strandings are defined as strandings occurring on ocean beaches; inshore strandings are those which occur landward of the ocean coastline, primarily in rivers, bays and sounds.

In 1987, systematic sampling was implemented via ground and/or aerial surveys in select statistical zones in order to develop an index of mortality which could be compared spatially and temporally. Statistical zones 17-21 and 4-5 in the U.S. Gulf of Mexico and 28-32 in the southeast U.S. Atlantic have been included in this study (Fig. 1). This systematic sampling regime, conducted only along the offshore areas of these zones, provides an index of total mortality when standardized for effort. Preliminary results of systematic sampling for stranded sea turtles are presented by Thompson and Martinez (1990).

MATERIALS AND METHODS

This report focuses on strandings which occurred in the U.S. Gulf of Mexico and southeast U.S. Atlantic regions from 1985 through 1991. Analysis was limited to 1985-1991 because data collection efforts were relatively synoptic during this time period. Prior to 1985, data collection efforts were often sporadic along the entire U.S. Gulf and Atlantic coasts. Results of the STSSN from 1986 through the present are summarized in a series of annual reports (Schroeder 1987, Schroeder and Warner 1988, Teas and Martinez 1989, Teas and Martinez 1992, Teas 1992a, Teas 1992b).

All five species known to inhabit the waters of the Gulf of Mexico and U.S. Atlantic were analyzed, these include: loggerheads (Caretta caretta), greens (Chelonia mydas), Kemp's ridleys (Lepidochelys kempi), hawksbills (Eretmochelys imbricata) and leatherbacks (Dermochelys coriacea). Only true strandings (dead or weak turtles which wash ashore or are found floating) of wild turtles for which species was positively identified and measurements were taken are included in this report. Strandings of headstarted turtles are not included since their stranding may be an artifact of captive rearing and release.

The U.S. Gulf of Mexico was subdivided into eastern (zones 1-12, 24 and 25) and western (zones 13-21) portions based on species composition differences noted in aerial surveys (Fritts et al. 1983, Thompson, et al. 1991.)

For the purposes of seasonal analysis, seasons were defined as follows: winter (December through February), spring (March through May), summer (June through August), fall (September through November).

Carapace lengths of stranded turtles were measured with calipers (straight length) or with flexible measuring tape (curved length) or both. If straight length was measured, this measurement was used in the analysis. If only curved measurements were taken, curved carapace lengths (CCL) were converted to straight carapace lengths (SCL) for size classification. Conversions were based on simple linear regressions of paired SCL and CCL data points from

turtles with both SCL and CCL measurements for all species except leatherbacks. For leatherbacks, functional regressions were performed on paired SCL and CCL data points in an effort to obtain a better fit on this small sample size. Regression equations for each species are as follows:

Loggerhead

$$SCL = -1.442 + (0.948 \times CCL)$$
$$(N = 932,\ r^2 = 0.97,\ P = 0.0000)$$

Green

$$SCL = 0.294 + (0.937 \times CCL)$$
$$N = 690,\ r^2 = 0.99,\ P = 0.0000)$$

Kemp's Ridley

$$SCL = 0.013 + (0.945 \times CCL)$$
$$(N = 305,\ r^2 = 0.99,\ P = 0.0000)$$

Hawksbill

$$SCL = -0.212 + (0.955 \times CCL)$$
$$(N = 55,\ r^2 = 0.99,\ P = 0.0001)$$

Leatherback

$$LogSCL = 0.355 + (0.921 \times LogCCL)$$
$$(N = 29,\ r^2 = 0.96,\ P = 0.0001)$$

Size classes were broken down into nineteen 10-cm intervals, ranging from 0.0 - 9.9 cm to 180.0 - 189.9 cm. A summary of straight carapace length measurements of marine turtle strandings by region is presented in Table 1.

DISCUSSION

Regional Distribution

In the southeast U.S. Atlantic, 6,684 marine turtle strandings were identified and measured between 1985 and 1991. Of these, 5,818 (87.0%) were offshore strandings and 866 (13.0%) were inshore strandings (Fig. 2, Table 2). The majority of offshore strandings were loggerheads with 4,675 (69.9%) being reported. Green turtles accounted for 630 offshore reports (9.4%), Kemp's ridleys 277 (4.1%), leatherbacks 190 (2.8%) and hawksbills 46 (0.7%). Inshore strandings were more equally distributed with loggerheads

accounting for 413 (6.2%) and green turtles 406 (6.1%). Kemp's ridleys, leatherbacks and hawksbills accounted for 29 (0.4%), 12 (0.2%) and 6 (0.1%) of the inshore total, respectively.

A total of 1,248 marine turtle strandings were identified and measured between 1985 and 1991 in the eastern U.S. Gulf of Mexico. Offshore strandings accounted for 71.4% (891) and inshore strandings accounted for 28.6% (357) of the total (Fig. 3, Table 3). Loggerheads accounted for 680 offshore strandings (54.5%), followed by green turtles 129 (10.3%), Kemp's ridleys 63 (5.0%), leatherbacks 12 (1.0%) and hawksbills 7 (0.6%). Inshore strandings consisted of 188 loggerheads (15.1%), 115 green turtles (9.2%), 48 Kemp's ridleys (3.8%), 5 hawksbills (0.4%) and 1 leatherback (0.1%).

Between 1985 and 1991 in the western U.S. Gulf of Mexico, 1,628 marine turtles were identified and measured. Of these, 89.4% (1456) were offshore strandings and 10.6% (172) were inshore strandings (Fig. 4, Table 4). Offshore, loggerheads accounted for 45.0% (732) of the total followed closely by Kemp's ridleys comprising 34.1% (555). Hawksbills, green turtles and leatherbacks accounted for 95 (5.8%), 47 (2.9%) and 27 (1.7%) of the offshore total, respectively. Green turtles were the most frequently stranded species inshore, accounting for 4.1% (66), followed by Kemp's ridleys 3.4% (56), loggerheads 2.4% (39), hawksbills 0.6% (10) and leatherbacks 0.1% (1).

Species Distribution

Loggerhead

A total of 6,727 loggerhead turtle strandings are included in this analysis, with 5,088 reported from the southeast U.S. Atlantic (91.9% offshore, 8.1% inshore) (Table 5), 868 from the eastern U.S. Gulf of Mexico (78.3% offshore, 21.7% inshore) (Table 6) and 771 from the western U.S. Gulf of Mexico (94.9% offshore, 5.1% inshore) (Table 7). In the southeast U.S. Atlantic, 52% of the loggerhead strandings reported were between 50.0 and 69.9 cm in length (Fig. 5). Loggerhead strandings occurred during all seasons with 45% being reported during the summer, 24% during the spring, 21% during the fall and 9% during the winter (Fig. 6). In the eastern U.S. Gulf of Mexico, over 70% of stranded loggerheads were greater than 80 cm in length (57.0% offshore, 14.1% inshore) (Fig. 7). Loggerhead strandings occurred during all seasons in the eastern U.S. Gulf of Mexico with 49% occurring in the spring, 28% in the summer, 13% in the winter and 10% in the fall (Fig. 8). In the western U.S. Gulf of Mexico, 55% of loggerhead strandings were between 50.0 and 69.9 cm in length (Fig. 9). Strandings occurred during all seasons with 47% washing ashore in the spring, 24% in the summer, 18% in the fall and 11% in the winter (Fig. 10).

Green

Strandings of green turtles totaled 1,393, with 1,036 occurring in the southeast U.S. Atlantic (60.8% offshore, 39.2% inshore) (Table 8), 244 in the eastern U.S. Gulf of Mexico (52.9% offshore, 47.1% inshore) (Table 9), and 113 in the western U.S. Gulf of Mexico (41.6% offshore, 58.4% inshore) (Table 10). In the southeast U.S. Atlantic, offshore strandings peaked in the 30.0 - 39.9 cm size class (25%) while inshore strandings were generally in the 40.0 - 59.9 cm range (20%) (Fig. 11). Offshore strandings were common during all seasons (winter 15%, spring 22%, summer 15%, fall 10%) while inshore strandings occurred most often during the winter (30%), primarily as a result of cold-stunning (Fig. 12). The majority of these cold-stun strandings occurred during December 1989 when over 200 green turtles were affected by a severe drop in temperature in northeastern Florida. In the eastern U.S. Gulf of Mexico, inshore strandings peaked in the 40.0 - 49.9 cm size class (18%) while offshore strandings were slightly larger in the 50.0 - 59.9 cm size class (15%) (Fig. 13). Strandings occurred during all seasons with 42% being reported in the winter, 26% in the spring, 13% in the summer and 18% in the fall (Fig. 14). In the western U.S. Gulf of Mexico, the majority of offshore strandings occurred in the 20.0 - 29.9 cm size class (19%). Inshore strandings were generally larger with most being 30.0 - 49.9 cm in length (25%) (Fig. 15). Strandings occurred in all seasons with 50% being reported during the winter (6% offshore, 44% inshore), 27% during the spring (21% offshore, 6% inshore), 14% during the summer (9% offshore, 5% inshore) and 11% during the fall (6% offshore, 5% inshore) (Fig. 16). The majority of the inshore strandings in the winter occurred during February 1989 after a severe drop in temperature on the lower Texas coast.

Kemp's Ridley

A total of 1,028 Kemp's ridley strandings were reported, with 306 occurring in the southeast U.S. Atlantic (90.5% offshore, 9.5 % inshore) (Table 11), 111 in the eastern U.S. Gulf of Mexico (56.8% offshore, 43.2% inshore) (Table 12) and 611 in the western U.S. Gulf of Mexico (90.8% offshore, 9.2% inshore) (Table 13). In the southeast U.S. Atlantic, the majority of Kemp's ridley strandings were in the 30.0 - 39.9 cm size class, both inshore (5%) and offshore (38%) (Fig. 17). Strandings occurred during all seasons with 39% being reported in the fall, 23% in the winter, 21% in the summer and 17% in the spring (Fig. 18). Kemp's ridley strandings in the eastern U.S. Gulf of Mexico were almost equally divided inshore (43%) and offshore (57%), with 20.0 - 39.9 cm turtles predominating inshore and 40.0 - 59.9 cm turtles predominating offshore (Fig. 19). Strandings were reported in all seasons with 31% occurring during the spring, 26% during the summer, 25% during the winter and 18% during the fall (Fig. 20). In the western U.S. Gulf of Mexico, Kemp's ridley strandings peaked in the 30.0 - 39.9 cm size class both inshore (3%) and offshore (26%). A secondary peak occurs in offshore strandings in the 50.0 - 69.9 cm size

range, accounting for 29% of the strandings in this region (Fig. 21). Kemp's ridley strandings were reported during all seasons, with 38% occurring during the summer, 36% during the spring, 21% during the fall and 6% during the winter (Fig. 22).

Hawksbill

Strandings of hawksbill turtles totaled 169, with 52 occurring in the southeast U.S. Atlantic (88.5% offshore, 11.5% inshore) (Table 14), 12 in the eastern U.S. Gulf of Mexico (58.3% offshore, 41.7% inshore) (Table 15) and 105 in the western U.S. Gulf of Mexico (90.5% offshore, 9.5% inshore) (Table 16). In the southeast U.S. Atlantic, 56% of hawksbill strandings were between 10.0 and 29.9 cm (Fig. 23). Offshore strandings occurred in all seasons (winter 19%, spring 31%, summer 21%, fall 17%) while inshore strandings were reported in the winter (2%), spring (8%) and summer (2%) (Fig. 24). Both inshore and offshore hawksbill strandings in the eastern U.S. Gulf of Mexico peaked in the 20.0 - 29.9 cm size class (Fig. 25). Both inshore and offshore strandings occurred during the winter (50%) and summer (25%), while only offshore strandings were reported in the spring (8%) and only inshore strandings were reported in the fall (17%) (Fig. 26). Over 62% of hawksbills washing ashore in the western U.S. Gulf of Mexico were weak post-hatchlings in the 0.0 to 9.9 cm size class (Fig. 27). Hawksbill strandings in the western U.S. Gulf of Mexico are most often reported during the summer (45%) and fall (43%), with 7% and 6% being reported during the winter and spring, respectively (Fig. 28).

Leatherback

A total of 243 leatherback strandings were reported, with 202 occurring in the southeast U.S. Atlantic (94.1% offshore, 5.9% inshore) (Table 17), 13 in the eastern U.S. Gulf of Mexico (92.3% offshore, 7.7% inshore) (Table 18) and 28 in the western U.S. Gulf of Mexico (96.4% offshore, 3.6% inshore) (Table 19). Over half of all leatherback strandings in the southeast U.S. Atlantic were between 140.0 - 159.9 cm (Fig. 29). Three strandings of post-hatchling leatherbacks (10.0 - 29.9 cm size range) were reported from this region, all in the summer or fall. Strandings were reported during all seasons with 50% occurring in the spring, 27% in the fall, 15% in the winter and 8% in the summer (Fig. 30). Strandings in the eastern U.S. Gulf of Mexico peaked in the 150 - 159.9 cm size class. Only one leatherback turtle was reported from inshore waters in this region (Fig. 31). Leatherback strandings in the eastern U.S. Gulf of Mexico occurred during the spring (46%) and summer seasons (54%) (Fig. 32). In the western U.S. Gulf of Mexico, 68% of leatherback strandings ranged from 110.0 to 139.9 cm and occurred in offshore waters. A single stranded leatherback was reported from inshore waters in this region (Fig. 33). Strandings occurred predominantly in the spring (64%) and summer (32%) months, with a single stranding being reported in the fall (4%) (Fig. 34).

CONCLUSIONS

The southeast U.S. Atlantic region appears to be an important year round habitat for juvenile through adult loggerheads and greens in both offshore and inshore waters. Kemp's ridleys, hawksbills and leatherbacks are also found year round, primarily utilizing offshore areas.

The eastern U.S. Gulf of Mexico is unique in that it appears to support a very large percentage of sub-adult and adult loggerheads during the spring and summer months, especially offshore along the south Florida coast. Juvenile to adult greens and Kemp's ridleys utilize both inshore and offshore waters extensively during all seasons. Hawksbills, although few in number, also utilize both inshore and offshore areas. Leatherbacks utilize this area primarily during the spring and fall as they migrate through to preferred feeding and nesting grounds.

The western U.S. Gulf of Mexico provides year round habitat for juvenile to sub-adult loggerheads and hatchling to adult Kemp's ridleys, primarily in offshore waters. Juvenile to sub-adult greens utilize both inshore and offshore waters throughout all seasons. Hatchling to juvenile hawksbills are common, primarily in offshore waters, during the summer and fall as prevailing water currents carry them into this area. Leatherbacks, as in the eastern U.S. Gulf of Mexico, are found as they migrate through this area in the spring and fall.

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LITERATURE CITED

Fritts, T.H., A.B. Irvine, R.D. Jennings, L.A. Collum, W. Hoffman and M.A. McGehee. 1983. Turtles, birds, and mammals in the northern Gulf of Mexico and nearby Atlantic waters. FWS/OBS-82/65. Washington, D.C.: Fish and Wildlife Service, U.S. Department of the Interior. 455 pp.

Schroeder, B.A. 1987. 1986 Annual Report of the Sea Turtle Stranding and Salvage Network, Atlantic and Gulf Coasts of the United States, January - December 1986. NOAA-NMFS-SEFC. CRD-87/88-12. Miami, FL: Coastal Resources Division, National Marine Fisheries Service. 45 pp.

Schroeder, B.A. and A.A. Warner. 1988. 1987 Annual Report of the Sea Turtle Stranding and Salvage Network, Atlantic and Gulf Coasts of the United States, January - December 1987. NOAA-NMFS-SEFC. CRD-87/88-28. Miami, FL: Coastal Resources Division, National Marine Fisheries Service. 45 pp.

Teas, W.G. 1992a. 1990 Annual Report of the Sea Turtle Stranding and Salvage Network, Atlantic and Gulf Coasts of the United States, January - December 1990. NOAA-NMFS-SEFC. CRD-91/92-60. Miami, FL: Coastal Resources Division, National Marine Fisheries Service. 48 pp.

Teas, W.G. 1992b. 1991 Annual Report of the Sea Turtle Stranding and Salvage Network, Atlantic and Gulf Coasts of the United States, January - December 1991. NOAA-NMFS-SEFC. CRD-91/92-62. Miami, FL: Coastal Resources Division, National Marine Fisheries Service. 48 pp.

Teas, W.G. and A. Martinez. 1989. 1988 Annual Report of the Sea Turtle Stranding and Salvage Network, Atlantic and Gulf Coasts of the United States, January - December 1988. NOAA-NMFS-SEFC. CRD-88/89-19. Miami, FL: Coastal Resources Division, National Marine Fisheries Service. 47 pp.

Teas, W.G. and A. Martinez. 1992. 1989 Annual Report of the Sea Turtle Stranding and Salvage Network, Atlantic and Gulf Coasts of the United States, January - December 1989. NOAA-NMFS-SEFC. CRD-91/92-39. Miami, FL: Coastal Resources Division, National Marine Fisheries Service. 50 pp.

Thompson, N.B. and A. Martinez. 1990. Preliminary Results of Systematic Sampling for Stranded Sea Turtles in NMFS Statistical Zones 4-5, 17-21 and 28-32. NOAA-NMFS-SEFC. MIA-89/90-05. Miami, FL: Miami Laboratory, National Marine Fisheries Service. 11pp.

Thompson, N.B., E.S. Denton, D.B. Koi, A. Martinez and K. Mullin. 1991. Turtles in the Gulf of Mexico: Pelagic Distributions and Commercial Shrimp Trawling. NOAA-TM-NMFS-SEFC-286. Miami, FL: Southeast Fisheries Center, National Marine Fisheries Service. 12 pp, 9 Figures, 4 Tables.

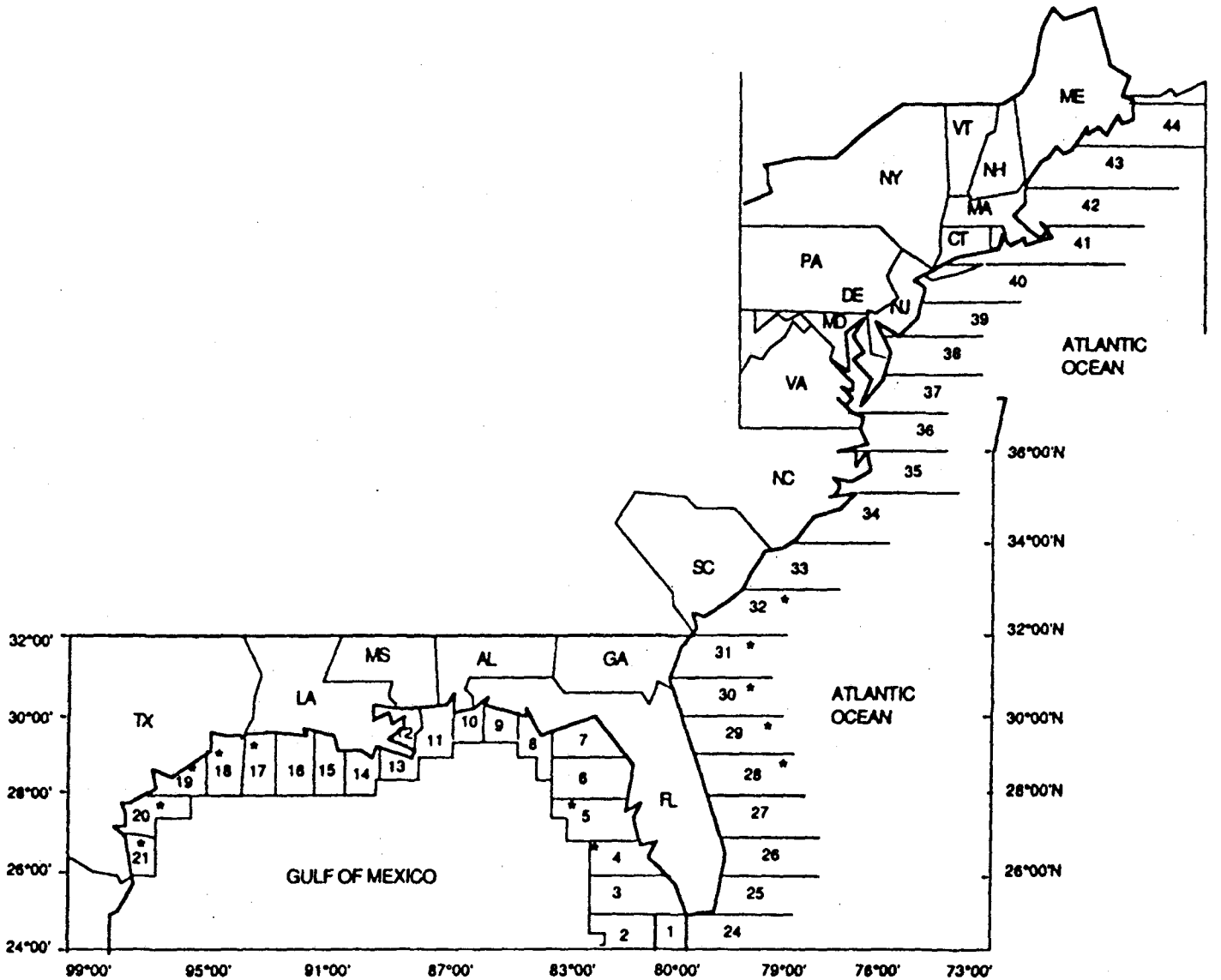

Figure 1. Statistical zones along the southeast U.S. Atlantic and U.S. Gulf of Mexico coasts. (Zones denoted by asterisk were included in systematic surveys.)

Table 1. Straight carapace lengths of marine turtle strandings reported along the southeast U.S. Atlantic and U.S. Gulf of Mexico coasts, 1985 - 1991.

	Number	Average SCL (cm)	Minimum SCL (cm)	Maximum SCL (cm)	Standard Deviation (cm)
SOUTHEAST U.S. ATLANTIC					
Caretta caretta	5088	68.7	3.4	121.9	16.5
Chelonia mydas	1036	42.7	7.7	113.5	15.5
Lepidochelys kempi	306	38.6	8.9	67.2	9.4
Eretmochelys imbricata	52	30.0	7.0	82.9	20.3
Dermochelys coriacea	202	144.1	12.1	183.8	21.5
EASTERN U.S. GULF OF MEXICO					
Caretta caretta	868	83.2	4.7	121.3	16.1
Chelonia mydas	244	46.3	12.0	100.3	14.2
Lepidochelys kempi	111	43.5	14.7	66.8	12.9
Eretmochelys imbricata	12	27.8	5.6	66.4	17.5
Dermochelys coriacea	13	150.0	135.5	168.0	8.1
WESTERN U.S. GULF OF MEXICO					
Caretta caretta	771	64.6	3.2	107.0	16.8
Chelonia mydas	113	40.2	13.0	99.2	15.5
Lepidochelys kempi	611	38.3	4.1	70.9	17.2
Eretmochelys imbricata	105	13.3	5.2	46.1	9.2
Dermochelys coriacea	28	130.9	102.9	156.6	13.8

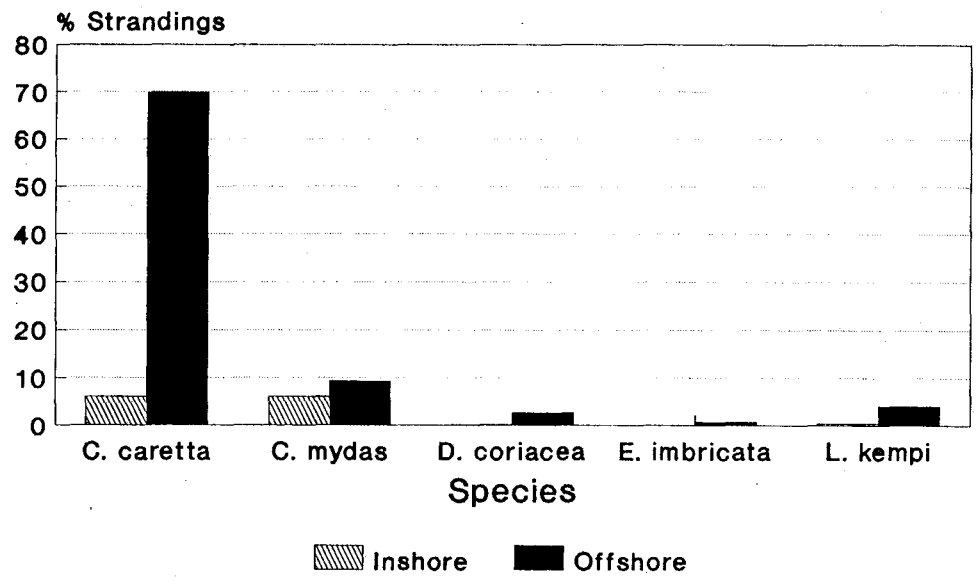

Figure 2. Species composition of stranded marine turtles on the southeast U.S. Atlantic coast, 1985 - 1991.

Table 2. Species composition of stranded marine turtles on the southeast U.S. Atlantic coast, 1985 - 1991.

Species	Inshore		Offshore	
	Number	Percent	Number	Percent
Caretta caretta	413	6.2%	4675	69.9%
Chelonia mydas	406	6.1%	630	9.4%
Dermochelys coriacea	12	0.2%	190	2.8%
Eretmochelys imbricata	6	0.1%	46	0.7%
Lepidochelys kempi	29	0.4%	277	4.1%
Total	866	13.0%	5818	87.0%

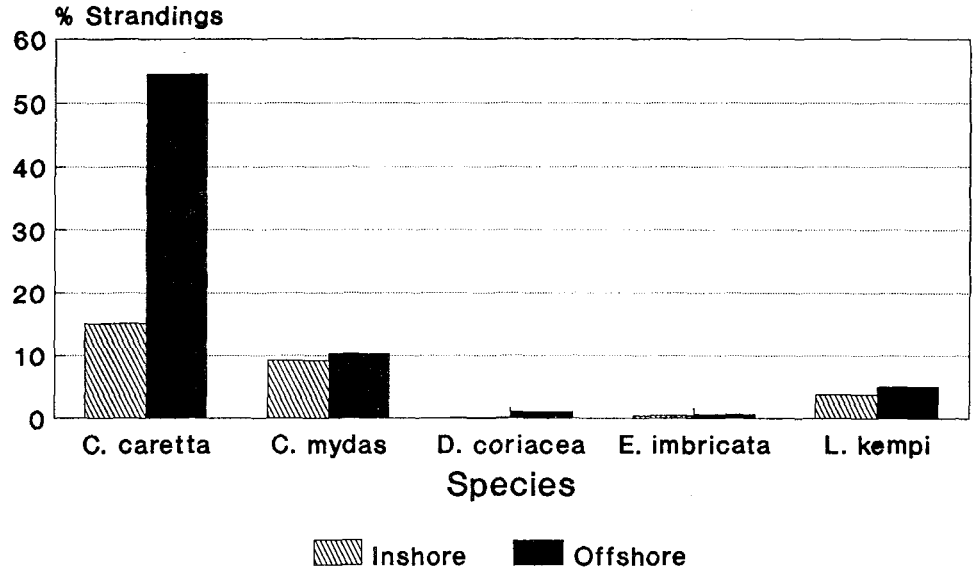

Figure 3. Species composition of stranded marine turtles on the eastern U.S. Gulf of Mexico coast, 1985 - 1991.

Table 3. Species composition of stranded marine turtles on the eastern U.S. Gulf of Mexico coast, 1985 - 1991.

Species	Inshore		Offshore	
	Number	Percent	Number	Percent
Caretta caretta	188	15.1%	680	54.5%
Chelonia mydas	115	9.2%	129	10.3%
Dermochelys coriacea	1	0.1%	12	1.0%
Eretmochelys imbricata	5	0.4%	7	0.6%
Lepidochelys kempi	48	3.8%	63	5.0%
Total	357	28.6%	891	71.4%

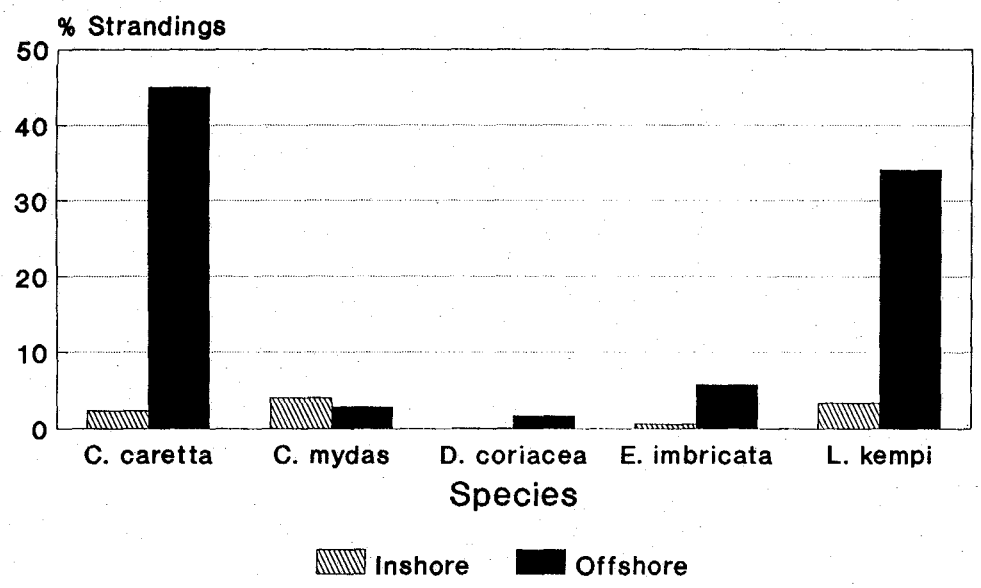

Figure 4. Species composition of stranded marine turtles on the western U.S. Gulf of Mexico coast, 1985 - 1991.

Table 4. Species composition of stranded marine turtles on the western U.S. Gulf of Mexico coast, 1985 - 1991.

Species	Inshore		Offshore	
	Number	Percent	Number	Percent
Caretta caretta	39	2.4%	732	45.0%
Chelonia mydas	66	4.1%	47	2.9%
Dermochelys coriacea	1	0.1%	27	1.7%
Eretmochelys imbricata	10	0.6%	95	5.8%
Lepidochelys kempi	56	3.4%	555	34.1%
Total	172	10.6%	1456	89.4%

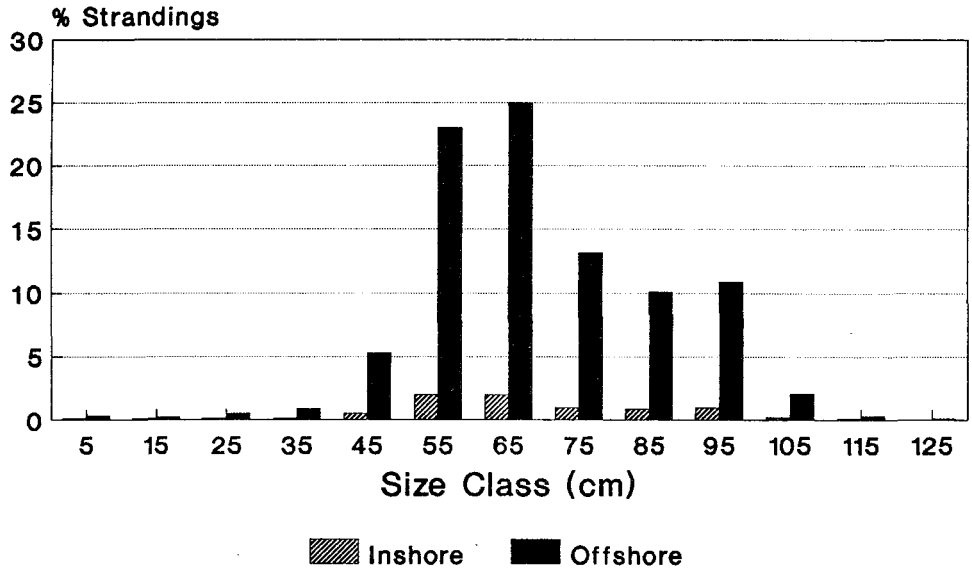

Figure 5. Size distribution of stranded loggerheads (Caretta caretta) on the southeast U.S. Atlantic coast, 1985 - 1991.

Table 5. Size distribution of stranded loggerheads (Caretta caretta) on the southeast U.S. Atlantic coast, 1985 - 1991.

	Inshore			Offshore		
Size Class (cm)	Number	Mean (cm)	Percent	Number	Mean (cm)	Percent
0.0 - 9.9	3	7.2	0.1%	14	6.6	0.3%
10.0 - 19.9	4	13.9	0.1%	9	14.4	0.2%
20.0 - 29.9	2	26.8	0.1%	24	26.7	0.5%
30.0 - 39.9	5	35.4	0.1%	44	35.5	0.9%
40.0 - 49.9	26	46.9	0.5%	272	47.0	5.3%
50.0 - 59.9	102	55.4	2.0%	1172	55.7	23.0%
60.0 - 69.9	104	64.2	2.0%	1273	64.2	25.0%
70.0 - 79.9	52	73.7	1.0%	670	74.4	13.2%
80.0 - 89.9	47	85.3	0.9%	513	84.9	10.1%
90.0 - 99.9	51	94.2	1.0%	557	94.0	10.9%
100.0 - 109.9	12	104.0	0.2%	106	103.5	2.1%
110.0 - 119.0	5	115.9	0.1%	16	113.0	0.3%
120.0 - 129.9	0			5	121.4	0.1%
Total	413		8.1%	4675		91.9%

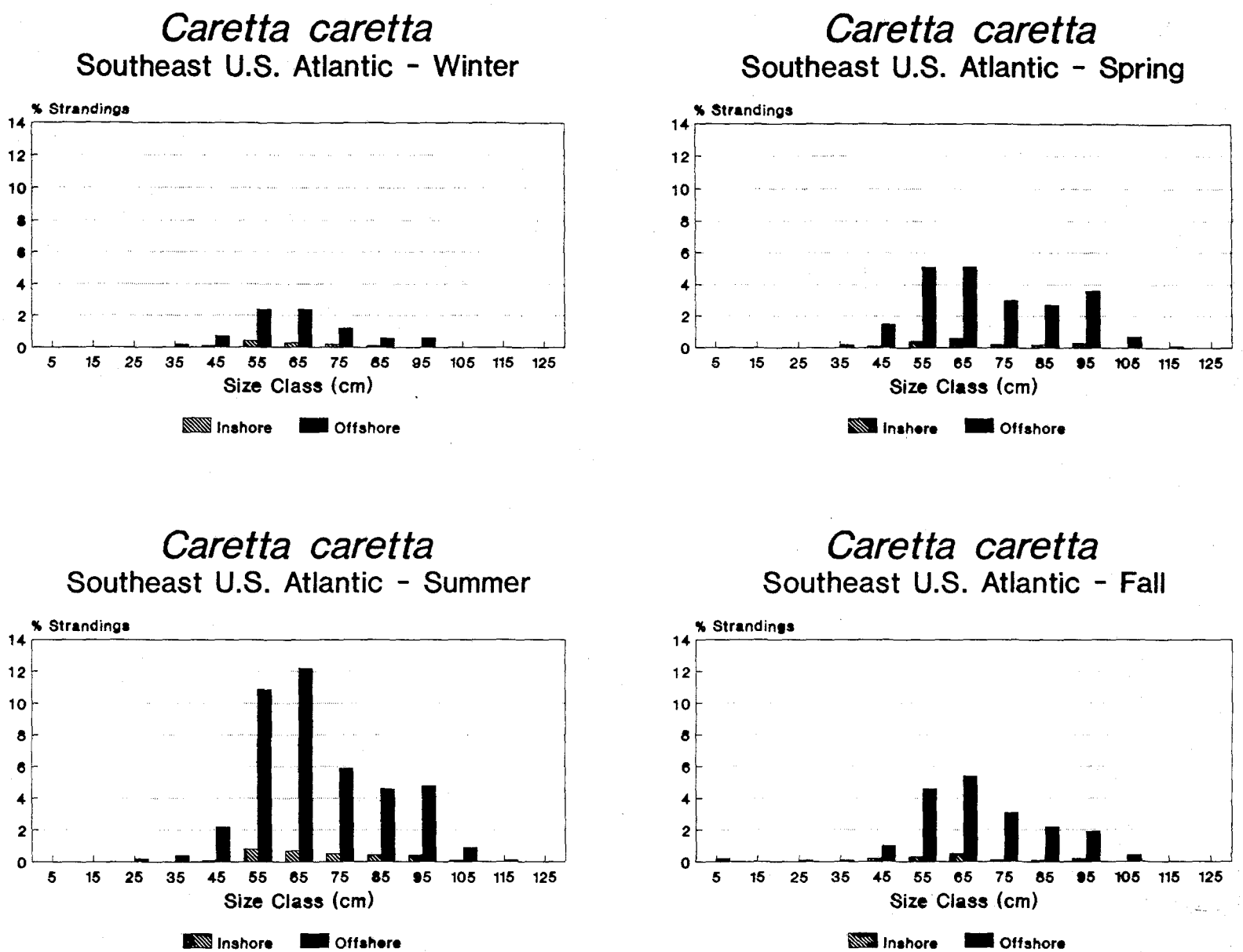

Figure 6. Seasonal size distribution of stranded loggerheads (Caretta caretta) on the southeast U.S. Atlantic coast, 1985 - 1991.

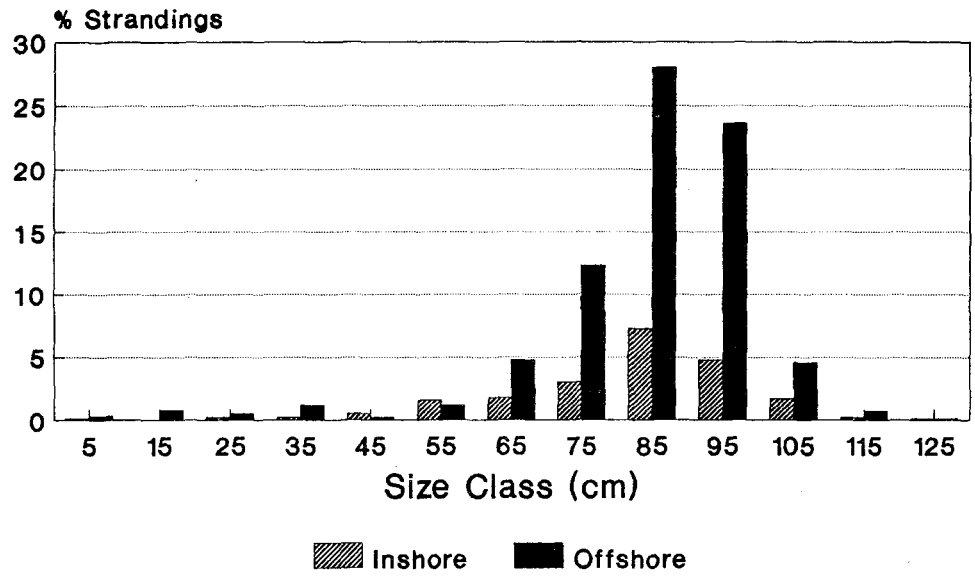

Figure 7. Size distribution of stranded loggerheads (Caretta caretta) on the eastern U.S. Gulf of Mexico coast, 1985 - 1991.

Table 6. Size distribution of stranded loggerheads (Caretta caretta) on the eastern U.S. Gulf of Mexico coast, 1985 - 1991.

	Inshore			Offshore		
Size Class (cm)	Number	Mean (cm)	Percent	Number	Mean (cm)	Percent
0.0 - 9.9	1	4.7	0.1%	3	7.4	0.3%
10.0 - 19.9	0			7	14.7	0.8%
20.0 - 29.9	2	26.7	0.2%	4	28.2	0.5%
30.0 - 39.9	2	35.0	0.2%	10	34.3	1.2%
40.0 - 49.9	4	43.1	0.5%	2	43.2	0.2%
50.0 - 59.9	14	55.6	1.6%	10	54.9	1.2%
60.0 - 69.9	16	64.4	1.8%	42	66.0	4.8%
70.0 - 79.9	26	74.4	3.0%	107	75.7	12.3%
80.0 - 89.9	63	85.6	7.3%	243	85.3	28.0%
90.0 - 99.9	42	94.3	4.8%	205	93.9	23.6%
100.0 - 109.9	15	103.5	1.7%	40	102.5	4.6%
110.0 - 119.9	2	113.0	0.2%	6	111.3	0.7%
120.0 - 129.9	1	121.3	0.1%	1	121.3	0.1%
Total	188		21.7%	680		78.3%

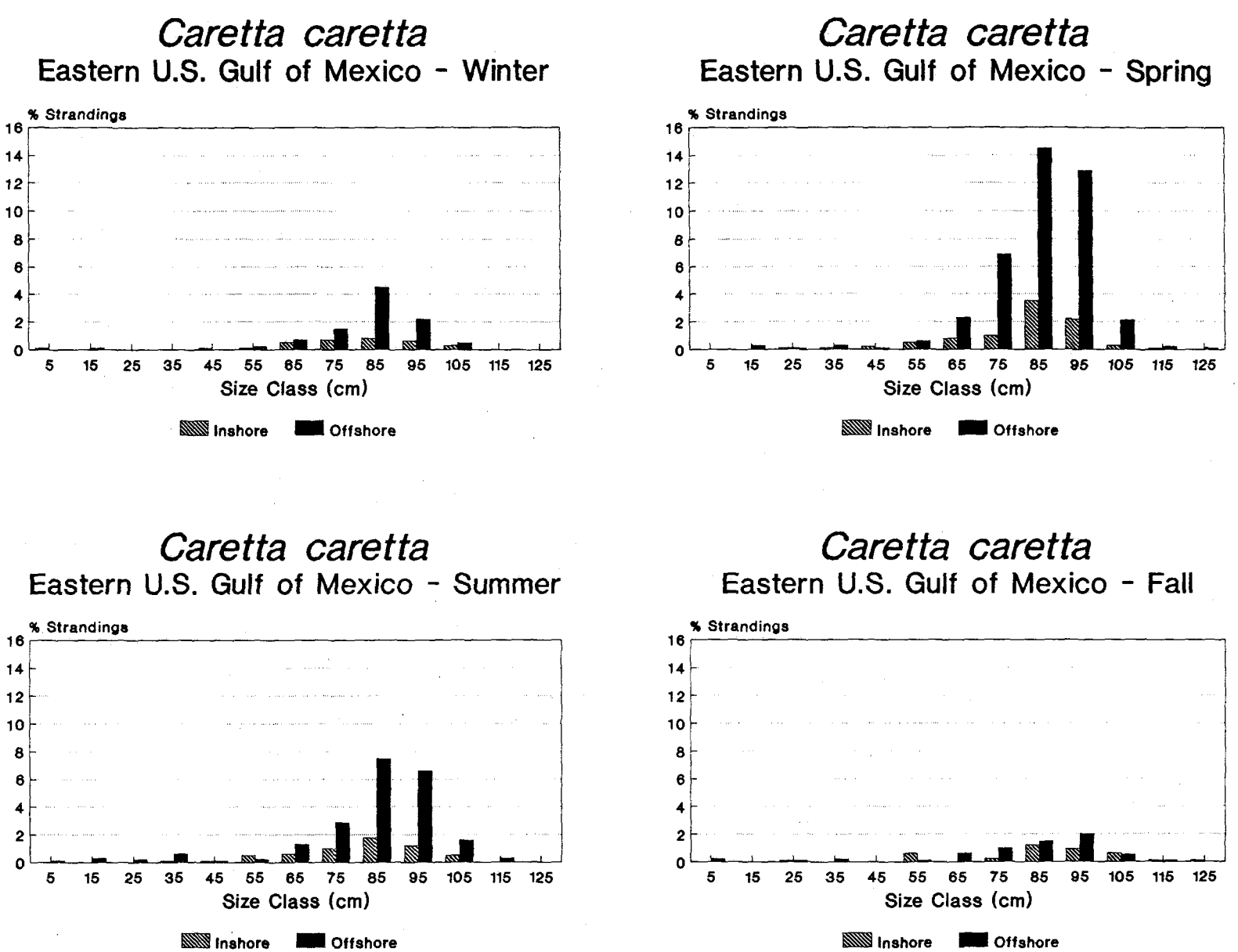

Figure 8. Seasonal size distribution of stranded loggerheads (Caretta caretta) on the eastern U.S. Gulf of Mexico coast, 1985 - 1991.

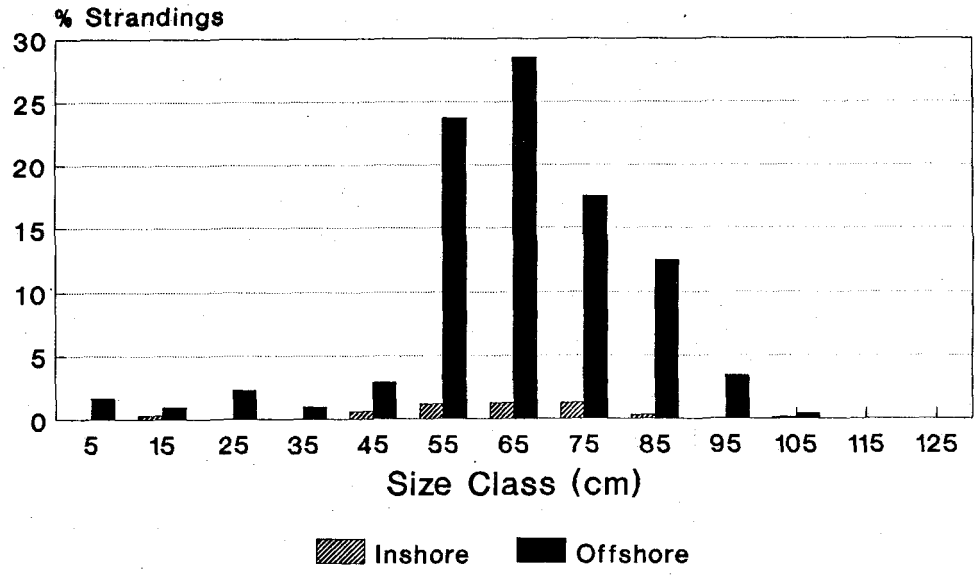

Figure 9. Size distribution of stranded loggerheads (Caretta caretta) on the western U.S. Gulf of Mexico coast, 1985 - 1991.

Table 7. Size distribution of stranded loggerheads (Caretta caretta) on the western U.S. Gulf of Mexico coast, 1985 - 1991.

	Inshore			Offshore		
Size Class (cm)	Number	Mean (cm)	Percent	Number	Mean (cm)	Percent
0.0 - 9.9	0			13	4.7	1.7%
10.0 - 19.9	2	13.6	0.3%	8	12.8	1.0%
20.0 - 29.9	0			18	25.9	2.3%
30.0 - 39.9	0			8	34.7	1.0%
40.0 - 49.9	5	45.5	0.6%	22	47.1	2.9%
50.0 - 59.9	9	58.5	1.2%	183	56.0	23.7%
60.0 - 69.9	10	64.8	1.3%	220	64.7	28.5%
70.0 - 79.9	10	73.7	1.3%	135	74.7	17.5%
80.0 - 89.9	2	83.9	0.3%	96	84.4	12.5%
90.0 - 99.9	0			26	93.6	3.4%
100.0 - 109.9	1	107.0	0.1%	3	103.3	0.4%
110.0 - 119.9	0			0		
120.0 - 129.9	0			0		
Total	39		5.1%	732		94.9%

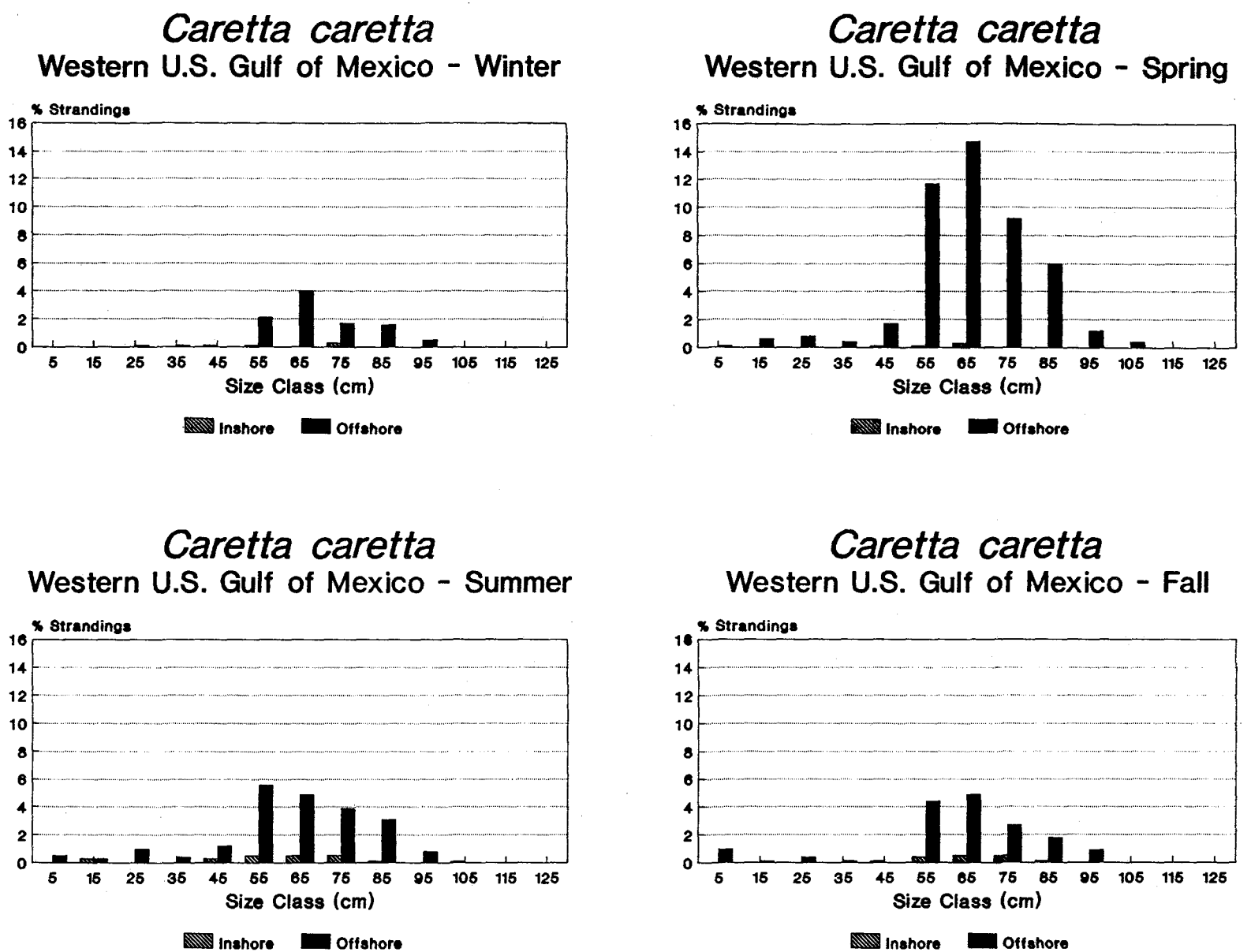

Figure 10. Seasonal size distribution of stranded loggerheads (Caretta caretta) on the western U.S. Gulf of Mexico coast, 1985 - 1991.

Chelonia mydas
Southeast U.S. Atlantic

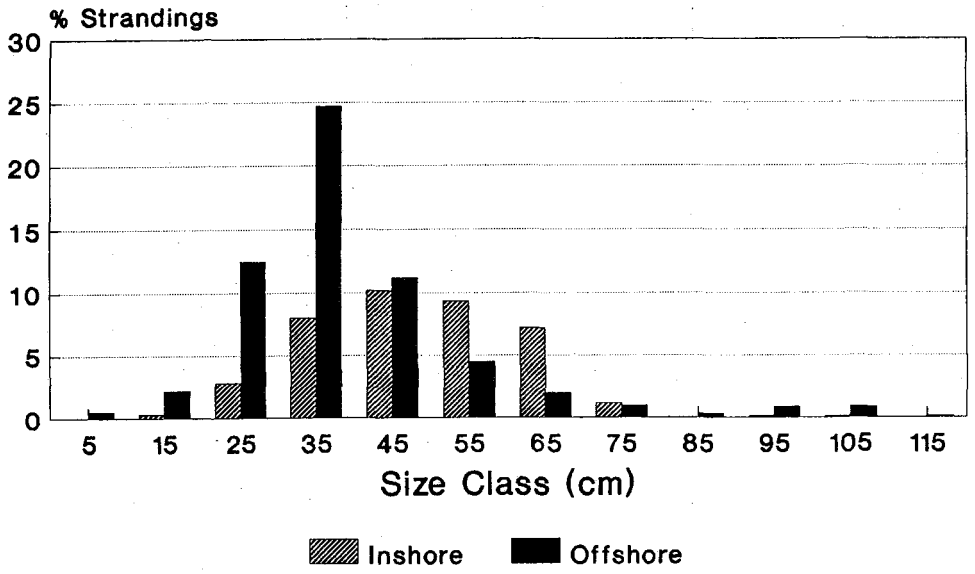

Figure 11. Size distribution of stranded greens (Chelonia mydas) on the southeast U.S. Atlantic coast, 1985 - 1991.

Table 8. Size distribution of stranded greens (Chelonia mydas) on the southeast U.S. Atlantic coast, 1985 - 1991.

	Inshore			Offshore		
Size Class (cm)	Number	Mean (cm)	Percent	Number	Mean (cm)	Percent
0.0 - 9.9	0			5	8.6	0.5%
10.0 - 19.9	3	16.5	0.3%	23	15.8	2.2%
20.0 - 29.9	29	27.0	2.8%	130	27.1	12.5%
30.0 - 39.9	83	35.1	8.0%	256	34.4	24.7%
40.0 - 49.9	106	44.6	10.2%	116	44.4	11.2%
50.0 - 59.9	96	54.7	9.3%	47	54.0	4.5%
60.0 - 69.9	75	63.9	7.2%	21	63.3	2.0%
70.0 - 79.9	12	73.4	1.2%	10	73.4	1.0%
80.0 - 89.9	0			3	83.3	0.3%
90.0 - 99.9	1	91.4	0.1%	9	95.9	0.9%
100.0 - 109.9	1	100.3	0.1%	9	102.2	0.9%
110.0 - 119.9	0			1	113.5	0.1%
Total	406		39.2%	630		60.8%

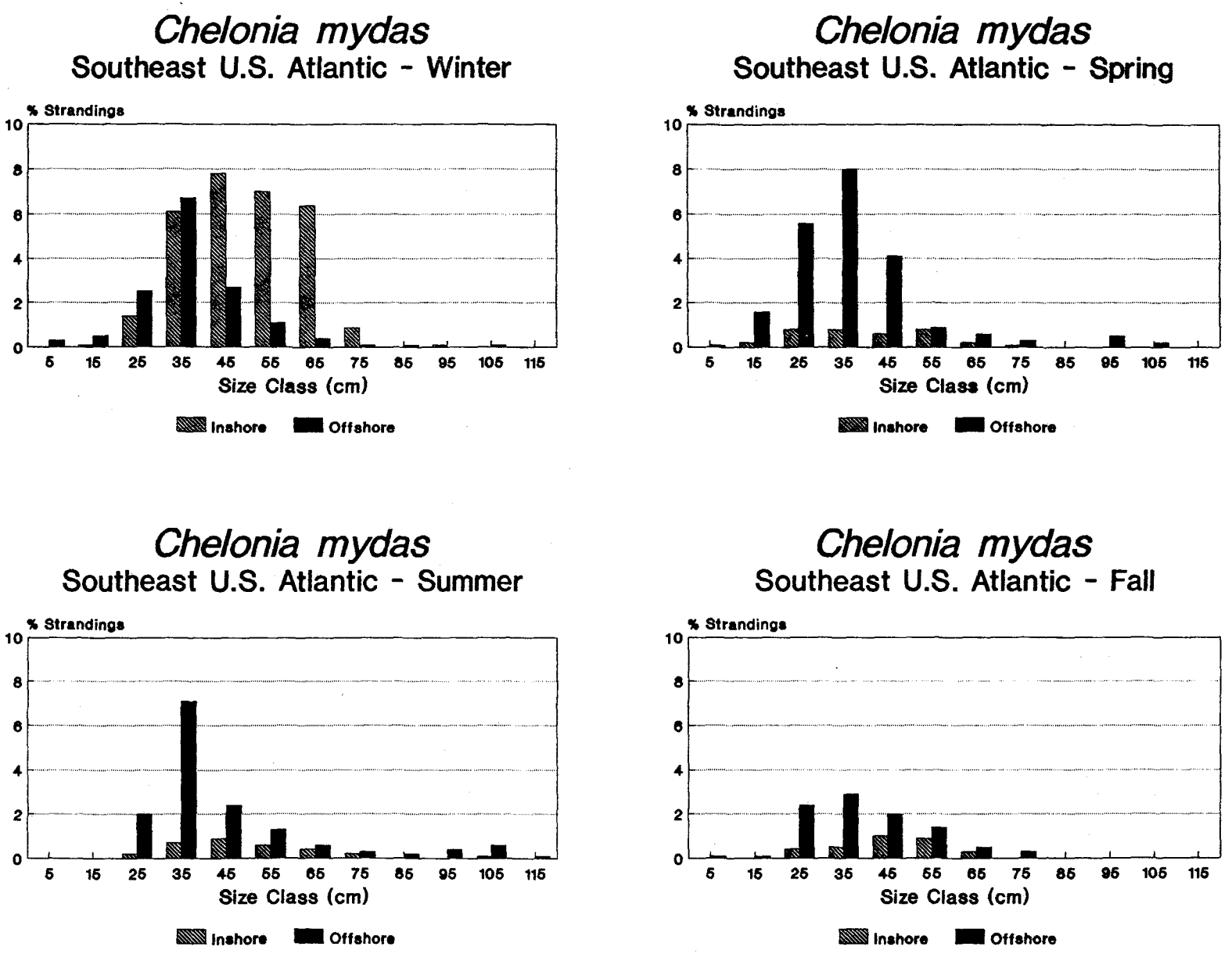

Figure 12. Seasonal size distribution of stranded greens (Chelonia mydas) on the southeast U.S. Atlantic coast, 1985 - 1991.

Chelonia mydas
Eastern U.S. Gulf of Mexico

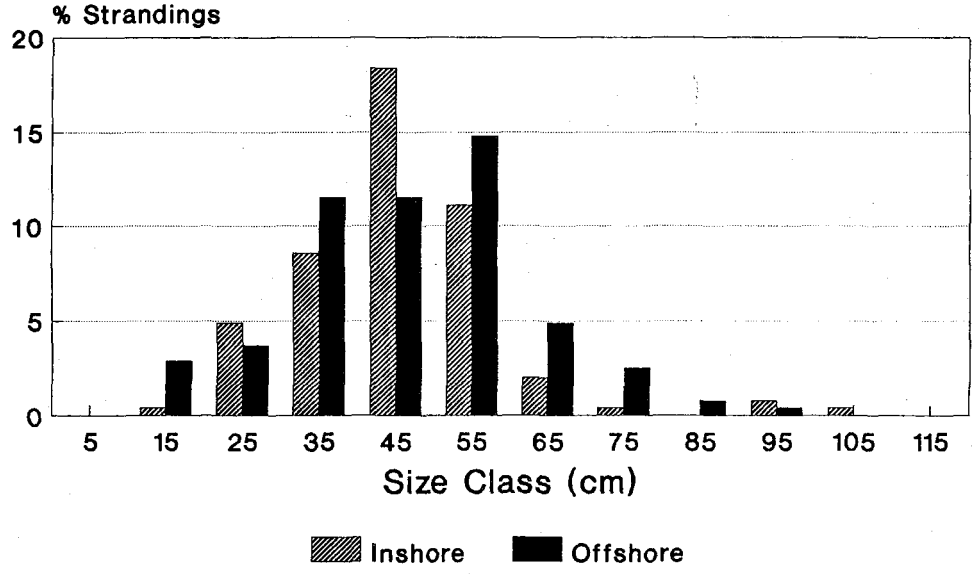

Figure 13. Size distribution of stranded greens (Chelonia mydas) on the eastern U.S. Gulf of Mexico coast, 1985 - 1991.

Table 9. Size distribution of stranded greens (Chelonia mydas) on the eastern U.S. Gulf of Mexico coast, 1985 - 1991.

	Inshore			Offshore		
Size Class (cm)	Number	Mean (cm)	Percent	Number	Mean (cm)	Percent
0.0 - 9.9	0			0		
10.0 - 19.9	1	17.6	0.4%	7	16.0	2.9%
20.0 - 29.9	12	26.4	4.9%	9	25.4	3.7%
30.0 - 39.9	21	35.8	8.6%	28	36.5	11.5%
40.0 - 49.9	45	44.8	18.4%	28	45.5	11.5%
50.0 - 59.9	27	54.0	11.1%	36	54.3	14.8%
60.0 - 69.9	5	63.3	2.0%	12	64.3	4.9%
70.0 - 79.9	1	76.2	0.4%	6	72.9	2.5%
80.0 - 89.9	0			2	84.9	0.8%
90.0 - 99.9	2	91.7	0.8%	1	91.4	0.4%
100.0 - 109.9	1	100.3	0.4%	0		
110.0 - 119.9	0			0		
Total	115		47.1%	129		52.9%

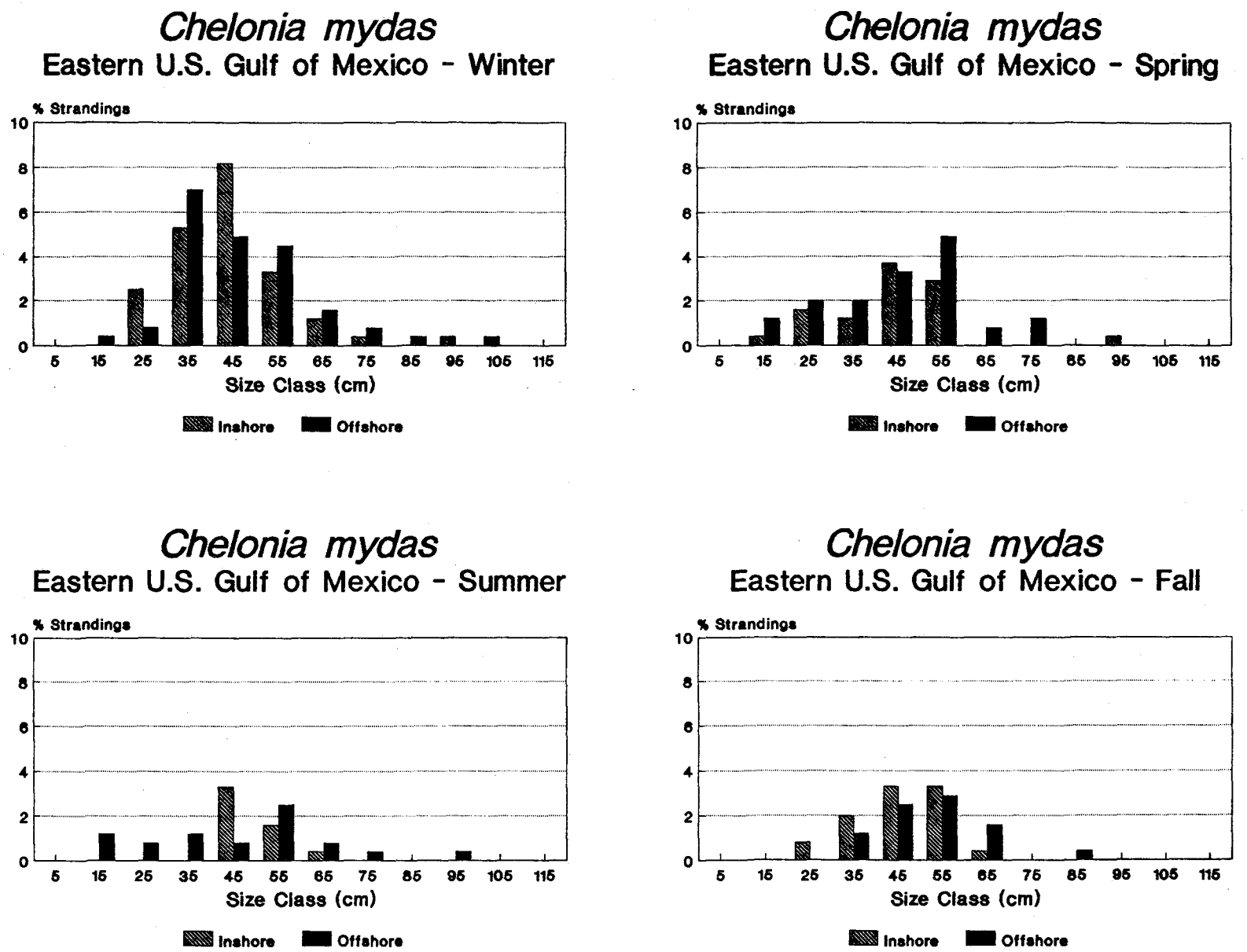

Figure 14. Seasonal size distribution of stranded greens (Chelonia mydas) on the eastern U.S. Gulf of Mexico coast, 1985 - 1991.

Chelonia mydas
Western U.S. Gulf of Mexico

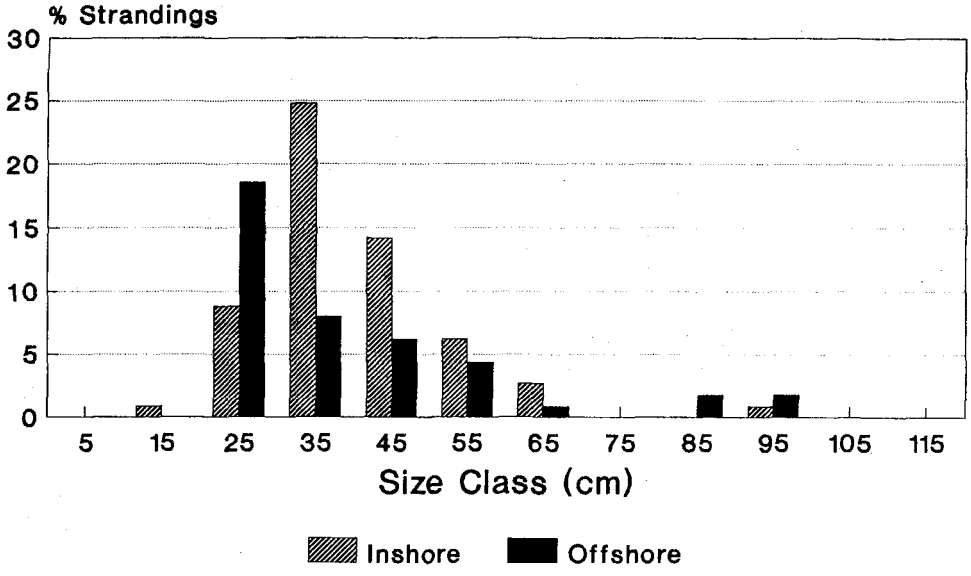

Figure 15. Size distribution of stranded greens (Chelonia mydas) on the western U.S. Gulf of Mexico coast, 1985 - 1991.

Table 10. Size distribution of stranded greens (Chelonia mydas) on the western U.S. Gulf of Mexico coast, 1985 - 1991.

	Inshore			Offshore		
Size Class (cm)	Number	Mean (cm)	Percent	Number	Mean (cm)	Percent
0.0 - 9.9	0			0		
10.0 - 19.9	1	13.0	0.9%	0		
20.0 - 29.9	10	26.7	8.8%	21	26.6	18.6%
30.0 - 39.9	28	35.4	24.8%	9	33.8	8.0%
40.0 - 49.9	16	45.9	14.2%	7	44.6	6.2%
50.0 - 59.9	7	54.4	6.2%	5	54.7	4.4%
60.0 - 69.9	3	65.0	2.7%	1	60.4	0.9%
70.0 - 79.9	0			0		
80.0 - 89.9	0			2	84.7	1.8%
90.0 - 99.9	1	98.5	0.9%	2	95.4	1.8%
100.0 - 109.9	0			0		
110.0 - 119.9	0			0		
Total	66		58.4%	47		41.6%

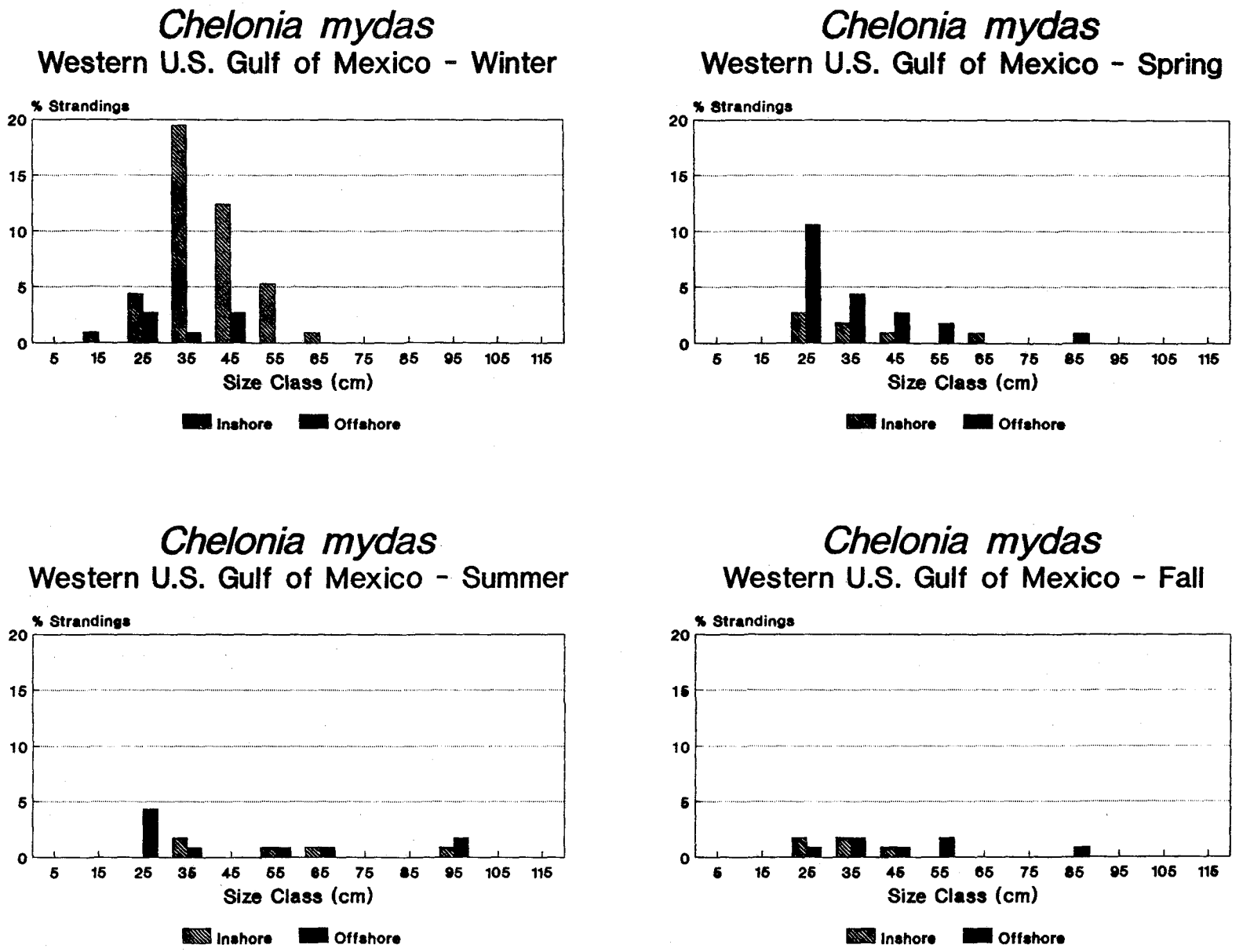

Figure 16. Seasonal size distribution of stranded greens (Chelonia mydas) on the western U.S. Gulf of Mexico coast, 1985 - 1991.

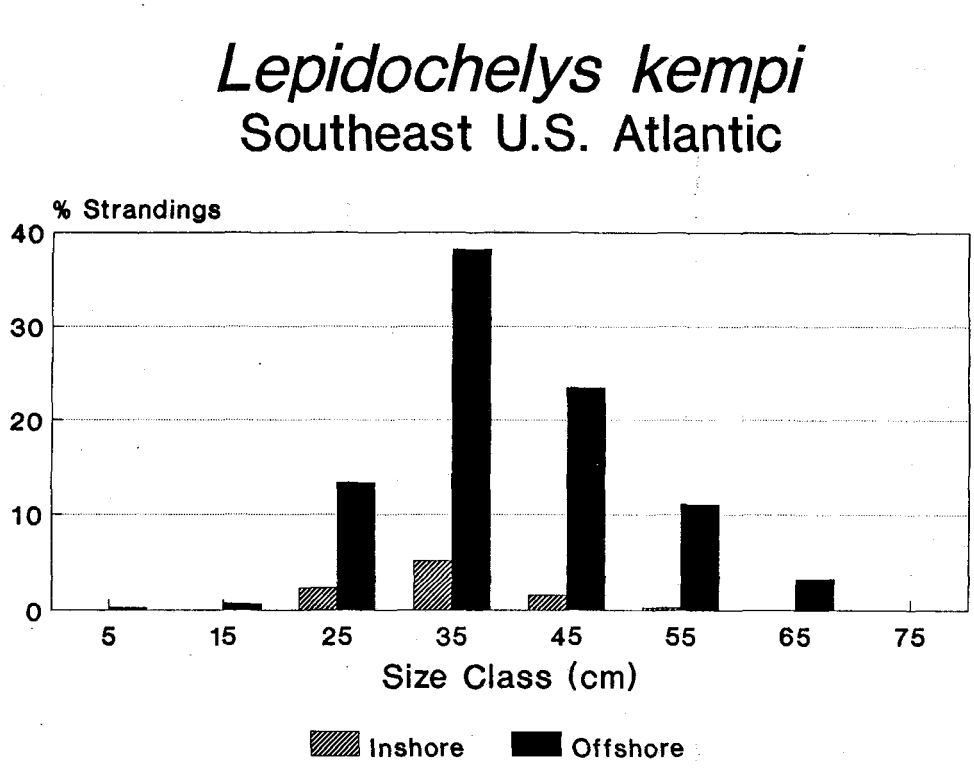

Figure 17. Size distribution of stranded Kemp's ridleys (Lepidochelys kempi) on the southeast U.S. Atlantic coast, 1985 - 1991.

Table 11. Size distribution of stranded Kemp's ridleys (Lepidochelys kempi) on the southeast U.S. Atlantic coast, 1985 - 1991.

	Inshore			Offshore		
Size Class (cm)	Number	Mean (cm)	Percent	Number	Mean (cm)	Percent
0.0 - 9.9	0			1	8.9	0.3%
10.0 - 19.9	0			2	15.2	0.7%
20.0 - 29.9	7	26.4	2.3%	41	26.7	13.4%
30.0 - 39.9	16	35.0	5.2%	117	35.0	38.2%
40.0 - 49.9	5	41.9	1.6%	72	43.8	23.5%
50.0 - 59.9	1	51.0	0.3%	34	52.8	11.1%
60.0 - 69.9	0			10	61.8	3.3%
70.0 - 79.9	0			0		
Total	29		9.5%	277		90.5%

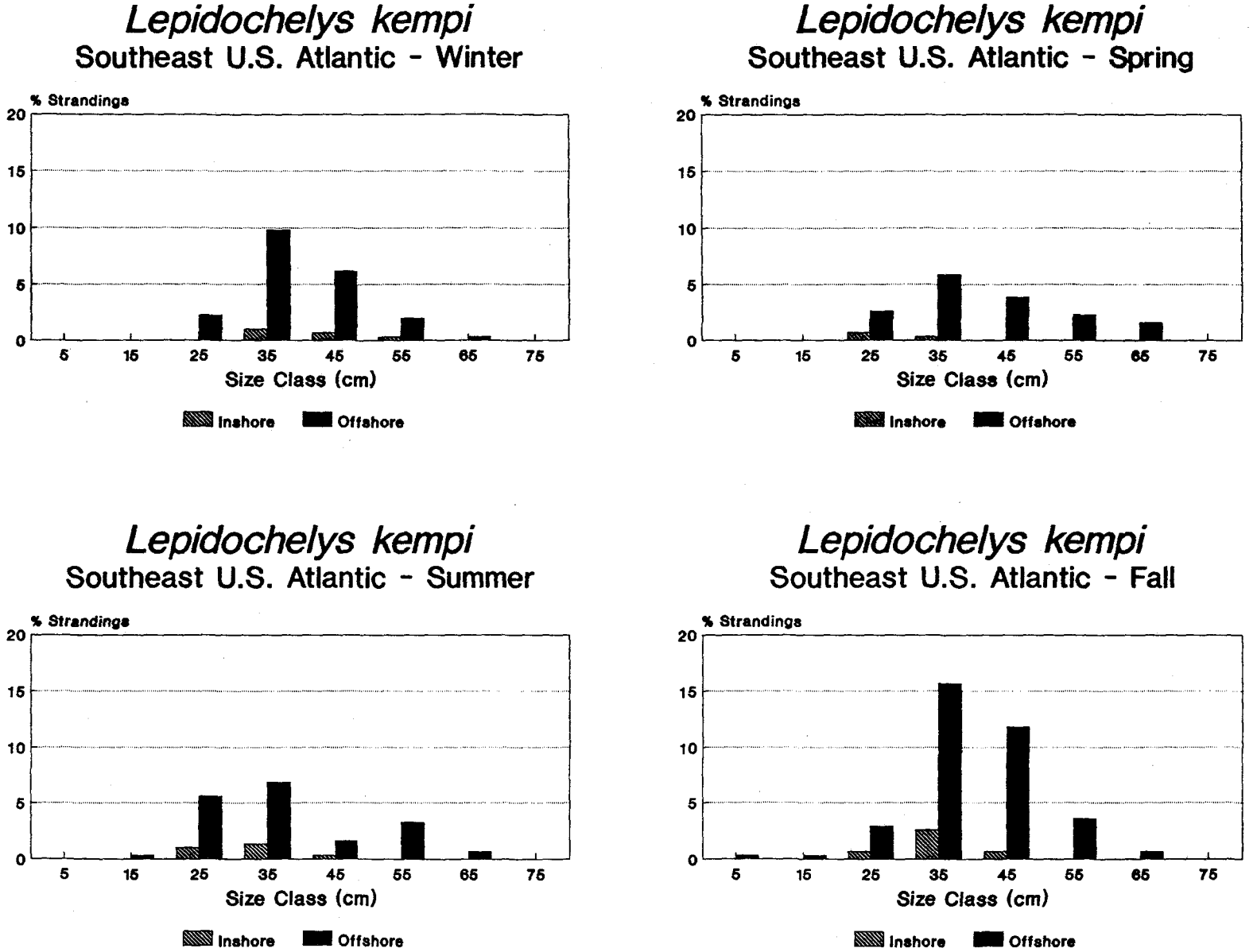

Figure 18. Seasonal size distribution of stranded Kemp's ridleys (Lepidochelys kempi) on the southeast U.S. Atlantic coast, 1985 - 1991.

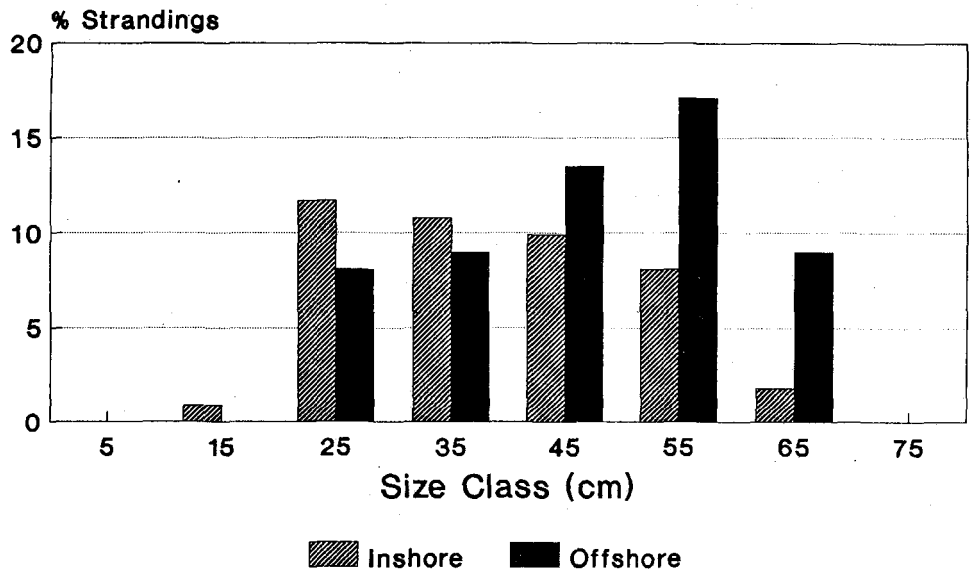

Figure 19. Size distribution of stranded Kemp's ridleys (Lepidochelys kempi) on the eastern U.S. Gulf of Mexico coast, 1985 - 1991.

Table 12. Size distribution of stranded Kemp's ridleys (Lepidochelys kempi) on the eastern U.S. Gulf of Mexico coast, 1985 - 1991.

	Inshore			Offshore		
Size Class (cm)	Number	Mean (cm)	Percent	Number	Mean (cm)	Percent
0.0 - 9.9	0			0		
10.0 - 19.9	1	14.7	0.9%	0		
20.0 - 29.9	13	26.5	11.7%	9	26.5	8.1%
30.0 - 39.9	12	34.3	10.8%	10	34.1	9.0%
40.0 - 49.9	11	44.3	9.9%	15	46.0	13.5%
50.0 - 59.9	9	54.5	8.1%	19	55.2	17.1%
60.0 - 69.9	2	64.5	1.8%	10	63.2	9.0%
70.0 - 79.9	0			0		
Total	48		43.2%	63		56.8%

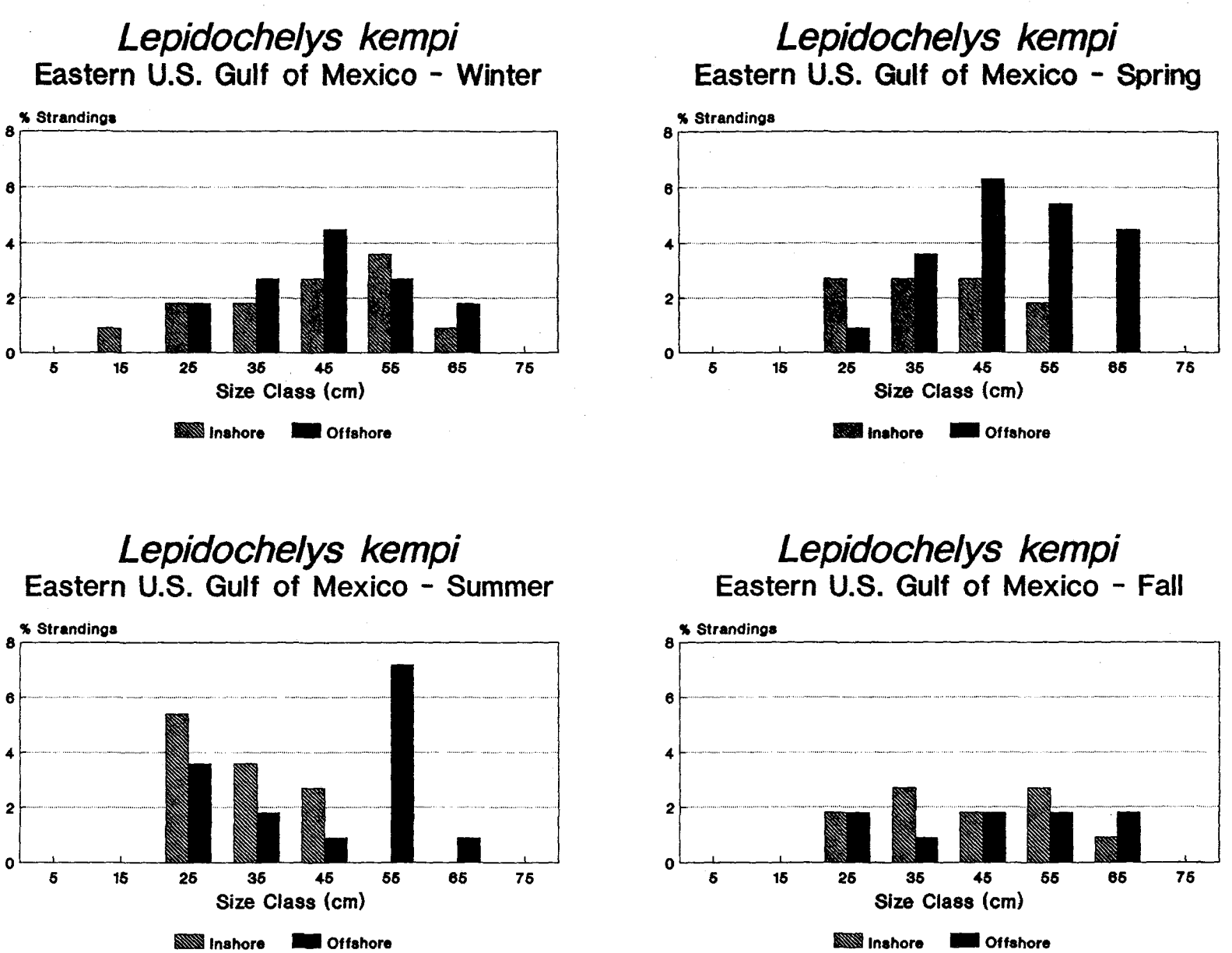

Figure 20. Seasonal size distribution of stranded Kemp's ridleys (Lepidochelys kempi) on the eastern U.S. Gulf of Mexico coast, 1985 - 1991.

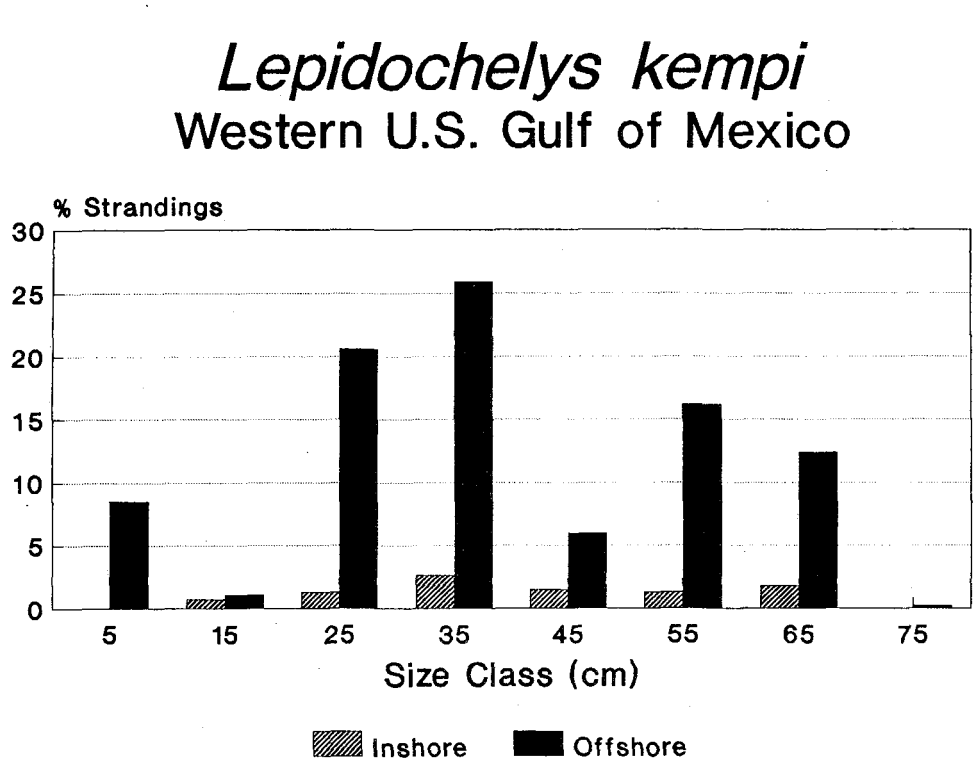

Figure 21. Size distribution of stranded Kemp's ridleys (Lepidochelys kempi) on the western U.S. Gulf of Mexico coast, 1985 - 1991.

Table 13. Size distribution of stranded Kemp's ridleys (Lepidochelys kempi) on the western U.S. Gulf of Mexico coast, 1985 - 1991.

	Inshore			Offshore		
Size Class (cm)	Number	Mean (cm)	Percent	Number	Mean (cm)	Percent
0.0 - 9.9	0			52	5.1	8.5%
10.0 - 19.9	4	18.0	0.7%	7	18.5	1.1%
20.0 - 29.9	8	27.7	1.3%	126	25.7	20.6%
30.0 - 39.9	16	35.2	2.6%	158	33.9	25.9%
40.0 - 49.9	9	41.8	1.5%	36	44.1	5.9%
50.0 - 59.9	8	55.2	1.3%	99	56.5	16.2%
60.0 - 69.9	11	62.2	1.8%	76	63.0	12.4%
70.0 - 79.9	0			1	70.9	0.2%
Total	56		9.2%	555		90.8%

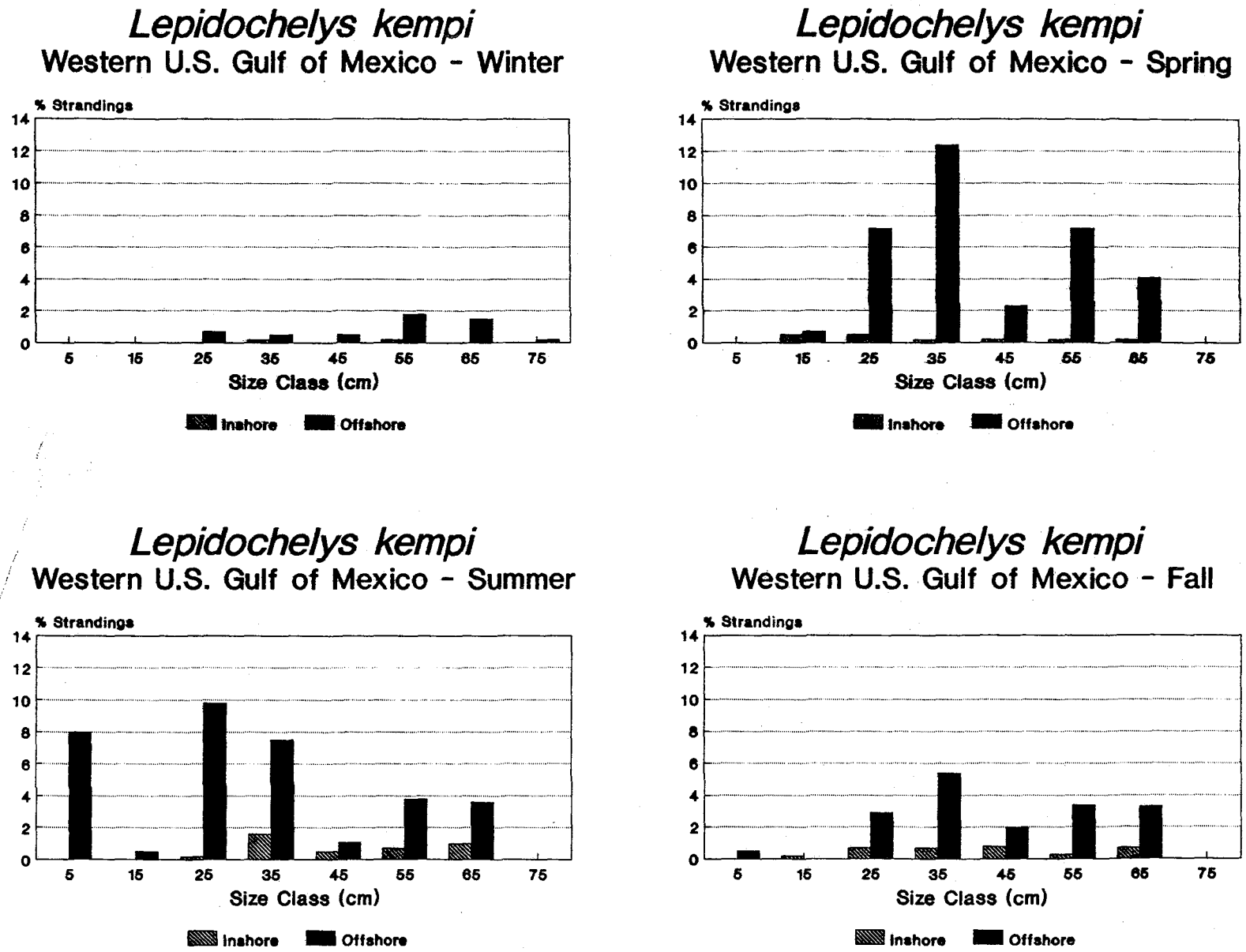

Figure 22. Seasonal size distribution of stranded Kemp's ridleys (Lepidochelys kempi) on the western U.S. Gulf of Mexico coast, 1985 - 1991.

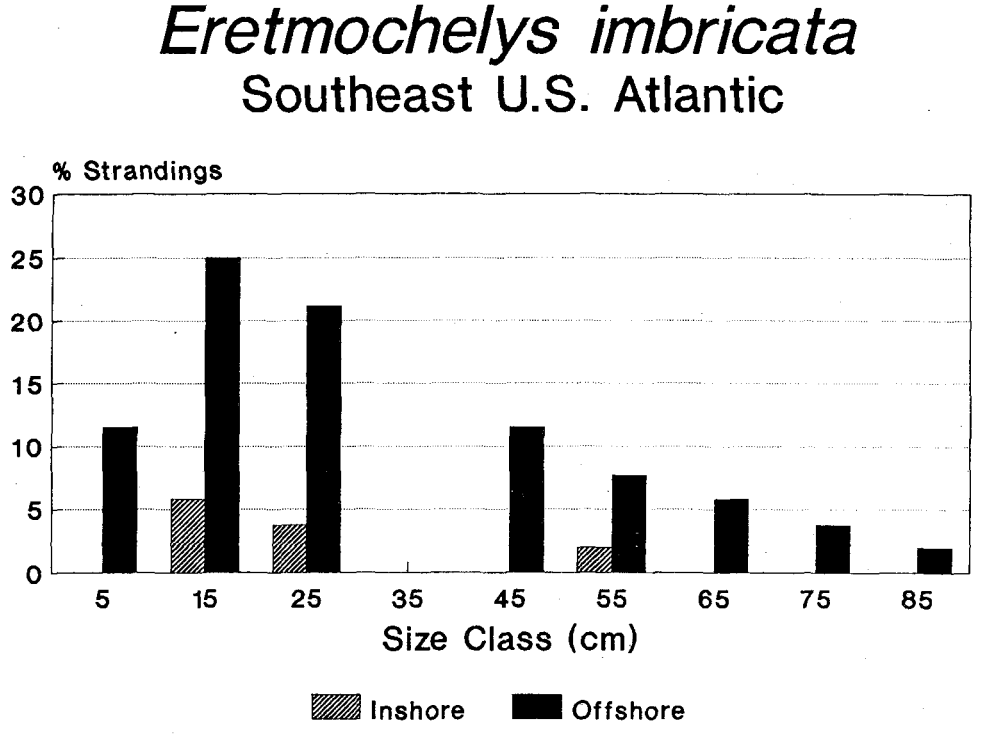

Figure 23. Size distribution of stranded hawksbills (Eretmochelys imbricata) on the southeast U.S. Atlantic coast, 1985 - 1991.

Table 14. Size distribution of stranded hawksbills (Eretmochelys imbricata) on the southeast U.S. Atlantic coast, 1985 - 1991.

	Inshore			Offshore		
Size Class (cm)	Number	Mean (cm)	Percent	Number	Mean (cm)	Percent
0.0 - 9.9	0			6	7.6	11.5%
10.0 - 19.9	3	13.5	5.8%	13	16.5	25.0%
20.0 - 29.9	2	23.4	3.8%	11	22.3	21.2%
30.0 - 39.9	0			0		
40.0 - 49.9	0			6	46.2	11.5%
50.0 - 59.9	1	51.8	2.0%	4	55.1	7.7%
60.0 - 69.9	0			3	63.0	5.8%
70.0 - 79.9	0			2	72.2	3.8%
80.0 - 89.9	0			1	82.9	2.0%
Total	6		11.5%	46		88.5%

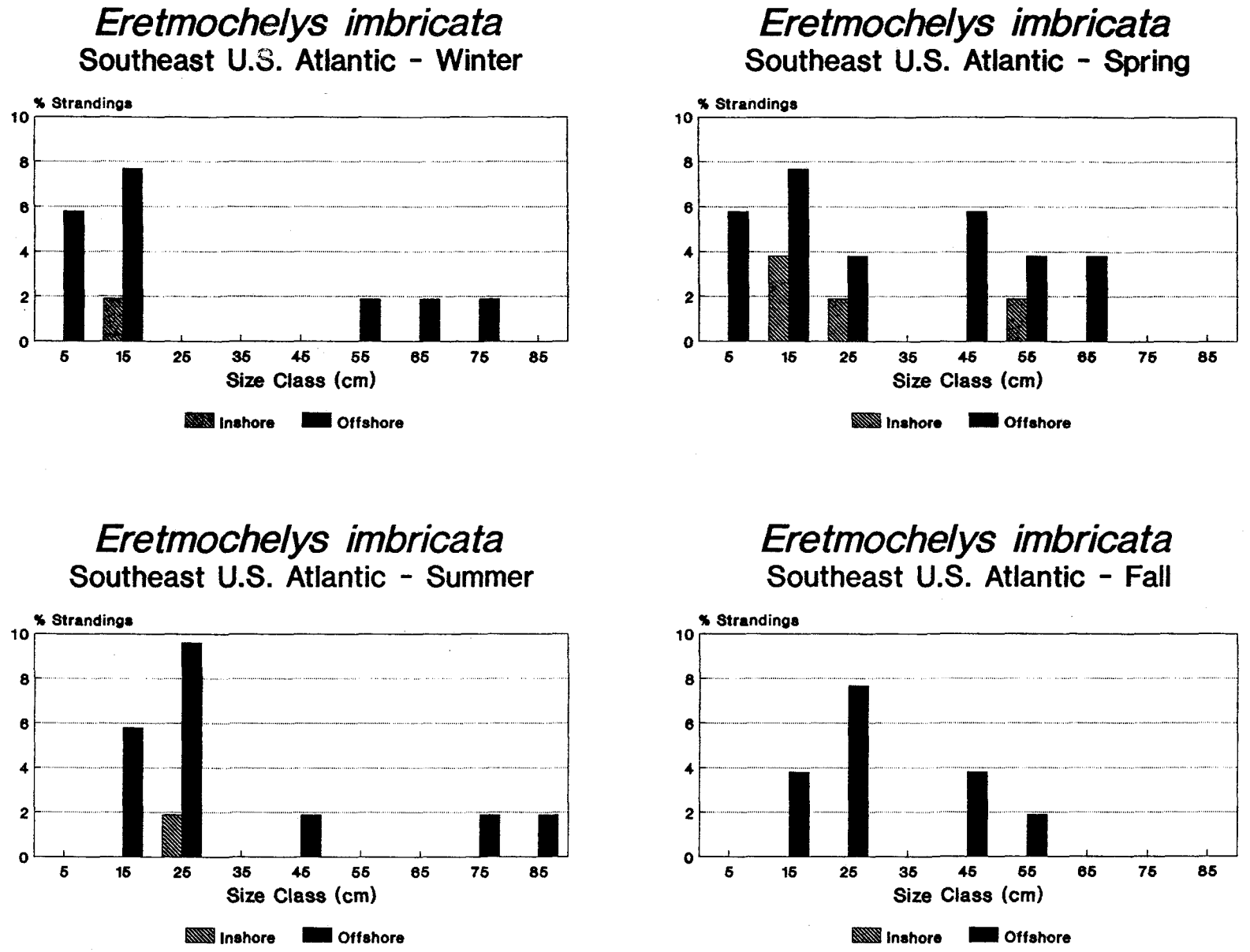

Figure 24. Seasonal size distribution of stranded hawksbills (Eretmochelys imbricata) on the southeast U.S. Atlantic coast, 1985 - 1991.

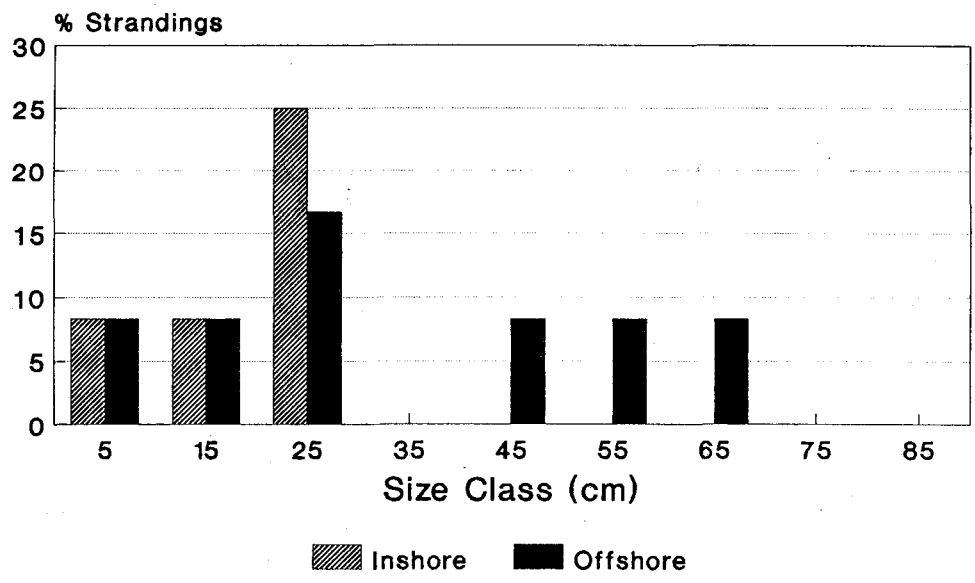

Figure 25. Size distribution of stranded hawksbills (Eretmochelys imbricata) on the eastern U.S. Gulf of Mexico coast, 1985 - 1991.

Table 15. Size distribution of stranded hawksbills (Eretmochelys imbricata) on the eastern U.S. Gulf of Mexico coast, 1985 - 1991.

	Inshore			Offshore		
Size Class (cm)	Number	Mean (cm)	Percent	Number	Mean (cm)	Percent
0.0 - 9.9	1	6.1	8.3%	1	5.6	8.3%
10.0 - 19.9	1	13.2	8.3%	1	17.0	8.3%
20.0 - 29.9	3	25.9	25.0%	2	25.8	16.7%
30.0 - 39.9	0			0		
40.0 - 49.9	0			1	45.7	8.3%
50.0 - 59.9	0			1	50.4	8.3%
60.0 - 69.9	0			1	66.4	8.3%
70.0 - 79.9	0			0		
80.0 - 89.9	0			0		
Total	5		41.7%	7		58.3%

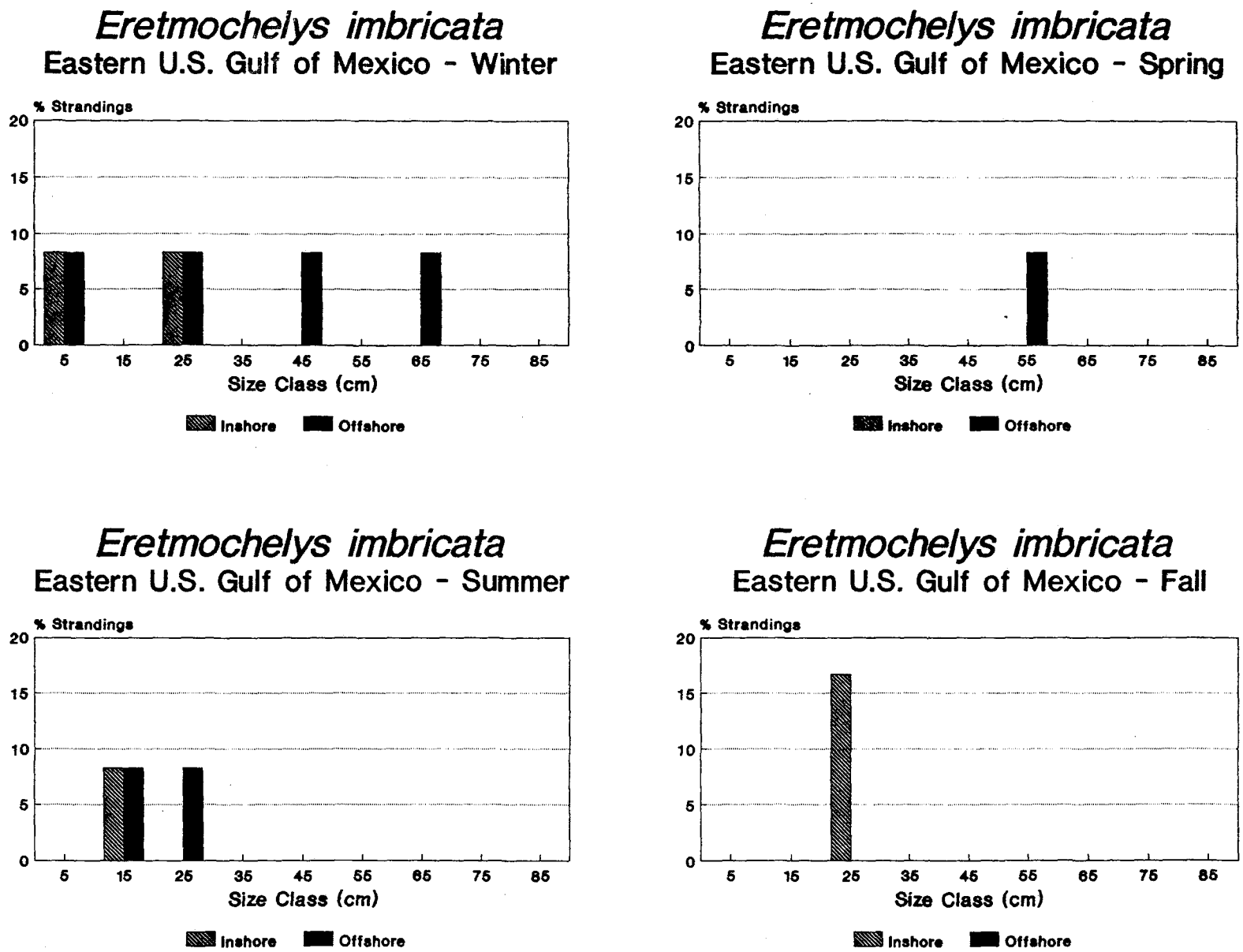

Figure 26. Seasonal size distribution of stranded hawksbills (Eretmochelys imbricata) on the eastern U.S. Gulf of Mexico coast, 1985 - 1991.

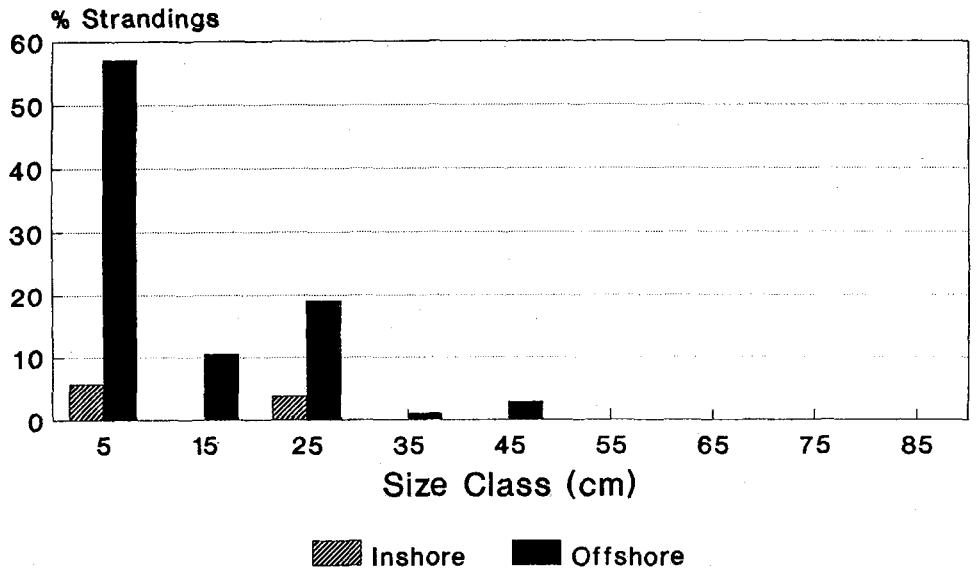

Figure 27. Size distribution of stranded hawksbills (Eretmochelys imbricata) on the western U.S. Gulf of Mexico coast, 1985 - 1991.

Table 16. Size distribution of stranded hawksbills (Eretmochelys imbricata) on the western U.S. Gulf of Mexico coast, 1985 - 1991.

	Inshore			Offshore		
Size Class (cm)	Number	Mean (cm)	Percent	Number	Mean (cm)	Percent
0.0 - 9.9	6	7.0	5.7%	60	7.2	57.1%
10.0 - 19.9	0			11	16.9	10.5%
20.0 - 29.9	4	25.1	3.8%	20	23.6	19.0%
30.0 - 39.9	0			1	31.3	1.0%
40.0 - 49.9	0			3	44.7	2.9%
50.0 - 59.9	0			0		
60.0 - 69.9	0			0		
70.0 - 79.9	0			0		
80.0 - 89.9	0			0		
Total	10		9.5%	95		90.5%

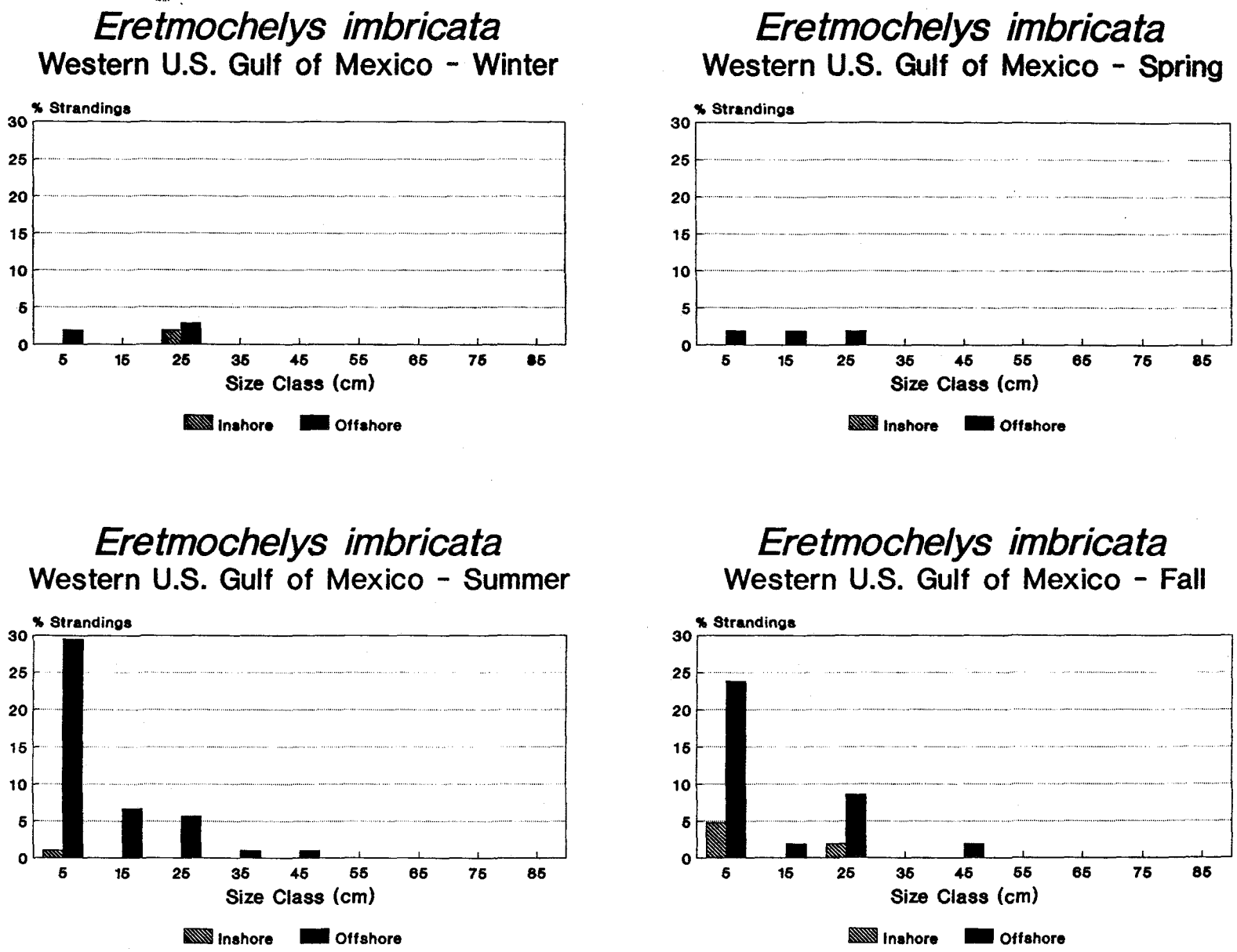

Figure 28. Seasonal size distribution of stranded hawksbills (Eretmochelys imbricata) on the western U.S. Gulf of Mexico coast, 1985 - 1991.

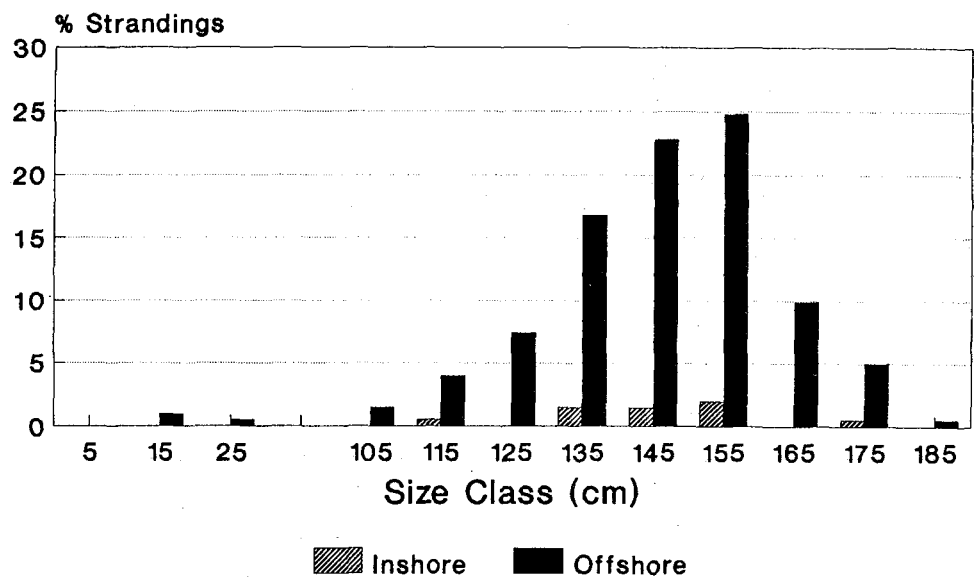

Figure 29. Size distribution of stranded leatherbacks (Dermochelys coriacea) on the southeast U.S. Atlantic coast, 1985 - 1991.

Table 17. Size distribution of stranded leatherbacks (Dermochelys coriacea) on the southeast U.S. Atlantic coast, 1985 - 1991.

	Inshore			Offshore		
Size Class (cm)	Number	Mean (cm)	Percent	Number	Mean (cm)	Percent
0.0 - 9.9	0			0		
10.0 - 19.9	0			2	14.4	1.0%
20.0 - 29.9	0			1	24.2	0.5%
100.0 - 109.9	0			3	105.7	1.5%
110.0 - 119.9	1	112.1	0.5%	8	116.4	4.0%
120.0 - 129.9	0			15	124.8	7.4%
130.0 - 139.9	3	134.1	1.5%	34	135.7	16.8%
140.0 - 149.9	3	144.0	1.5%	46	145.5	22.8%
150.0 - 159.9	4	152.5	2.0%	50	154.5	24.8%
160.0 - 169.9	0			20	163.7	9.9%
170.0 - 179.9	1	170.5	0.5%	10	172.5	5.0%
180.0 - 189.9	0			1	183.8	0.5%
Total	12		5.9%	190		94.1%

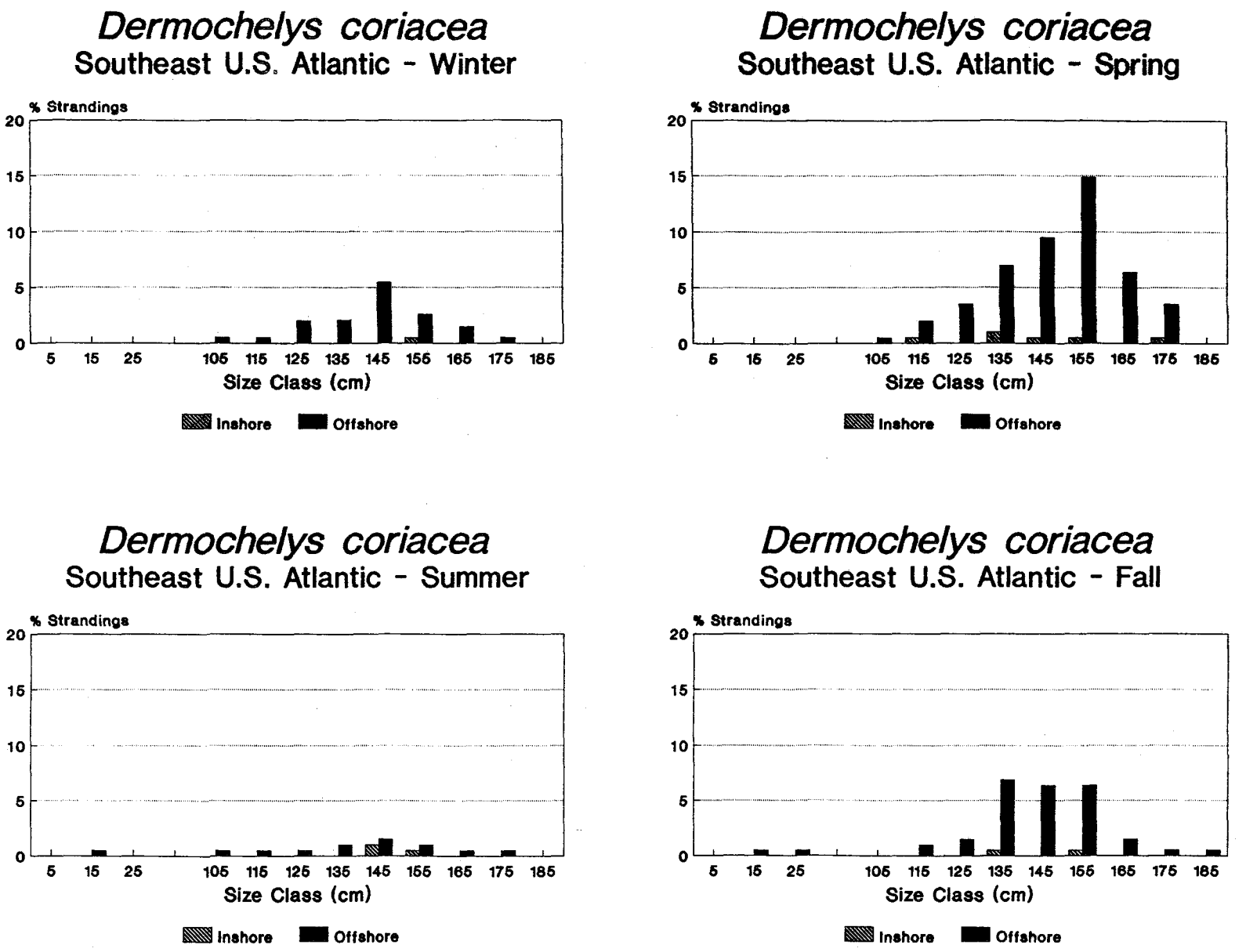

Figure 30. Seasonal size distribution of stranded leatherbacks (Dermochelys coriacea) on the southeast U.S. Atlantic coast, 1985 - 1991.

Dermochelys coriacea
Eastern U.S. Gulf of Mexico

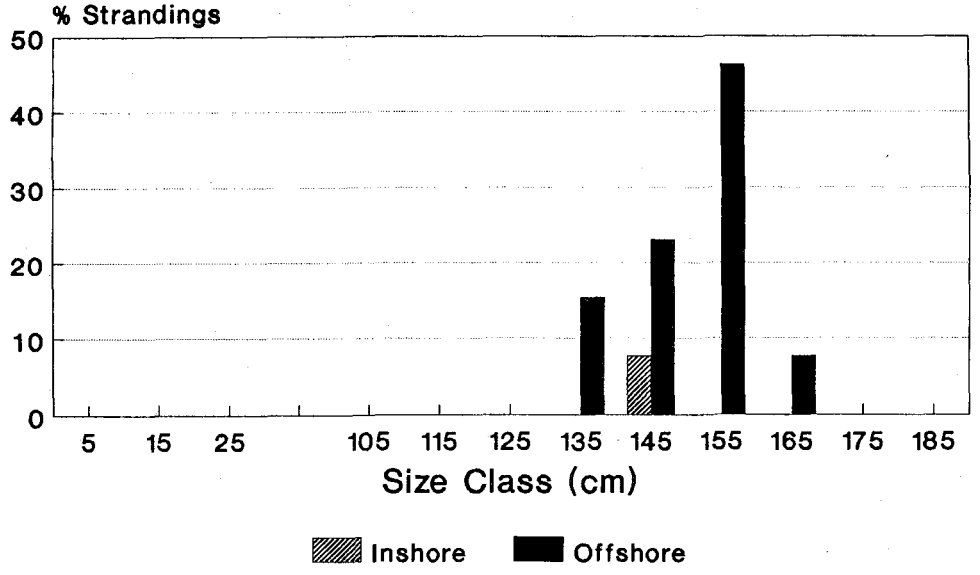

Figure 31. Size distribution of stranded leatherbacks (Dermochelys coriacea) on the eastern U.S. Gulf of Mexico coast, 1985 - 1991.

Table 18. Size distribution of stranded leatherbacks (Dermochelys coriacea) on the eastern U.S. Gulf of Mexico coast, 1985 - 1991.

	Inshore			Offshore		
Size Class (cm)	Number	Mean (cm)	Percent	Number	Mean (cm)	Percent
0.0 - 9.9	0			0		
10.0 - 19.9	0			0		
20.0 - 29.9	0			0		
100.0 - 109.9	0			0		
110.0 - 119.9	0			0		
120.0 - 129.9	0			0		
130.0 - 139.9	0			2	137.0	15.4%
140.0 - 149.9	1	148.4	7.7%	3	146.3	23.1%
150.0 - 159.9	0			6	153.5	46.2%
160.0 - 169.9	0			1	168.0	7.7%
170.0 - 179.9	0			0		
180.0 - 189.9	0			0		
Total	1		7.7%	12		92.3%

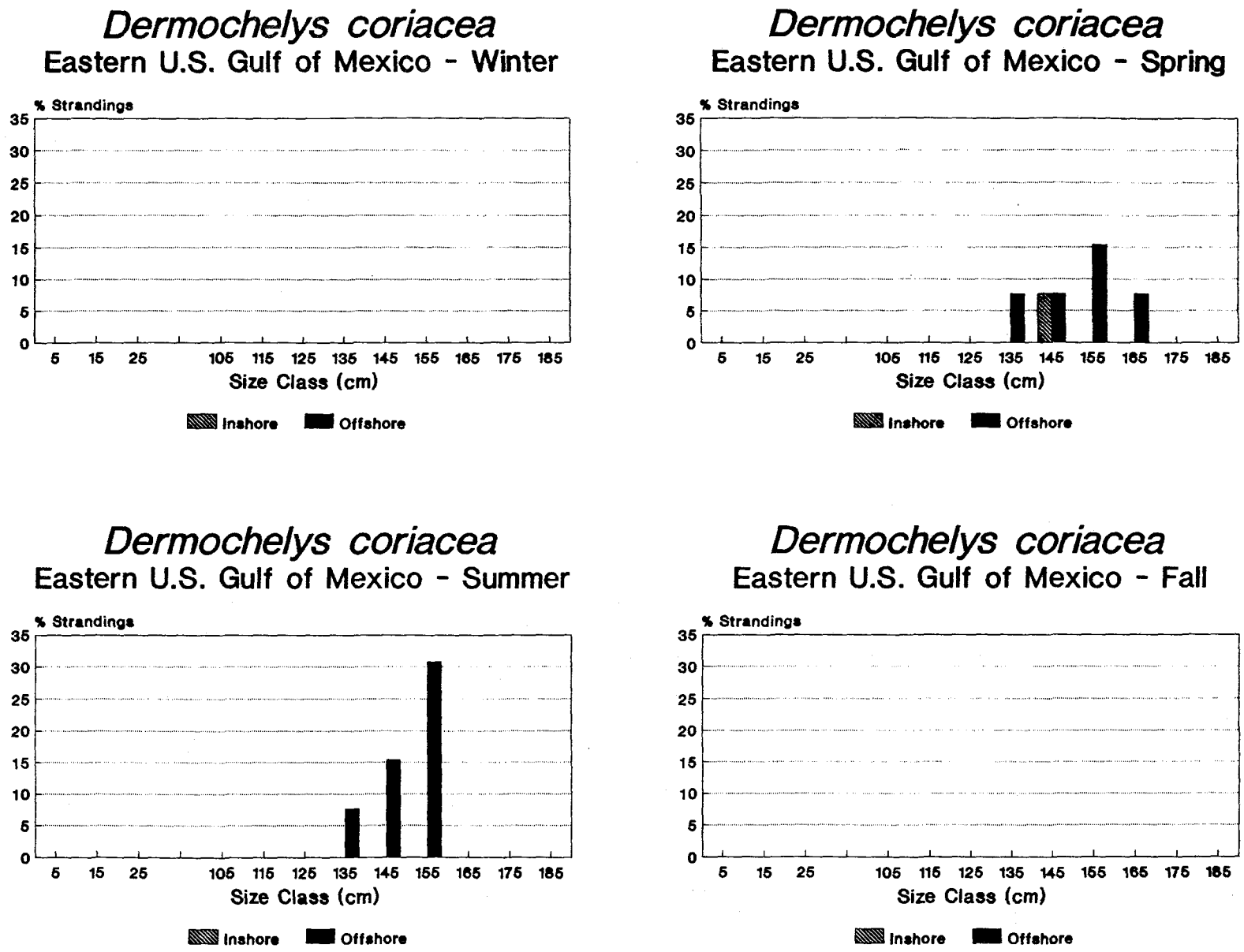

Figure 32. Seasonal size distribution of stranded leatherbacks (Dermochelys coriacea) on the eastern U.S. Gulf of Mexico coast, 1985 - 1991.

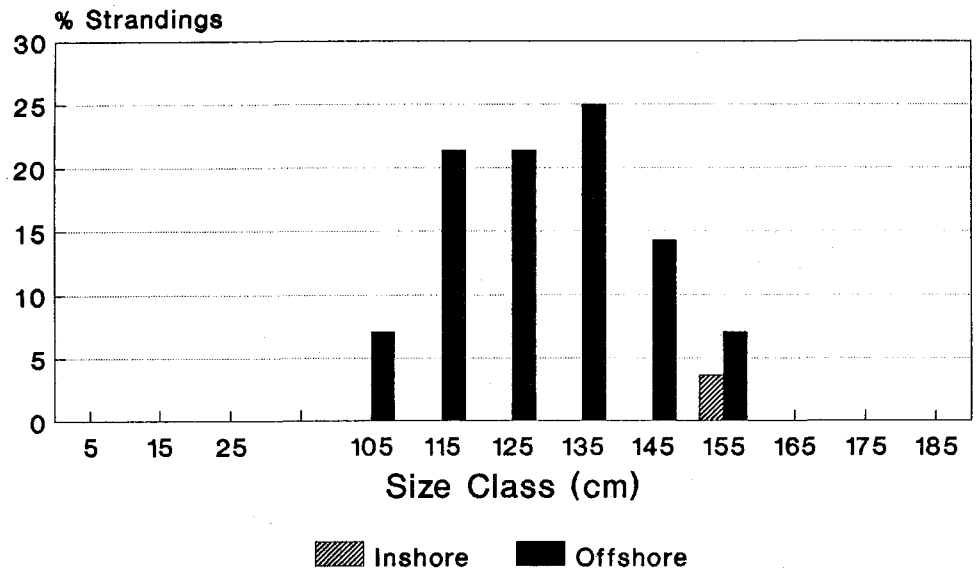

Figure 33. Size distribution of stranded leatherbacks (Dermochelys coriacea) on the western U.S. Gulf of Mexico coast, 1985 - 1991.

Table 19. Size distribution of stranded leatherbacks (Dermochelys coriacea) on the western U.S. Gulf of Mexico coast, 1985 - 1991.

	Inshore			Offshore		
Size Class (cm)	Number	Mean (cm)	Percent	Number	Mean (cm)	Percent
0.0 - 9.9	0			0		
10.0 - 19.9	0			0		
20.0 - 29.9	0			0		
100.0 - 109.9	0			2	106.2	7.1%
110.0 - 119.9	0			6	117.0	21.4%
120.0 - 129.9	0			6	126.1	21.4%
130.0 - 139.9	0			7	135.6	25.0%
140.0 - 149.9	0			4	145.8	14.3%
150.0 - 159.9	1	156.6	3.6%	2	152.9	7.1%
160.0 - 169.9	0			0		
170.0 - 179.9	0			0		
180.0 - 189.9	0			0		
Total	1		3.6%	27		96.4%

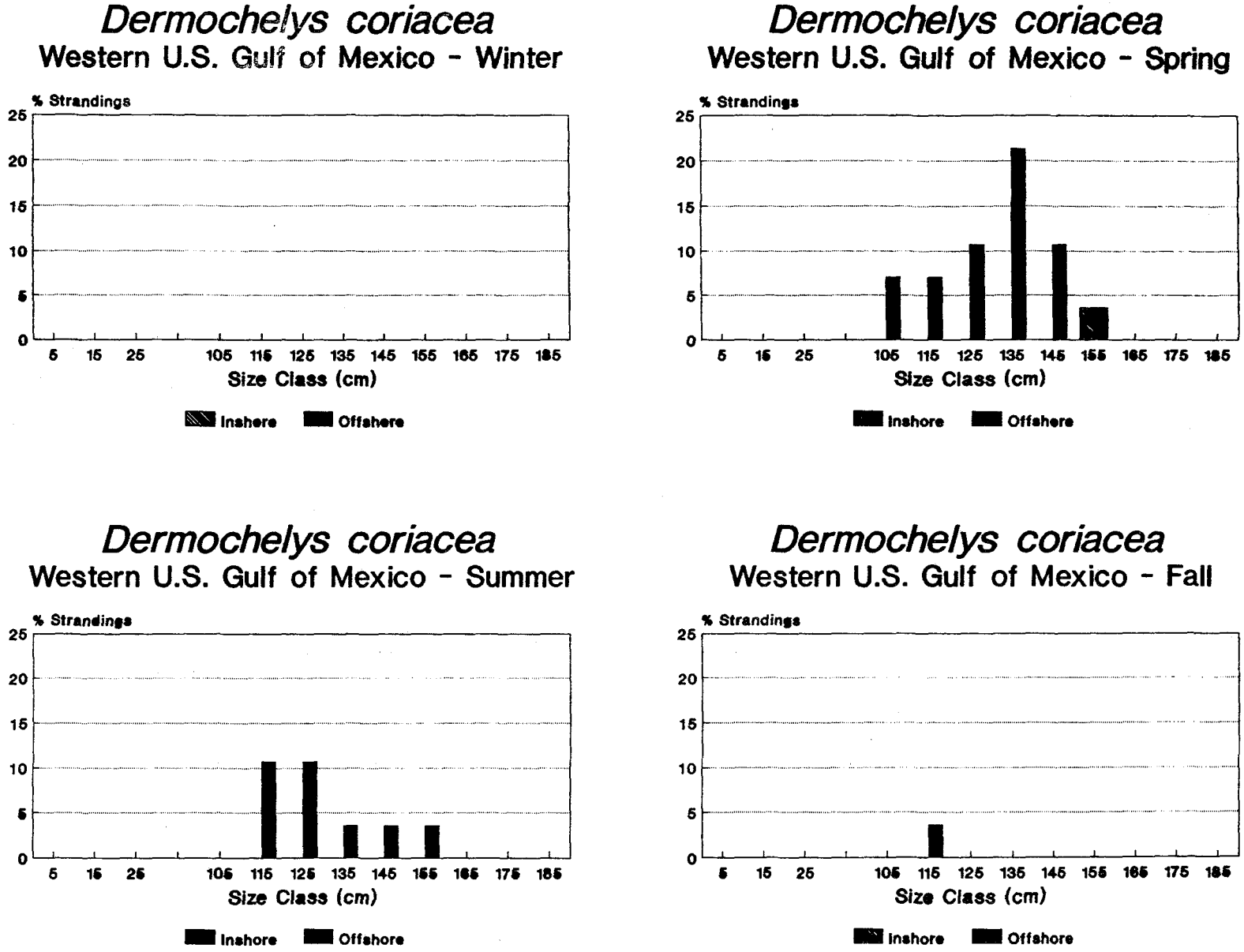

Figure 34. Seasonal size distribution of stranded leatherbacks (Dermochelys coriacea) on the western U.S. Gulf of Mexico coast, 1985 - 1991.