The Distribution of Kemp’s Ridley Sea Turtles (*Lepidochelys kempi*) Along the Texas Coast: An Atlas

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ABSTRACT

Eight hundred sixty-five records of Kemp’s ridley sea turtles (*Lepidochelys kempi*) reported from Texas between the late 1940’s to April 1990 were compiled from six databases and the literature, then plotted on a series of Texas maps. Four categories of Kemp’s ridleys are identified throughout the atlas: head-started (turtles that are raised in captivity their first year of life), wild, historical (pre-1980), and nesters. Geographic, seasonal, and size distributions of the turtle categories are plotted by regions. Most Kemp’s ridleys were reported from the northeast and central Texas coast. They were reported from both inshore (landward of barrier islands) and offshore (seaward of barrier islands). Scattered nestings occurred in the central to southern regions. Kemp’s ridleys were found more often during the spring and summer. A total of 546 turtle records contained measurements; most were 20–59.9 cm curved carapace length and considered sub-adults. Comparison of distributions of head-started and wild Kemp’s ridleys suggests head-started Kemp’s ridleys inhabit the same areas as wild Kemp’s ridleys.

Introduction

The Kemp’s ridley sea turtle (*Lepidochelys kempi*) has a unique life history that has been widely discussed by sea turtle biologists (Carr 1955, 1957; Carr and Caldwell 1958; Carr 1961; Hildebrand 1963; Chavez et al. 1968; Pritchard and Marquez 1973). It is an endangered species of sea turtle and has the most restricted breeding range. The primary nesting site for the Kemp’s ridley is on the northeastern coast of Mexico, near the village of Rancho Nuevo, Tamaulipas, approximately 322 km (200 mi) south of Brownsville, Texas (Hildebrand 1963). Scattered nestings occur to the south and north of the main nesting beach on the Mexican coast and along the southern and central coastline of Texas (Werler 1951; Carr 1961; Hildebrand 1963, 1980; Pritchard and Marquez 1973; Fuller 1978; Francis 1978; Shaver et al. 1988). There is one record of a Kemp’s ridley nesting on the west coast of Florida (Meylan et al. 1990).

Outside the breeding area, the Kemp’s ridley range includes other coastal areas of the Gulf of Mexico, the western North Atlantic from Florida to Nova Scotia and the eastern North Atlantic including the British Isles, Netherlands, and France (Bleakney 1965; Brongersma 1972; Pritchard and Marquez 1973; Manzella et al. 1988). Brongersma and Carr (1983) reported one Kemp’s ridley from Malta in the Mediterranean, and two have been reported from the Madeira Islands and Western Africa (Brongersma 1972; Fontaine et al. 1989a).

In 1978 an experimental sea turtle head-start conservation project began, involving the U.S. Fish and Wildlife Service, National Park Service, National Marine Fisheries Service (NMFS), and Texas Parks and Wildlife Department, in cooperation with the Instituto Nacional de la Pesca de Mexico. The objective of this project was to increase survival during the first year of life and to establish a nesting colony of Kemp’s ridleys on Padre Island National Seashore (PINS), near Corpus Christi, Texas. Annually, 2000 eggs were removed from the natural nesting beach and were incubated in Padre Island sand at PINS. After hatching, the turtles were allowed to crawl down the beach to the water and swim in the surf (Fletcher 1989). This “imprinting” to Padre Island...
Records of 506 turtles were obtained from the STSSN data base maintained at the NMFS Southeast Fisheries Science Center’s (SEFSC) Miami Laboratory. Two hundred ninety-eight records were acquired from four data bases maintained at the NMFS SEFSC Galveston Laboratory, including 260 tag return records of head-started turtles and 36 records of either wild Kemp’s ridleys caught incidentally to fishing, rehabilitated turtles, or sightings of sea turtles. Four records were acquired from the sea turtle data base at the NMFS Laboratory in Pascagoula, Mississippi, and 57 records, including 13 records of nesting Kemp’s ridleys, were acquired from the published literature (Werler 1951; Carr 1961; Hildebrand 1963; Chavez 1967; Molinar 1973; Francis 1978; Fuller 1978; Hildebrand 1980; Rabalais and Rabalais 1980; Fritts and Reynolds 1981; Shaver et al. 1988; Ogren 1989). Only those records positively identifying Kemp’s ridleys were used and each record was verified to avoid duplication.

The coast of Texas was divided into 8 regions. Regions were selected for clarity in plotting; however, boundaries of major bay systems were also considered (Fig. 1). From northeast to southwest, the regions consist of the following: region 1—Sabine Pass/High Island Area; region 2—Bolivar Peninsula/Galveston Area; region 3—Freeport/East Matagorda Bay; region 4—Matagorda Bay and Peninsula; region 5—San Antonio Bay/Copano Bay/Matagorda Island; region 6—Corpus Christi Bay/Northern Padre Island; region 7—Central Laguna Madre/Padre Island; region 8—Southern Laguna Madre/Padre Island. Most data fall within the regional boundaries; those occurring outside are shown on maps of the entire Texas coastline and are labeled region 9 on the tables and graphs.

Four categories of Kemp’s ridleys are used throughout the atlas. Because there was no data base available for sea turtle records before 1980, two categories of wild turtles are presented. Wild turtles recorded prior to 1980 are classified as historical records and represented by a circle. The majority of historical records are from the literature. Wild turtles recorded from 1980 to the present are represented by a triangle and the majority of these records were gathered from the STSSN data base. Head-started turtles (turtles reared, tagged, and released as part of the head-start conservation project) are represented by a square. Nesting turtles, identified separately because Texas is the northern extreme of the nesting range, are represented by a diamond.

The plotted symbols represent approximate turtle locations. Latitude and longitude were usually estimated in reports of turtle strandings, tag returns,
Pages 3-4 were not present in the original publication.
<table>
<thead>
<tr>
<th></th>
<th>Stranded #</th>
<th>Stranded %</th>
<th>Shrimp trawl #</th>
<th>Shrimp trawl %</th>
<th>Other bycatch #</th>
<th>Other bycatch %</th>
<th>Other #</th>
<th>Other %</th>
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<td>6</td>
<td>0.7</td>
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<td>2</td>
<td>0.2</td>
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<td>1</td>
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<td>9</td>
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<td>9.8</td>
<td>27</td>
<td>3.2</td>
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<td>0.9</td>
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<td>23.4</td>
<td>6</td>
<td>0.7</td>
<td>5</td>
<td>0.6</td>
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<tr>
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<td>33.3</td>
<td>35</td>
<td>4.1</td>
<td>15</td>
<td>1.5</td>
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<td>16</td>
<td>1.8</td>
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<td>3.8</td>
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</table>

101 (18.5%) ≥ 60 cm, and only 33 (6.1%) < 20 cm (Fig. 24). Wild Kemp’s ridleys (n=486) were reported most frequently in the 20–59.9 cm (73.0%) range, followed by ≥ 60 cm (21.6%) and < 20 cm (5.3%) (Fig. 25). Head-started turtles (n=54) were reported most frequently in the 20–59.9 cm (98.2%), of which 20.3% were > 40 cm CCL. Only 1.8% of head-started turtles were < 20 cm and no head-started turtles were reported ≥ 60 cm. Measurements for nesting turtles were not available. Size distribution maps are presented in Figures 26–34. A summary of head-started, wild, and historical Kemp’s ridleys, by size and recovery method, is presented in Table 3.

**Discussion**

Kemp’s ridley sea turtles were found along the entire Texas coast, but most frequently in the northeastern and central regions. The infrequent occurrence of Kemp’s ridleys in the inshore habitat of the two southernmost regions of the coast may be attributed to the type of habitat found in the Laguna Madre. This hypersaline area differs from all other Texas estuaries in having clear, shallow waters and a hard sand bottom (Diener 1975). Little or no commercial crab and shrimp fishing exist in this inshore area (Margot Hightower, SEFSC, NMFS, Galveston, TX 77551; pers. commun. May 1991). Large beds of seagrasses and algae are present and green sea turtles (*Chelonia mydas*), which feed on the grasses and algae, are found in the southern reaches of the Laguna Madre. The northern and central Texas estuaries are bordered by tidal marshes and mud flats and have more turbid waters (Diener 1975). They support commercial fisheries for crab and shrimp (Margot Hightower, SEFSC, NMFS, Galveston, TX 77551; pers. commun. May 1991).

Fishes, crabs, and the gastropod scavenger *Nassarius* were the most frequently identified food items in the stomachs of 49 Kemp’s ridleys that were found stranded along the northern Texas coast between 1986 and 1989 (Stanley, in prep.). Similar results were reported by Owens (1986) based on the examination of stomachs from 77 Kemp’s ridleys (including 47 head-started turtles) stranded along the central Texas coast. Owens suggested that turtles feed on trawler bycatch, because of the presence of fish


<table>
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<tr>
<td>Frequency of Kemp’s ridleys* by size and recovery method. Percentages are based on 546 turtles*.</td>
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<tr>
<td></td>
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<tr>
<td></td>
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<tr>
<td>&lt;20 cm</td>
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<tr>
<td>Total</td>
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<td>≥60 cm</td>
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<tr>
<td>Head-started</td>
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<tr>
<td>Wild</td>
</tr>
<tr>
<td>Historical</td>
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<tr>
<td>Total</td>
</tr>
</tbody>
</table>

* No measurements were recorded for the thirteen nesting turtles.
† Owing to rounding errors, percentages may not add up to 100%.
‡ “Other bycatch” includes turtles caught by hook and line and by gill net.
§ “Other” includes turtles dip-netted or caught by hand while swimming at the surface, turtles found in power plant intakes, sightings of turtles, and turtles with no recovery method.

(which turtles could not normally catch) and the gastropod scavenger Nassarius (an indicator that the food was dead when it was eaten) in the gut contents of stranded turtles. The fishes and crabs favored by the Kemp’s ridleys are more plentiful in the north-eastern and central estuaries of Texas. Therefore, these areas seem to be a more suitable habitat than the southern areas.

Head-started and wild Kemp’s ridleys were found in the same areas. Both head-started and wild Kemp’s ridleys were most numerous in regions 2 and 6, the Bolivar/Galveston area and the Corpus Christi/North Padre Island area. Region 6 was the primary release area (Fig. 1) for most head-started Kemp’s ridleys (Fontaine et al. 1990). A high number of head-started turtles were reported from region 5 which includes Copano Bay, a head-start release site in 1985 (Manzella et al. 1988). Wild Kemp’s ridleys were also numerous in region 1, the Sabine Pass/High Island area. Region 1 was the fourth most numerous region for head-started turtles. This area is considered a major feeding ground for Kemp’s ridleys (Ogren 1989). Only two head-started Kemp’s ridleys were reported from regions 7 and 8, the southern areas of the coast. Wild Kemp’s ridleys were also infrequently reported from these regions.

Head-started turtles were more frequently reported farther offshore and in shrimp trawls than wild Kemp’s ridleys. This may be due to the fact that head-started turtles bear a tag, which may prompt the public to report the turtles more readily than untagged turtles.

Both head-started and wild Kemp’s ridleys were more frequently reported in the spring and summer.

Head-started and wild Kemp’s ridleys occurred more frequently in the 20–59.9 cm CCL size class and could be considered sub-adults (Ogren 1989). The average size of head-started turtles at release was 16–18 cm SCL. Most tag returns of head-started turtles, reported with measurements, occurred in the 20–59.9 cm CCL range (n=53) and 21% were > 40 cm. These measurements suggest these turtles do adapt and grow, after release into their natural habitat. Apparently the most common size class of ridleys found in the Gulf of Mexico is 20–59.9 cm. (Ogren 1989; Schmid and Ogren 1990).

The present atlas illustrates the distribution of head-started and wild Kemp’s ridleys along the Texas coast. The head-started turtles do seem to adapt to the wild and are found in the same areas as wild Kemp’s ridleys. Tag returns of head-started turtles found in other areas of the Gulf of Mexico and the Atlantic coast of the United States (n=425), also sug-
gest that these turtles adapt to the wild after release and are found in the same areas as wild Kemp's ridleys (Manzella et al. 1988; Fontaine et al. 1989a). Similar atlases showing the distribution of known records of Kemp's ridleys throughout their entire range would be useful to sea turtle biologists, conservationists, and agencies responsible for protection and management of this endangered species.

Acknowledgments

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Citations


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Figure 1
The Texas coast divided into eight regions. The offshore area, outside the regional boundaries, is region 9. Major release sites of headstarted turtles are also shown.

Figure 2
Frequency distribution of Kemp's ridleys found along the Texas coast.
**Figure 3**
Frequency distribution of Kemp’s ridley groups, by region.

**Figure 4**
Geographic distribution of Kemp’s ridleys in region 1 - Sabine Pass/High Island area.
Figure 5
Geographic distribution of Kemp’s ridleys in region 2 - Bolivar Peninsula/Galveston area.

Figure 6
Geographic distribution of Kemp’s ridleys in region 3 - Freeport/East Matagorda Bay.
Figure 7
Geographic distribution of Kemp’s ridleys in region 4 - Matagorda Bay and Peninsula.

Figure 8
Geographic distribution of Kemp’s ridleys in region 5 - San Antonio Bay/Copano Bay/Matagorda Island.
Figure 9
Geographic distribution of Kemp's ridleys in region 6 - Corpus Christi Bay/Northern Padre Island.

Figure 10
Geographic distribution of Kemp's ridleys in region 7 - Central Laguna Madre/Padre Island.
Figure 11
Geographic distribution of Kemp’s ridleys in region 8 - Southern Laguna Madre/Padre Island.

Figure 12
Geographic distribution of Kemp’s ridleys outside the regional boundaries. The wild turtle positioned on land near region 2 was found in a drainage ditch in Houston, TX.
Figure 13
Frequency distribution of Kemp’s ridleys, by season.

Figure 14
Frequency distribution of Kemp’s ridley groups, by season.
Figure 15
Seasonal distribution of Kemp's ridleys in region 1 - Sabine Pass/High Island area.
Figure 15 (continued)
Figure 16
Seasonal distribution of Kemp's ridleys in region 2 - Bolivar Peninsula/Galveston area.
Figure 16 (continued)
Figure 17
Seasonal distribution of Kemp's ridleys in region 3 - Freeport/East Matagorda Bay.
Figure 17 (continued)
Figure 18
Seasonal distribution of Kemp's ridleys in region 4 - Matagorda Bay and Peninsula.
Figure 18 (continued)
Figure 19
Seasonal distribution of Kemp’s ridleys in region 5 - San Antonio Bay/Copano Bay/Matagorda Island.
Figure 20
Seasonal distribution of Kemp's ridleys in region 6 - Corpus Christi Bay/Northern Padre Island.
Figure 20 (continued)
Figure 21
Seasonal distribution of Kemp's ridleys in region 7 - Central Laguna Madre/Padre Island.
Figure 21 (continued)
Figure 22
Seasonal distribution of Kemp's ridleys in region 8 - Southern Laguna Madre/Padre Island.
Figure 22 (continued)
Figure 23
Seasonal distribution of Kemp’s ridleys outside the regional boundaries. The wild turtle positioned on land near region 2 on the Fall map, was found in a drainage ditch in Houston, TX.
Figure 23 (continued)
Curved carapace length measurements of Kemp’s ridleys found along the Texas coast.
Figure 25
Frequency distribution of Kemp’s ridley groups, by curved carapace lengths.
Figure 26
Size distribution of Kemp’s ridleys in region 1 - Sabine Pass/High Island area.
Figure 27
Size distribution of Kemp's ridleys in region 2 - Bolivar Peninsula/Galveston area.
Figure 28
Size distribution of Kemp's ridleys in region 3 - Freeport/East Matagorda Bay.
Figure 29
Size distribution of Kemp's ridleys in region 4 - Matagorda Bay and Peninsula.
Figure 29 (continued)
Figure 30
Size distribution of Kemp’s ridleys in region 5 - San Antonio Bay/Copano Bay/Matagorda Island.
Figure 29 (continued)
Figure 31
Size distribution of Kemp's ridleys in region 6 - Corpus Christi Bay/Northern Padre Island.
Figure 31 (continued)
Figure 32
Size distribution of Kemp's ridleys in region 7 - Central Laguna Madre/Padre Island.
Figure 32 (continued)
Figure 33
Size distribution of Kemp's ridleys in region 8 - Southern Laguna Madre/Padre Island.
Figure 33 (continued)
Figure 34
Size distribution of Kemp's ridleys outside the regional boundaries. The wild turtle positioned on land near region 2 was found in a drainage ditch in Houston, TX.