USN ENVIRONMENTAL IMPACT:
for testing new hull designs
for "SEA WOLF" class nuclear sub.

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L. OGREN '91

A SUMMARY OF RECENT SEA TURTLE DISTRIBUTION AND RELATIVE ABUNDANCE BY SPECIES, LIFE HISTORY STAGE, ACTIVITIES (REPRODUCTIVE, FEEDING, MIGRATION) AND SEASONAL OCCURRENCE AT THREE LOCALITIES IN THE GULF OF MEXICO.

PANAMA CITY, FLORIDA

The loggerhead (Caretta caretta), Green (Chelonia mydas), Kemp's ridley (Lepidochelys kempi), and leatherback (Dermochelys coriacea) have all been reported to occur in the marine habitat adjacent to Panama City. The most common resident species found here is the loggerhead, followed by the highly migratory leatherback. The green, primarily a tropical species, is much less abundant, as is the Kemp's ridley because of it's depleted status and preference for mud bottom, crab-rich habitats elsewhere in the northern gulf.

All of the loggerheads found in the coastal habitat are either adults or older subadults, with the exception of the small hatchlings transiting the nearshore waters from the nesting beach to the pelagic zone. The leatherbacks are represented by adult-sized individuals, or adults, in all of the areas being discussed here. Whereas, only the early life stages, or juveniles of the coastal benthic green and Kemp's ridley are found in local waters. The loggerhead is the only species that nests on local beaches and only a few individuals nest every year. There is a single documented nesting of a green turtle in recent years from the Fort Walton area (Eglin, AFB) west of here, and a three-decade-old record of a leatherback that nested between Panama City and Destin to the west. No ridleys have ever been observed nesting here nor in the entire eastern Gulf of Mexico. However, a nesting event was recorded at St. Petersburg Beach, Florida, two years ago. No significance could be attached to this rare and unusual event.

Of the four species of sea turtles that occur in this area, only one, the loggerhead could be considered a resident. All of its major life stages are found here, but they are nowhere abundant as they are along the Atlantic Coast. Nesting females are attracted to the miles of relatively undeveloped [illegible] and high energy beaches. Emerging hatchlings find suitable conditions and currents for dispersal into the pelagic zone and away from coastal predators.

The adult and subadult loggerheads find suitable forage in a large variety of invertebrates such as mollusks, crustaceans, echinoderms and coelenterates. Live-bottom habitats, limestone outcrops, many man-made reefs and wrecks provide sleeping or loafing sites throughout the area. This temperate dwelling species is more tolerant of cooler temperatures, but does exhibit a response to low temperatures by moving offshore to deeper, warmer water in the winter months. On the east coast of Florida, winter dormancy has been observed to occur when water temperatures drop to 15 degrees Celsius or lower.

The adult leatherback is a highly migratory and pelagic species that does frequent coastal waters feeding on vast numbers of drifting scyphozoans (jellyfish), their primary prey species. Although this species nests in tropical regions throughout its world-wide range, it apparently has a greater tolerance of colder waters than the loggerhead. Foraging migrations commonly occur as far north as Canada. Feeding aggregations are a frequent occurrence in the nearshore and offshore

waters of this area. They even have been observed within the St. Andrews Bay system. These factors and the near oceanic characteristics of the coastal waters make the Panama City area an attractive habitat for this species.

Only the small juvenile life stages of the post-pelagic green turtle and Kemp's ridley have been reported from these coastal waters. However, a single adult male green turtle was captured by a shrimp trawler offshore Cape San Blas at a depth of about 30 meters. Despite the occasional adult, the small green turtles are utilizing this area as a developmental habitat, foraging on the abundant sea grasses within the bay system. The coastal benthic Kemp's ridley is apparently a transient in this immediate area, moving to and from developmental habitats that have an abundance of their preferred food, portunid crabs (swimming crabs).

As for the posthatchling pelagic life stages of all the above species, we can only assume that some representatives of each species are present at one time or another offshore Panama City. This cryptic oceanic life stage has been called the "lost year". The loggerhead and Kemp's ridley, two species that nest in the northern part of the gulf, are the species most likely to be found in this habitat. The very few records of posthatchling turtles are for loggerheads in the northeastern Gulf of Mexico.

The seasonality of all species that occur here are poorly understood. In general terms, the adult and older subadult loggerhead, is a year-round resident. The leatherback is a seasonal migrant that moves inshore in the early spring and summer foraging on the abundance of scyphozoans driven shoreward by the prevailing strong southerly winds. Juvenile greens and Kemp's ridleys are present in the shallower nearshore waters during the warmer months of the year. They may move offshore to depths of about 30 meters with the onset of cold frontal systems that develop in the fall and in response to decreasing water temperatures. Sometimes these turtles become either cold-stunned or killed when caught in shallow water bays during a rapidly moving cold front and persistent low temperatures.

CORPUS CHRISTI, TEXAS

Five species of sea turtles have been reported from the Corpus Christi area. They are, in order of abundance, the loggerhead, leatherback, green, Kemp's ridley, and hawksbill (Eretmochelys imbricata). At the turn of the century green turtles were abundant enough to support a commercial fishery and cannery. The fishery collapsed after a series of severe winters that occurred in the late 1800's. The green turtle apparently was less tolerant of these low temperatures it encountered at the northern limits of its range. Except for the resident foraging population of adult and subadult loggerheads, all the other species are either migratory, rare occurrences, or in a temporary developmental habitat represented only by juvenile life stages. The leatherback would be categorized as a foraging migrant, the hawksbill as a rare species represented by posthatchlings and juveniles. The Kemp's ridley would be classified as an adult migrant, moving through area to and from the nesting beaches, or as a post-pelagic benthic juvenile moving into a coastal developmental habitat.

The green would also be classified as a benthic juvenile foraging on the sea grasses within the bay system.

Because of the limited nesting activity in Texas for all species, posthatchlings transiting shelf waters are not expected to be commonly encountered (headstarted ridleys would be an exception). However, posthatchlings originating from other nesting beaches may be driven onto the shelf and into nearshore waters (and stranded on beaches) by strong currents and winds that develop from hurricanes or tropical depressions.

Texas may not provide a suitable marine environment for the survival of posthatchlings emerging from the miles of undeveloped beaches. Therefore, incipient colonization by natural occurring nesters, or by artificial propagation, may not be successful in the long-term. Therefore, an assessment would be that these waters only provide for a foraging habitat or migratory route for the above named species.

An abundance of forage items for the loggerhead exists off the coast. In addition to mollusks and crustaceans, these loggerheads are feeding heavily on sea pens, a soft coral.

The seasonality of occurrences of the leatherback is linked with the abundance of its preferred forage item(s). The latter, primarily scyphozoans, are widely distributed but become concentrated along the coastline into dense assemblages by prevailing current systems. With the advent of southerly winds in the spring and summer, we can expect to see leatherbacks in the nearshore environment.

Adult and subadult loggerheads most likely move offshore in response to cold water temperatures. Whether or not they become dormant and hibernate in deeper troughs or man-made channels during winter months is not known.

For Kemp's ridley, an annual nester, the few surviving adults would be expected to move through the area along the coast in the early spring (April-May) to nest at Rancho Nuevo, Mexico. They would then return as they finished their multiple nesting activities and return to their foraging grounds off east Texas, Louisiana and Mississippi in June-July. This species is at such low population levels, that interference or adverse impacts on these few migrating individuals could prevent the recovery of this species.

KEY WEST, FLORIDA

The loggerhead and green are the most common sea turtles in the Key West area. The leatherback has been observed north of the proposed test site between Cape Sable and Naples. Because of the shallow reef-studded bottom around Key West, its movements are probably restricted to the deeper channels and "drop-offs". The loggerhead is a common inhabitant, as is the green, and these are the species of major concern here. Little information on the hawksbill is available, but the occasional individual could probably be seen around the reefs. Kemp's ridley, surprisingly, has not been reported from the Keys with the exception of two recapture records several years ago of females tagged at Rancho Nuevo, Mexico.

No recent recaptures have been reported. However, juveniles have been reported from the northern portion of Florida Bay, Sandy Key, and the western mangrove shoreline of Everglades National Park.

The life stages of all the species listed from this area are similar to the other sites in Florida and Texas. These are adult and subadult loggerheads, newly emerged loggerhead hatchlings transiting the shoal waters of the Keys, adult-sized leatherbacks, and juvenile green turtles.

The Keys provide an abundance of foraging habitats for the carnivorous loggerhead and herbivorous green turtle. The leatherback finds suitable upper water column grazing on the jellyfish fauna in deeper surrounding waters, and the few hawksbills find reefs well populated with sponges, their primary forage item. Apparently, the mud bottom, crab-rich habitat is lacking in the Keys and the Kemp's ridley does not descend from more northern areas adjacent the continental land mass to these primarily reefal communities.

Seasonality changes would not be as noticeable here as in the other two northern localities because of the moderate temperatures. However, a more dramatic change does occur with the adult loggerhead population every spring. The annual event in late April-early May is part of the mass nesting assemblage that congregates, off Florida's east coast. The Keys become a staging area for reproductively active loggerheads from the Gulf and perhaps the Caribbean. As the season progresses, breeding pairs and solitary individuals move northward along the outer shelf break of the Keys to the Florida mainland. It may be a rather short-time event, lasting one or two weeks. Returning turtles disperse at the nesting beaches after the breeding-nesting season is over in August, but the route back is not known. Point-to-point tagging-recapture data of the female portion of this breeding assemblage documents the fact that these migrations do occur, however.

For the juvenile greens, the Keys are obviously a very important developmental habitat with the mature life stages being found in the Caribbean area. The greens are especially abundant in the shoal waters and submarine seagrass pastures of Florida Bay, the Dry Tortugas, and along the main chain of the Keys.

DISCUSSION, A SUMMARY OF THE SALIENT FEATURES OF EACH LOCALITY.

PANAMA CITY, FLORIDA

Sea turtle activity in coastal waters moderate. Resident adult and subadult loggerhead most conspicuous sea turtle. Offshore movements in response to frontal systems in fall and winter. Large leatherbacks can occur in nearshore waters, including the lower bay system, in late winter through summer, primarily. Occurrences associated with southerly winds and an abundance of scyphozoans (jellyfish).

CORPUS CHRISTI, TEXAS

Sea turtle activity in coastal waters moderate. Resident foraging adult and subadult loggerheads most common species. Occasional leatherbacks move inshore to feed on scyphozoans. The most important consideration is the precarious status of the Kemp's ridley population. Adult ridleys migrate through the area in April through May and again in June through July, on the way to and from their rookery in Mexico. Extreme caution should be exercised to avoid any harassment or mortality as each individual adult has become an irreplacable reproductive unit necessary for the survival of the species.

KEY WEST, FLORIDA

Adult and subadult loggerheads most common species in immediate areas of the Keys. Juvenile greens are a close second. The loggerhead migration route to nesting beaches on the east coast of Florida is channeled through the Keys during April and May every year. Lower Keys may be a "staging" area of importance to the Gulf of Mexico and Caribbean foraging populations for the loggerhead.

Year-round occupancy of shallow marine seagrass pastures and adjacent reefal resting/shelter areas are important to a large population of juvenile greens.

COMMENTS ON THE PRELIMINARY PROGRESS REPORT, JAMES DOBBIN ASSOCIATES, INC., JANUARY 11, 1991.

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New data concludes that numbers or Kemp's ridley females calculated from nest counts of total breeding population were over- estimated. Current figures re-calculated using a higher figure for nests/season/female reduced early population estimate by about 50 percent. The new figure is approximately 360+ female Kemp's ridley nesting at Rancho Nuevo.

Barrier islands of Louisiana may have been important at one time (up to the 1960s), but continued erosion and subsidence of these dynamic structures may preclude any nesting in the future. Also, heavy shrimping has taken it's toll of sea turtles in surrounding waters.

The northeastern Gulf of Mexico, particularly St. Vincent, St. George, and Dog Island have the most important nesting beaches.

Historical records and recent surveys do not indicate that Texas beaches are important nesting areas. Less than 3 to 5 Kemp's ridley are reported to have nested each year. Loggerheads are a little more common, but not significantly so. Loggerheads are considered to benthic carnivor .s, not omnivorous.

Posthatchling refers to that life stage spent at sea and encompasses the period between hatching, including the pelagic stage, before migrating to the coastal zone. The coastal life stage is sometimes referred to as post-pelagic, for the first few months or so.

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There is no evidence that supports a statement that says Kemp's ridley is common in the Keys per se. Ridleys prefer mud bottom, crab-rich habitats, not reefal communities.

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There has never been a documented nesting of a Kemp's ridley in the eastern Gulf of Mexico. A single recent exception was an unusual nesting event reported from St. Petersburg Beach two years age.

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The importance of every surviving adult Kemp's ridley cannot be overstressed. Successful recovery of this species is now dependent on every single reproductive unit remaining in the population.

Protection of the coastal migratory route of this species through the Corpus Christi area in April through May and June through July is essential.

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Keys are an important staging area for reproductively active loggerheads from wide ranging foraging grounds in the gulf and Caribbean.

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The near-oceanic quality of the coastal waters and the abundance of scyphozoans provide an attractive habitat for leatherbacks from late winter to early spring through summer.

(NOTE: Several years ago during the summer, USNCSC conducted experimental mid-water explosive tests, approximately 12 miles offshore, at a depth of 120 feet. Three leatherbacks were impacted adversely; one died and the other two obviously injured and behaved abnormally. One was hemorrhaging from nares indicating possible lung damage. (Per. comm Project Report by William Tolbert, 1981).