Species Status Assessment

Common Name: Kemp's ridley turtle **Date Updated:** September 2024

Scientific Name: *Lepidochelys kempii* **Updated by:** Katherine Lawson

Class: Reptilia

Family: Cheloniidae

Species Synopsis *(a short paragraph which describes species taxonomy, distribution, recent trends, and habitat in New York):*

The Kemp's ridley turtle is the smallest of the sea turtles. First named *Thalassochelys kempii* by Samuel Garman in 1880, the Kemp's ridley was named after a fisherman who submitted the type specimen from Key West, Florida (NMFS et al. 2011). When it was determined that the Kemp's ridley and olive ridley (*Lepidochelys olivacea*) were cogeneric, Kemp's ridleys were renamed as *Lepidochelys kempii.* Occasionally, the species name is spelled *kempi.* Some consider Kemp's ridley to be a subspecies of the olive ridley, but this view is generally not supported in the scientific community, and Pritchard (1969, 1989) determined that there was enough morphological evidence to support the notion that Kemp's ridleys are a separate species. Genetic evidence also supports this designation (Bowen et al. 1991).

The Kemp's ridley sea turtle experienced declines throughout its range from the 1940s to 1980s (NMFS et al. 2011). After the implementation of many conservation efforts, most populations appear to be stable or increasing currently (NMFS et al. 2011). Trends are usually derived from nesting beaches. New York appears to be an important foraging ground for juvenile Kemp's ridleys aged 2-5 (Sadove and Cardinale 1993, Morreale and Standora 1998). Sadove and Cardinale (1993) estimated that 100-300 juvenile Kemp's ridleys used New York waters each year between June and October. An increasing amount of individuals have been found cold-stunned during the winter since 2020 (Montello 2023).

I. Status

a. Current legal protected Status

i. **Federal:** Endangered **Candidate:** N/A

ii. **New York:** Endangered

b. Natural Heritage Program

i. **Global:** G1

ii. **New York:** S1N **Tracked by NYNHP?:** Yes

Other Ranks:

-IUCN Red List: Critically Endangered

Northeast Regional SGCN: RSGCN

-CITES Appendix I

Status Discussion:

The Kemp's ridley was first listed under the Endangered Species Conservation Act in 1970, and subsequently under the Endangered Species Act in 1970. In the U.S., the National Marine Fisheries Service (NMFS) and U.S. Fish and Wildlife Service (USFWS) have joint responsibility.

Since the Kemp's ridley is highly migratory, it is protected under several international treaties, including the Convention on Migratory Species, Specially Protected Areas and Wildlife Protocol of the Cartagena Convention, and the Inter-American Convention for the Protection and Conservation of Sea Turtles.

NMFS and USFWS have been working with the Mexican government to establish a bi-national recovery plan (2nd revision released in 2011). The Kemp's ridley has been protected in Mexico since the 1960s, and a complete ban on the take of any sea turtle was established in 1990. The Rancho Nuevo nesting beach was protected in 1977, and it was designated a National Protected Area in 2002.

II. Abundance and Distribution Trends

Region	Present?	Abundance	Distribution	Time Frame	Listing status	SGCN?
North America	Yes	Increasing	Unknown	Mid 1980s-2011		-
Northeastern US	Yes	Increasing	Unknown			-
New York	Yes	Unknown	Unknown		Endangered	Yes
Connecticut	Yes	Declining	Unknown		Endangered	Yes
Massachusetts	Yes	Unknown	Unknown		Endangered	Yes
New Jersey	Yes	Unknown	Unknown		Endangered	Yes
Pennsylvania	No	-	-			-
Vermont	No	-	-			-
Ontario	No	-	-			-
Quebec	No	-	-			-

Column options
Present?: Yes; No; Unknown; No data; (blank) or Choose an Item
Abundance and Distribution: Declining; Increasing; Stable; Unknown; Extirpated; N/A; (blank) or Choose an item
SGCN?: Yes; No; Unknown; (blank) or Choose an item

Monitoring in New York *(specify any monitoring activities or regular surveys that are conducted in New York):*

The main New York monitoring program for the species is entanglement and stranding response provided by NY Marine Rescue Center d/b/a The Riverhead Foundation and the Atlantic Marine Conservation Society (AMSEAS). Satellite tags were placed on a total of 12 Kemp's ridley sea turtles that were rehabilitated after being cold stunned between 2007-2015. Nine of these individuals migrated south after being tagged, exhibiting expected movement patterns after being rehabilitated. This data also supports that rehabilitated individuals occupy similar habitats to non-rehabilitated individuals and exhibit typical diving behavior once released back into the wild (Robinson et al. 2020). Stranding responders in New York report turtle response data periodically to the NOAA Sea Turtle Stranding and Salvage Network (STSSN 2024).

The NYSDEC and Tetra Tech organized aerial surveys, targeted to capture large whale species, in the NY Bight in 2017-2020. Sea turtles were also opportunistically sighted during these surveys. Due to the small size of the Kemp's ridley sea turtles, it is almost impossible to confidentially confirm this species while in the air, compared to the larger species such as loggerheads and leatherback sea turtles. Because of this, sea turtles are often grouped into an unidentified sea turtle group during these surveys. During the 3 years of the surveys, only 1 Kemp's Ridley was identified and 424 sightings of 503 individuals were grouped into this unidentified category. Sea turtle sightings were highest during the summer followed by the fall and lowest during the spring and winter months (Tetra Tech and LGL 2020). NYSDEC also runs a citizen science program to collect sea turtle sightings from the public called Flipper Files. The New York State Energy Research & Development Authority (NYSERDA) ran aerial surveys from 2016-2019 prepared by Normandeau inc. that included data on sea turtle abundance (NYSERDA 2021). From 2016-2019, 64 Kemp's Ridley were recorded from aerial transects, though approximately 300 additional turtles were not able to be identified to species (NYSERDA 2021). The New York State Department of State (NYSDOS) prepared an Offshore Atlantic Ocean Study in 2013 that modelled sea turtle abundance in New York based off of the North Atlantic Right Whale Consortium database, which details shipboard survey observations from 1978-2011 (NYSDOS 2013). The OBIS-SEAMAP database reports sighting records from a number of compiled sources, including AMAPPS, (AMAPPS III 2021), NYSERDA, Robinson (et al. 2020), New York Aerial Surveys, and more.

Due to the long-distance migratory behavior of sea turtles, sea turtles are also surveyed by regional research programs that include New York State waters. The Atlantic Marine Assessment Program for Protected Species (AMAPPS), a multi-agency effort to survey protected species run jointly by NOAA, NMFS, BOEM, and the U.S. Navy, runs aerial surveys in New York waters. AMAPPS III (2020-2024) is currently running observations that include New York Waters (NEFSC and SEFSC 2021). The U.S. Navy has developed a spatial density model for sea turtles off the Atlantic Coast that predicts monthly sea turtle presence in the Mid-Atlantic and elsewhere. The model applies a novel approach to using unspecific, hard-shell sightings in mapping (Sparks and DiMatteo 2023).

Trends Discussion *(insert map of North American/regional distribution and status):*

The Kemp's ridley turtle experienced a major decline from the 1940s to the 1980s throughout its range (NMFS et al. 2011). Most of the current trend information comes from nest counts at nesting beaches. Estimates of turtles at foraging grounds are unavailable throughout most of their range, as these estimates are more difficult and expensive to perform in comparison to surveys of nesting beaches.

The majority of Kemp's ridley nesting occurs in Tamaulipas, Mexico. One primary nesting beach, Rancho Nuevo in Mexico, had an estimated 40,000 nesting females in 1947 (Carr 1963), though this number continues to be updated (Bevan et al. 2016). The lowest nest count of this beach was 702 nests in 1985, which likely represented less than 300 females (NMFS et al. 2011). Since the mid-1980s, the number of nests in this area has increased by about 15% each year (Heppell et al. 2005). In 2009, over 20,000 nests were observed, although this number dropped to just over 13,000 in 2010 (NMFS et al. 2011). In 2014, nearly 11,000 nests were observed in the primary nesting sites in Mexico, representing about 4,400 nesting females (NMFS and USFWS 2015). Each year, numerous nests are protected by being relocated to a corral to prevent predation, harvest and inundation. As the population grows, the proportion of protected nests will likely decrease, and thus the growth rate could slow (Heppell et al. 2005).

In the U.S., the majority of Kemp's ridley nests are found along the Texas coast. Over 900 nests were documented in Texas from 2002 – 2010, compared to 81 nests observed from 1948-2001 (Shaver and Caillouet 1998; Shaver 2005). Estimates for the Northwest Atlantic Regional Management Unit, a genetically distinct subpopulation, show an increasing trend in the number of Kemp's ridley sea turtle nesting sites (Mazaris et al. 2017) and the Texas nesting population segment was found to increase by over 280 individuals between 1979 and 2017 (Valdivia et al. 2019).

In the early 2000s, population growth models predicted that the population should continue to grow at a rate of at least 12-16% (possibly as high as 19%), each year if survival rates remained constant (Heppell et al. 2005, NMFS et al. 2011). Based on these models, the NMFS et al. (2011) Bi-National Recovery Plan estimated that the Kemp's ridley population could reach the down-listing criterion of 10,000 nesting females in a season by 2011, and could reach the delisting criterion of an average of 40,000 nesting females per season over a 6-year period by 2024. However, this prediction was not met by the 2015 NOAA 5-Year Review, which saw only 4,400 nesting females on Mexican priority beaches (NMFS and USFWS 2015), highlighting the need for ongoing conservation. Low survival levels in adult and sub-adult females may have caused declines in the 2010s (NMFS and USFWS 2015), but additional research is needed. Many possible sources of declines have been suggested, including the 2010 British Petroleum Deepwater Horizon oil spill, shrimp trawling, density-dependent mortality of juveniles, other environmental changes, or simple nesting oscillation patterns (NMFS and USFWS 2015; Caillouet 2019). Moreover, true population size and downlisting and delisting criteria continue to be amended and debated (e.g. Bevan et al. 2016; Caillouet & Gallaway 2024).

Figure 1. Kemp's ridley sea turtle range (NOAA 2024)

Figure 2. Kemp's ridley sea turtle distribution (NMFS 2007).

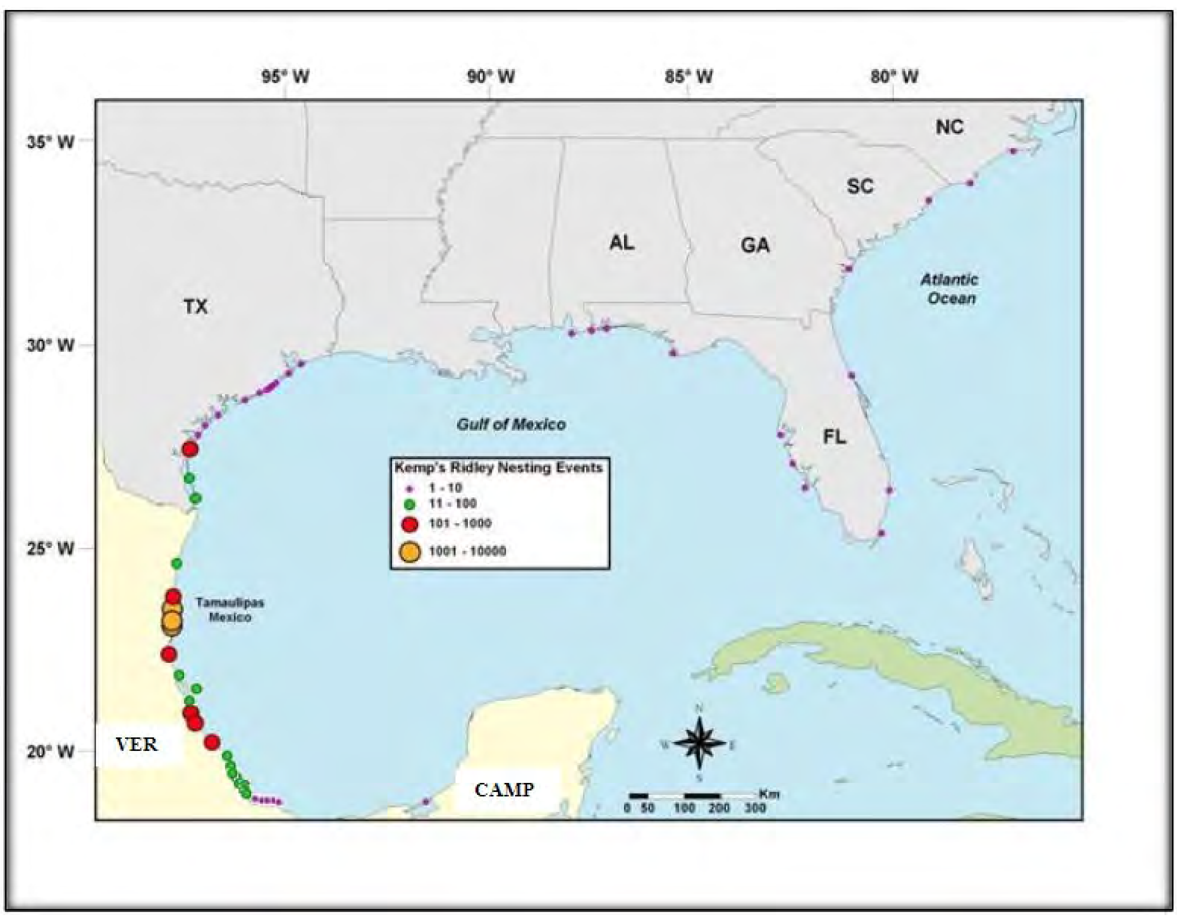

Figure 3. Major nesting beaches of Kemp's ridley sea turtles (NMFS and USFWS 2015)

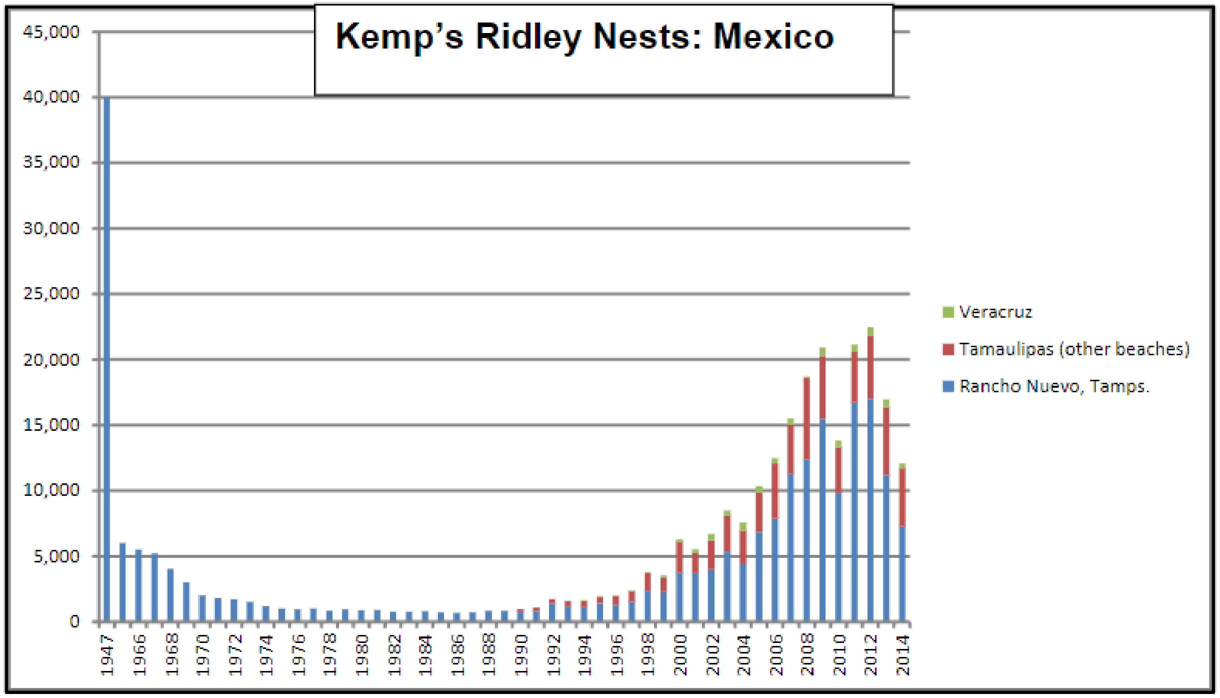

Figure 4. The total number of nests recorded at Tamaulipas (Rancho Nuevo and adjacent beaches) and Veracruz, Mexico, from 1947-2014. Prior to 1988 only Rancho Nuevo was surveyed. Playa Dos was added in 1988 and Tepehuajes in 1996 (NMFS and USFWS 2015).

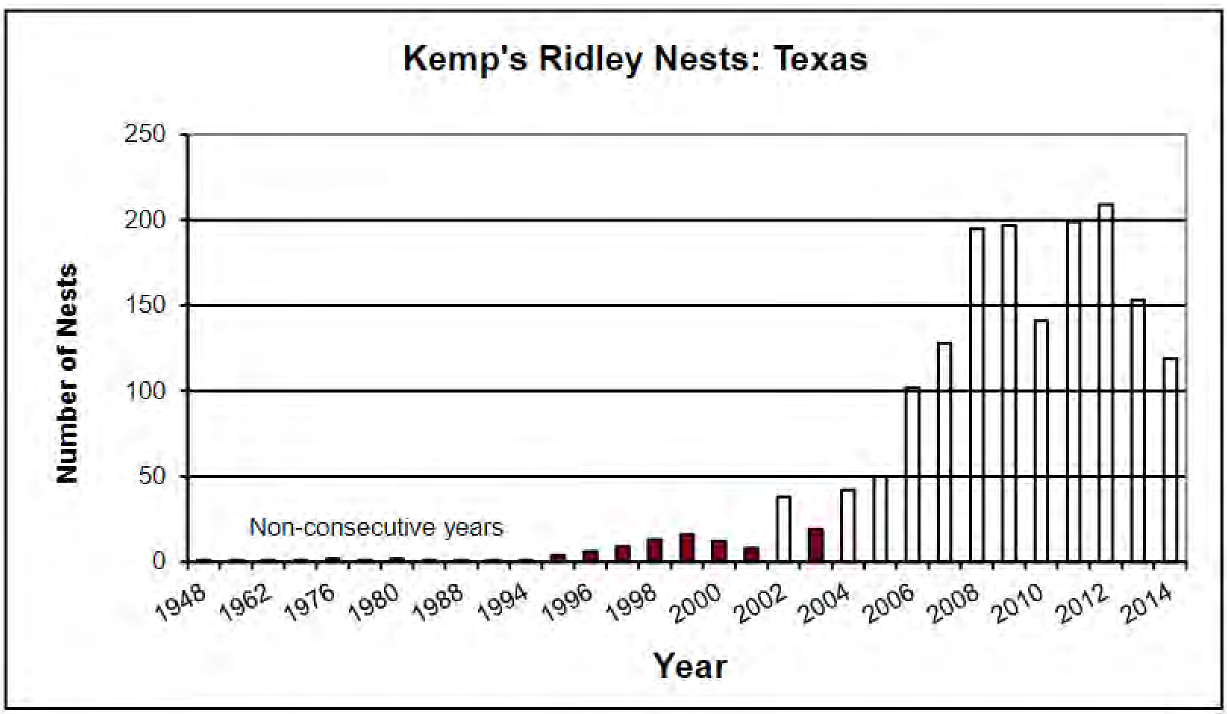

Figure 5. The total number of nests recorded at PAIS, Texas, from 1948-2014 (D. Shaver, PAIS, personal communication 2015) (NMFS and USFWS 2015).

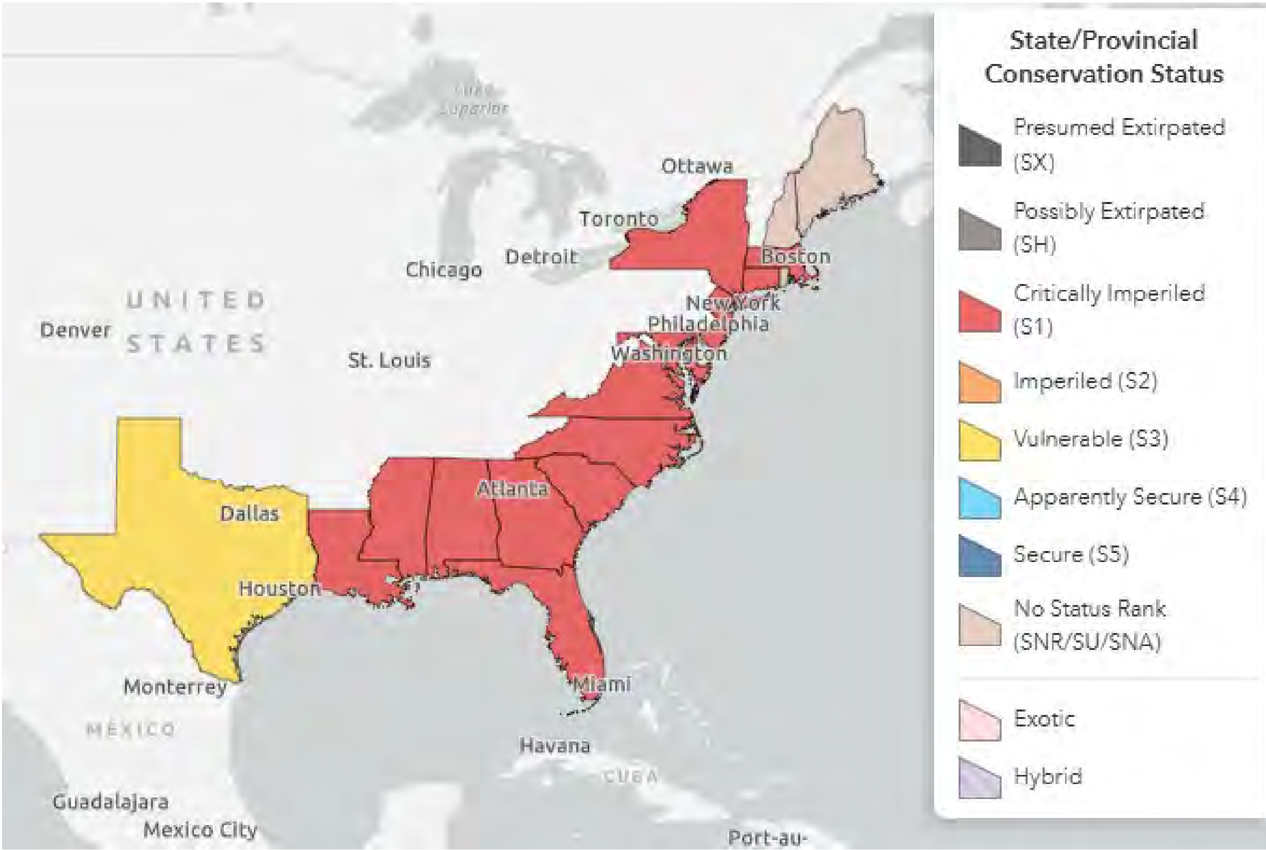

Figure 6. Conservation status of Kemp's Ridley sea turtle in North America (NatureServe2024).

III. New York Rarity *(provide map, numbers, and percent of state occupied)*

No recent population estimates have been calculated for Kemp's Ridley migrants in New York, but observational data is available (Figure 7 and 8). In stranding data reported to STSSN (Figure 9), Kemp's Ridley sea turtle strandings increased from 2015 to 2023.

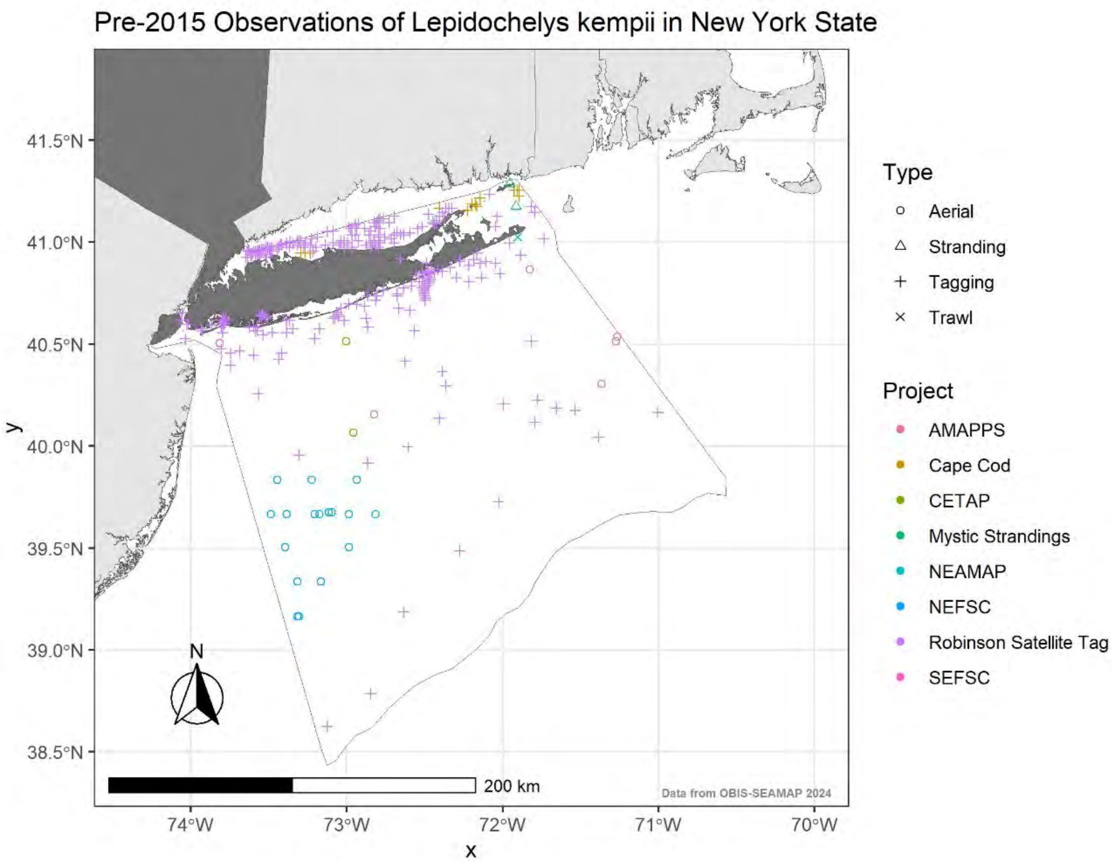

Figure 7. Observation of Kemp's ridley sea turtles reported to OBIS-SEAMAP prior to 2015 (OBIS-SEAMAP 2024). Project data included from Atlantic Marine Assessment Program for Protected Species (AMAPPS), Cape Cod Sea Turtle Release Program (Mergio 2024), Cetacean and Turtle Assessment Program (CETAP), Mystic Aquarium Stranding Data (Smith 2014), Northeast Area Monitoring and Assessment Program (NEAMAP), Northeast Fisheries Science Center (NEFSC), Robinson et al. (2020), and Southeast Fisheries Science Center (SEFSC). Figure prepared by NYNHP.

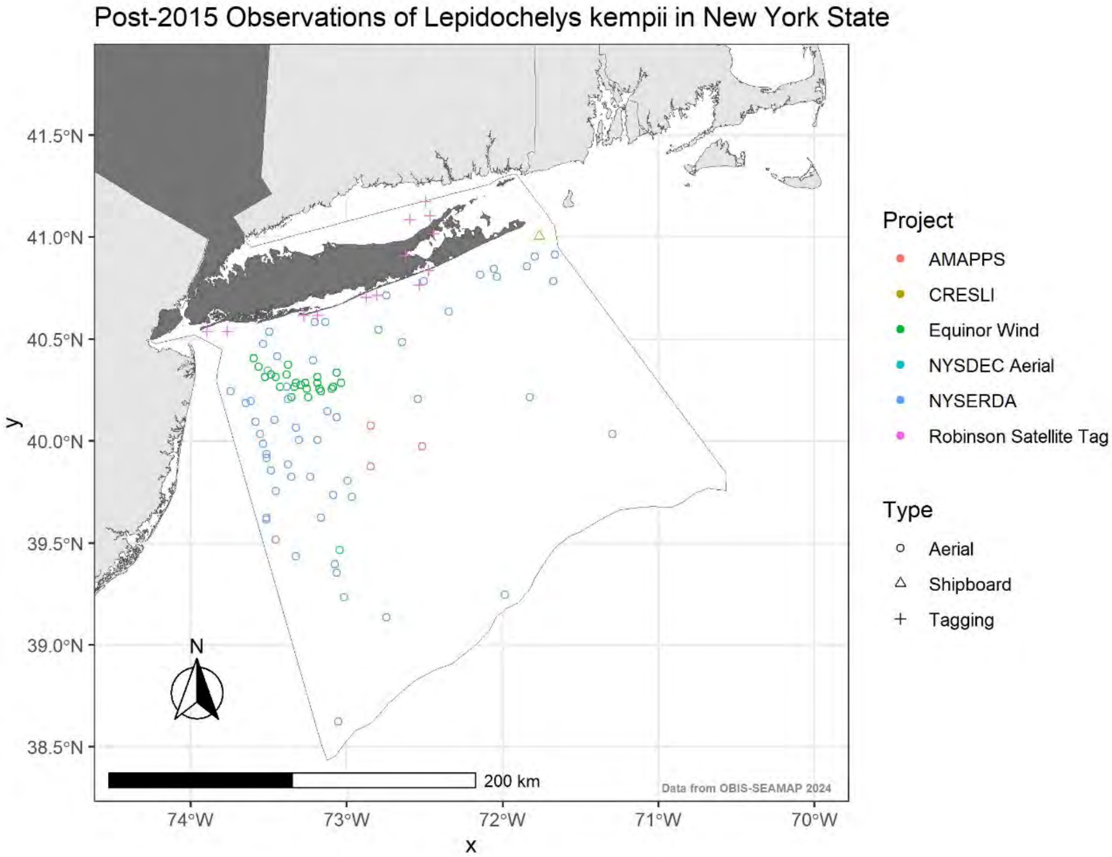

Figure 8. Observation of Kemp's ridley sea turtles reported to OBIS-SEAMAP after 2015 (OBIS-SEAMAP 2024). Project data included from Atlantic Marine Assessment Program for Protected Species (AMAPPS), Coastal Research and Education Society of Long Island (CRESLI), Equinor Wind Project, New York State Division of Environmental Conservation Aerial Surveys (NYSDEC), and New York State Energy Research and Development Authority (NYSERDA), and Robinson et al. (2020). Figure Prepared by NYNHP.

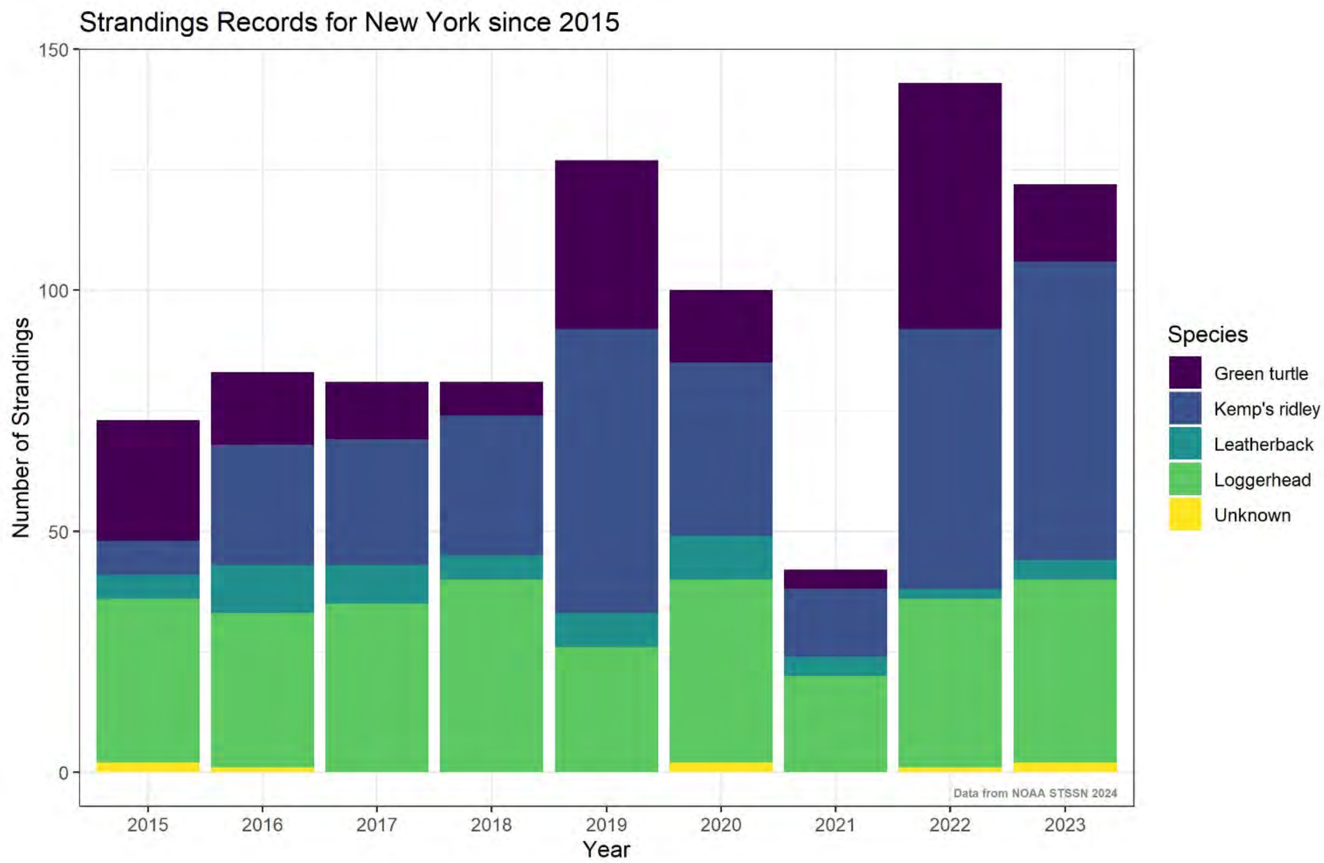

Figure 9. New York sea turtle strandings reported to NOAA Sea Turtle Stranding and Salvage Network (STSSN 2024), including data from NY Marine Rescue Center and the Atlantic Marine Conservation Society. Figure prepared by NYNHP.

Details of historic and current occurrence:

Sadove and Cardinale (1993) estimated 100 – 300 juvenile Kemp's ridley turtles using the New York Bight region based on mark-recapture studies done from 1987 – 1992.

Using data submitted to OBIS-SEAMAP (2024), records post 2005 can be estimated from Aerial and Shipboard based projects. OBIS-SEAMAP was founded in 2002, and compiles data from many sources. The sampling effort and data submission is dependent on each individual project, so may represent an incomplete representation of records and species distribution (See Figure 10). These observations were geographically filtered within the area described by the New York Ocean Action Plan (Figure 7). The increase in records could be reflective of an increase in effort post 2015, for example, NYSERDA and NYSDEC Aerial survey efforts began after 2015 (Figure 11). For the period 2005 – 2014, aerial and shipboard projects reported only 5 Kemp's ridley sea turtles, and for 2015 – 2023, it has records of 85 sea turtles.

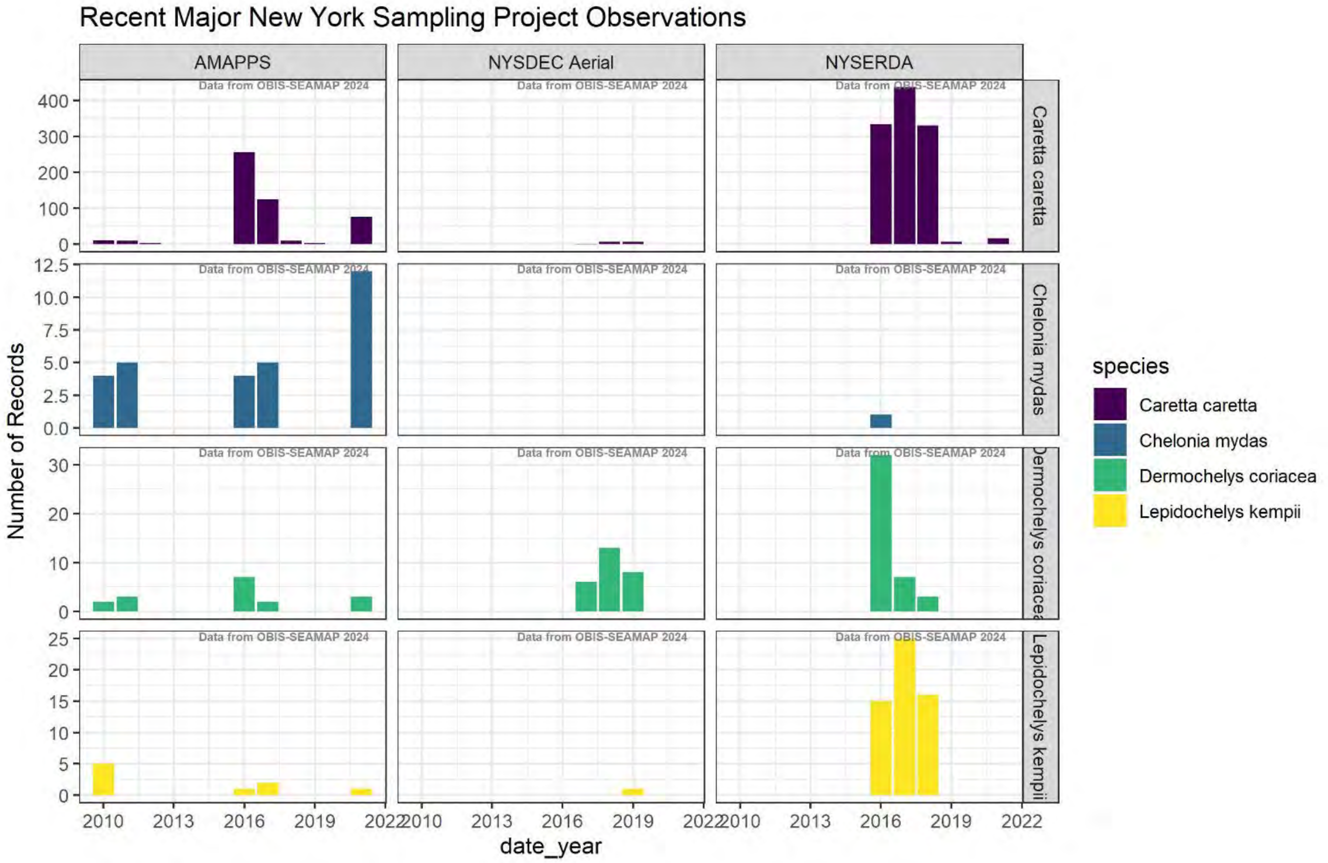

Figure 10. An example of biased record data for different years of sampling due to important survey project start dates. Only AMAPPS collected data prior to 2015, and NYSERDA was able to capture high numbers of sea turtles compared to AMAPPS during years they overlapped. Figure prepared by NYNHP.

New York's Contribution to Species North American Range:

Unknown for New York. Recent abundance estimates are not available.

Percent of North American Range in NY	Classification of NY Range	Distance to core population, if not in NY
1-25%	Peripheral	

Column options
Percent of North American Range in NY: 100% (endemic); 76-99%; 51-75%; 26-50%; 1-25%; 0%; Choose an item
Classification of NY Range: Core; Peripheral; Disjunct; (blank) or Choose an item

Kemp's ridley turtles are found with some regularity from June – October in the New York Bight (Sadove and Cardinale 1993, Morreale and Standora 1998). Mark-recapture from 1987 – 1992 indicate that around 100 – 300 juvenile Kemp's ridley turtles use the region each summer. It appears that the majority of these turtles use New York waters for just one season, and do not return in subsequent years. Each winter, NY Marine Rescue Center responds to cold-stunned Kemp's ridley turtles. In the recent years there has been an increase in the number of cold stunned turtles in NY, with the majority of the individuals being Kemp's ridley and green sea turtles (Montello 2023). Morreale and Standora (1998) documented two Kemp's ridleys that were found cold-stunned in subsequent years, but did not ever document a Kemp's ridley that was tagged during the summer and found cold-stunned the subsequent winter. It is generally believed that those individuals that are found cold-stunned are migrating from more northern foraging grounds (Morreale and Standora 1998).

IV. Primary Habitat or Community Type *(from NY crosswalk of NE Aquatic, Marine, or Terrestrial Habitat Classification Systems):*

a. Marine, Deep Subtidal, Marine Eelgrass Community, Estuarine, Brackish Shallow Subtidal, Aquatic Bed/Benthic Geomorphology, Brackish Deep Subtidal

b. Pelagic

Habitat or Community Type Trend in New York

Habitat Specialist?	Indicator Species?	Habitat/ Community Trend	Time frame of Decline/Increase
No	Yes	Unknown	

Column options
Habitat Specialist and Indicator Species: Yes; No; Unknown; (blank) or Choose an item
Habitat/Community Trend: Declining; Stable; Increasing; Unknown; (blank) or Choose an item

Habitat Discussion:

Kemp's ridley turtles nest on sandy, high-energy oceanic beaches. Hatchlings are carried by the currents; most remain in the Gulf of Mexico and may be associated with the *Sargassum* community. Most likely remain within the Gulf of Mexico, with some being transported into the Northwest Atlantic via the Gulf Stream (Collard and Ogren 1990, Putman et al. 2010). After two years, juveniles recruit to neritic benthic habitat (NMFS et al. 2011). It is this stage that is found in New York waters. While present in the neritic environment, Kemp's ridleys have been documented in a large variety of benthic substrates, including sandy bottoms (Morreale and Standora 1992), seagrass beds (Carr and Caldwell 1956, Byles 1988, Danton and Prescott 1988, Schmid and Barichivich 2005, 2006), mud bottoms (Ogren 1989, Schmid 1998), or some combination of these (Ogren 1989, Rudloe et al. 1991).

In New York, juveniles 2-5 years of age with a carapace length of ~27 cm can be found in certain areas within Long Island Sound, Block Island Sound, Gardiners Bay and the Peconic Estuary. These seem to be the most important habitats for juvenile Kemp's ridleys in New York; they are also found in some number in Jamaica Bay, lower New York harbor and Great South Bay (Sadove and Cardinale 1993). They are found in New York waters from June through October, and cold-stunned individuals are found occasionally during the winter.

There are similar foraging areas that extend from New England south to Florida for Kemp's ridleys that are recruited into the Northwest Atlantic. Many are found in estuarine habitats. In general, the farther south the foraging area is, the larger the average size of Kemp's ridleys utilizing the area (Carr 1980, Henwood and Ogren 1987). Whether this is because the turtles are older or just exhibit higher growth rates is unknown (Snover 2002).

Each winter, juveniles migrate from foraging areas to overwintering areas. Once turtles migrate past Cape Hatteras, North Carolina, some move offshore into the warmer waters of the Gulf Stream, and some continue as far as Cape Canaveral, Florida to overwinter. Those that do continue to Florida primarily use hard bottom substrate and live bottom habitat to overwinter (Gitschlag 1996, Schmid and Witzell 2006). During spring, Kemp's ridleys migrate back north (Henwood and Ogren 1987, Schmid 1995), although there has not been any evidence to indicate that the same individuals are returning to New York waters each year (Morreale and Standora 1998).

Kemp's ridleys originally tagged as juveniles off the Atlantic Coast have been documented using the Rancho Nuevo nesting beach (Schmid 1995; Chaloupka and Zug 1997; Schmid and Witzell 1997, Schmid and Woodhead 2000). Nesting also occurs in Veracruz, Mexico; Texas; and occasionally in North Carolina, South Carolina and Florida (NMFS et al. 2011). In July of 2018, a nest was found in Queens, NY in the Gateway National Recreation Area. 96 hatchlings were released and this was the first record of a Kemp's ridley sea turtle nesting and depositing eggs in NY (Rafferty et al. 2019). The majority of adults are found in the Gulf of Mexico (USFWS and NMFS 1992). They are primarily found in nearshore waters that are 37 m or less (NMFS et al. 2011). Females establish residency seasonally in waters surrounding the Yucatan Peninsula and the northern Gulf of Mexico (NMFS et al. 2011). Habitat use by males is poorly understood, although they appear to remain primarily in nearshore waters (Shaver 2006a, 2007, Shaver et al. 2005b).

V. Species Demographics and Life History

Breeder in NY?	Non-breeder in NY?	Migratory Only?	Summer Resident?	Winter Resident?	Anadromous/ Catadromous?
Choose an item.	Yes	Choose an item.	Yes	Choose an item.	Choose an item.

Column options

First 5 fields: Yes; No; Unknown; (blank) or Choose an item

Anadromous/Catadromous: Anadromous; Catadromous; (blank) or Choose an item

Species Demographics and Life History Discussion *(include information about species life span, reproductive longevity, reproductive capacity, age to maturity, and ability to disperse and colonize):*

Actual life span has not been documented but is estimated to be at least 30 years. Kemp's ridley turtles are believed to reach sexual maturity between 10 and 16 years of age (Chaloupka and Zug 1997; Schmid and Witzell 1997; Zug et al. 1997; Schmid and Woodhead 2000). Kemp's ridley turtles display a synchronized nesting habit known as an "arribada." Large groups of turtles will gather at a nesting beach, and waves of females will come ashore to nest. The triggers of an arribada are currently unknown (NMFS et al. 2011). The only confirmed Kemp's ridley arribada occurs in Tamaulipas, Mexico. Nearly 95% of the total worldwide Kemp's ridley nesting occurs in this state, concentrated mainly on three beaches: Rancho Nuevo, Tepehaujes, and Barra del Tordo (NMFS et al. 2011). Kemp's ridley turtles all belong to a single genetic population, unlike other sea turtle species (Wibbels & Bevan 2019).

The nesting season is from April to July. Females nest two to three times per season, with an inter-nesting interval of two to three weeks (Miller 1997; NMFS et al. 2011). Around 100 eggs are deposited in each nest. The average remigration interval is two years, although intervals of one and three years also occur. There is some thought that males are not reproductively active every year (Wibbels et al. 1991).

The sex of hatchlings is determined by incubation temperature, with eggs incubated above a critical temperature being females, and eggs incubated below a critical temperature being males (Mrosovsky 1994; Wibbels 2003). Eggs that are relocated to corrals display a strong female bias, with about 76% of hatchlings from 1998 – 2006 being females (NMFS et al. 2011). From 2001 – 2006, over 60% of hatchlings from nests left in place were females (NMFS et al. 2011). A female-bias is also seen in juveniles, although it is less pronounced than the hatchling bias (Gregory and Schmid 2001; Witzell et al. 2005; Coyne and Landry 2007). See Habitat Discussion for information on dispersal capabilities and movement information. Kemp's ridleys tagged in New York have been tracked to waters off the southeastern U.S., including the coastal waters of North and South Carolina (Morreale and Standora 1989, 1998).

Egg survival has been estimated to be around 0.678 based on data from Rancho Nuevo 1992 – 2003 (NMFS et al. 2011). All hatchlings that emerge within the corrals are released directly into the water, whereas a lower percentage of hatchlings from *in situ* nests survive the trek to the water. Monitoring of 3,000 *in situ* nests in 2007 determined an emergence success of around 80%, and 66% of hatchlings reached the water (NMFS et al. 2011).

Survival rates of other life stages are poorly understood and difficult to estimate. Annual survival was estimated to be 0.61 for benthic immatures from 2 – 5 years of age (TEWG 2000; Heppell et al. 2005). Heppell et al. (2005) used an age-based model to fit nest numbers at Rancho Nuevo, Tepehaujes and Playa Dos from 1978 – 2003 to estimate survival of different life stages. The model suggested an annual survival rate of 0.31 for pelagic immatures and 0.91 for large benthic immatures and adults (Heppell et al. 2005). This model was updated by the Kemp's Ridley Recovery Team (NMFS et al. 2011) to determine survival rates from 1997 – 2009. The survival rate of hatchlings and pelagic-stage immatures was estimated to be 0.318; the survival rate of neritic juveniles age 2 – 5 was estimated to be 0.815 (NMFS et al. 2011). The survival rate of large juveniles and adults was estimated to be 0.935 (NMFS et al. 2011). However, recent declines in nesting populations suggest that juvenile and adult survival has changed post 2010.

Raccoons, dogs, pigs, skunks, badgers, gulls, coyotes, ghost crabs and ants are known to prey upon eggs and/or hatchlings. In Rancho Nuevo, 88 nests were left *in situ* with no predator protection during the 2003-2004 nesting season. 73 of these nests were depredated and eight were poached (NMFS et al. 2011). The relocation of about 90% of nests in Mexico to corrals has drastically reduced predation. Domestic animals are believed to take around 5% of nests in Rancho Nuevo and Play Dos-Barra del Tordo (NMFS et al. 2011). As the population increases and a smaller proportion of nests are relocated into corrals, predation is expected to increase (NMFS et al. 2011).

Density-dependent pathogens are known to effect nesting success of olive ridleys (Mo 1988). Whether the same phenomenon will be observed in Kemp's ridleys as nesting density increases is currently unknown (NMFS et al. 2011). Severe storms can destroy nests and affect egg and hatchling survival.

Large fish and sharks are known to prey upon hatchling and juvenile Kemp's ridleys (NMFS et al. 2011). 159 juvenile to adult Kemp's ridleys that stranded from 1980 – 2006 had evidence of shark attacks, although whether the bites occurred pre- or post-mortem was unknown in most instances (NMFS et al. 2011). Red tides appear to have some effect on Kemp's ridleys, 59 stranded in "apparent association with red tide occurrence" from 1991 – 2001 (STSSN).

A number of diseases have been documented in sea turtles. Fungal infestations leading to systemic mycoses have been found in cold-stunned Kemp's ridleys (Manire et al. 2001) and also can cause mortality in captive-reared Kemp's ridleys (Leong et al. 1989). Endoparasites such as trematodes, tapeworms, and nematodes can lead to mortality in sea turtles. Leeches and barnacles also may contribute to mortality in Kemp's ridleys (Herbst and Jacobson 1995, George 1997). Fibropapillomatosis (FP), a disease that causes the growth of tumors and skin lesions is believed to have been documented in Kemp's ridley turtles (Barragan and Sarti 1994; Guillen and Pena Villalobos 2000). FP causes the growth of tumors that can block the vision in turtles and lead to decreased swimming and foraging capabilities (Herbst 1994).

Sea turtles are vulnerable to dramatic changes in temperature. While most turtles are believed to migrate out of New York waters in late summer (Morreale and Standora 1998), some may be feeding in shallow waters and still be in the area when water temperatures drop significantly. When this happens, sea turtles can fall victim to a process known as cold-stunning. This is a hypothermic state that can result in the turtle drifting at sea in a lethargic state. Cold-stunning often results in mortality, unless the turtles wash ashore and are rescued by stranding groups.

VI. Threats *(from NY 2015 SWAP or newly described)*

One of the major threats to sea turtle populations in New York is fisheries interactions. Sea turtles can become trapped in pound nets, longline fisheries, trap fisheries, trawl fisheries, dredges, purse seines and gill nets. Turtles trapped in gear can drown or suffer serious injuries as a result of constriction by lines (NMFS et al. 2011). Additionally, turtles can be hooked by longline gear, which can cause injury and reduced feeding capabilities. Trawlers that are not outfitted with Turtle Excluder Devices (TEDs) can entrap and drown sea turtles. Additionally, dredges can destroy habitat and crush or entrap sea turtles (NMFS et al. 2011). In New York, Morreale and Standora (1998) reported that commercial fisherman were responsible for 84% of all 317 live turtles captured in a mark-recapture study from 1987 – 1992. 93% of these captures were in pound nets; sea turtles were also caught in trawls and entangled in lobster pot lines and gill nets (Morreale and Standora 1998).

Climate change is believed to have major effects on sea turtles throughout their range. Extreme temperature changes could lead to increased numbers of cold-stunned sea turtles; it is also possible that changing temperatures could lead to conditions that are more favorable for sea turtles. There have been a record high number of cold-stunned sea turtles found the past couple of winter throughout the Northeast; it is believed that this could be a result of climate change (M. Montello, pers. comm.). Between 1998 and 2019, 279 Kemp's ridley sea turtles have been cold-stunned in New York state waters, with an increase in the number of strandings in later years (Montello et al. 2022). In 2023, Kemp's ridley were the most commonly found cold-stunned turtle in New York. Typically, cold-stunned turtles are recovered in New York between November and December (Montello et al. 2022). Of the 94 cold-stunned sea turtles that NY Marine Rescue Center responded to in the 2022/2023 season, 43 were Kemp's ridley turtles. Models of increasing sea surface temperatures in the Northeastern United States was associated with higher predicted levels of Kemp's ridley sea turtle cold-stunning, suggesting an increase in the importance and instances of this threat in the future (Griffin et al. 2019).

Additionally, climate change is believed to be associated with rising water temperatures, as well as changes in ice cover, salinity, oxygen levels and circulation (IPCC 2007). These changes are likely to cause shifts in range and abundance of different species of algae, plankton and fish (IPCC 2007). These shifts could alter the suitability of New York habitat (as well as habitat in other parts of sea turtles' ranges) for occupancy by sea turtles. Changing currents as a result of climate change could affect sea turtle migration and survival of oceanic-stage juveniles (NMFS et al. 2011).

Climate change could have significant effects on Kemp's ridley turtles in other parts of their range as well. More nests could be destroyed as a result of the increasing abundance and severity of storms along the nesting range. Rising sea levels could cause major problems on low-lying nesting beaches. Additionally, there is concern that rising temperatures could skew hatchling sex ratios towards a strong female bias (NMFS et al. 2011).

Coastal development can lead to destruction or degradation of sea turtle foraging habitat. Noise produced during construction could have negative behavioral and physiological effects on sea turtles, and increased vessel traffic can lead to exclusion from foraging areas or increased collision rates (NMFS et al. 2011). The construction of seawalls, rock revetments, groins, jetties, and other beach armoring mechanisms degrades sea turtle nesting habitat and increases erosion in certain areas of the beaches (NMFS et al. 2011). Additionally, bright lighting near beaches can disorient hatchlings, and cause them to move towards the light rather than the ocean (Ehrhart 1983; Mann

1977; McFarlane 1963; Philibosian 1976). This misorientation can lead to increased risk from predators, entrapment in vegetation, dessication, and being hit by vehicles (NMFS et al. 2011). Increased human presence on nesting beaches can lead to egg and hatchling mortality from beach vehicles, beach cleaning, and recreational beach equipment. Nesting females may also alter their behavior in areas of high human presence (NMFS et al. 2011).

Sea turtles may occasionally be hit by vessels, which can cause mortality and severe injury. About 13% of turtles that stranded from 1997 – 2001 had evidence of ship strikes, although it was not possible to determine whether the collisions occurred pre- or post-mortem in most instances (NMFS et al. 2011). From 1996 – 2000, 128 nesting females in the three major nesting beaches in Mexico had evidence of propeller scarring (Witzell and Schmid 2004). It is likely that sea turtles are struck by vessels more often than reported. It is also possible that increased boat traffic may exclude Kemp's ridleys from foraging areas. Sea turtles are also occasionally taken into the intake canal of power plants, where they can drown (NMFS et al. 2011). With a recent increase in boat traffic, NY has seen more human interactions between vessels and all species of sea turtles (Montello personal communication).

Persistent chlorinated hydrocarbons, heavy metals, and organic contaminants have been found in Kemp's ridley turtles (NMFS et al. 2011). The effect of most of these contaminants on Kemp's ridleys is currently unknown, but there is concern that elevated levels could lead to immunosuppression and chronic health problems (NMFS et al. 2011). Keller et al. (2004) found correlations between organochlorine contaminants and changes in immune function, possible liver damage, and changes in protein and carbohydrate regulation. There is some evidence that contaminants bioaccumulate in Kemp's ridleys (Orvik 1997), and also that female marine turtles offload contaminants to eggs (McKenzie et al. 1999). Finally, juvenile sea turtles can experience biointoxication from harmful algae blooms which may cause mortality.

The Gulf of Mexico, which supports a large proportion of the Kemp's ridley population, is an area of high-density offshore oil exploration and extraction (NMFS et al. 2011). Oil spills are known to directly affect marine turtles (Yender and Mearns 2003), and can lead to immunosuppression and chronic health issues (Sindermann et al. 1982; Lutcavage et al. 1997). Oil spills can affect nesting success and hatchling survival, with the potential for eggs and hatchlings to become oiled. Additionally, nesting females may crawl through oil on beaches, avoid oiled beaches, or be blocked from nesting areas by oil barriers used in spill response (Milton et al. 2003; NMFS et al. 2011). There is the potential that Kemp's ridleys could be impacted by a degradation of water quality from operational discharges of oil extraction (NMFS et al. 2011).

Sea turtles could ingest or become entangled in marine debris, which can reduce food intake and digestive capacity and cause injury or mortality (Bjorndal et al. 1994; Sako and Horikoshi 2002). There is also the potential that sea turtles could absorb toxins in the ingested debris (Balazs 1985). Kemp's ridleys have ingested plastic, rubber, fishing line and hooks, tar, string, Styrofoam, epoxy and aluminum (Shaver 1991; Werner 1994). Generally, ingestion of debris is not believed to be as much of a problem for Kemp's ridleys as for other species of sea turtles (Bjorndal et al. 1994; Witzell and Schmid 2005).

The effects of anthropogenic noise on sea turtles are poorly understood. Studies have shown that sea turtles exposed to certain levels of low frequency sound may spend more time at the surface and/or move out of the area (Lenhardt et al. 1983, O'Hara and Wilcox 1990). Samuel et al. (2005) found elevated noise levels, primarily from boat traffic, in the Peconic Bay Estuary system in New York during the sea turtle activity season. They suggest that continued exposure to these sound levels could potentially lead to behavioral effects on sea turtles using the area (Samuel et al. 2005). The authors also suggest that similar sound levels should be expected in other coastal foraging and nesting areas. Sea turtles have been found to change swimming patterns and orientation in response to air guns, which are frequently used in oil and gas exploration (O’Hara and Wilcox 1990). The impact of anthropogenic noise on sea turtles requires future research, but surveyed experts report a belief that seismic surveys could pose a threat to turtles (Nelms et al. 2016).

Threat Level 1	Threat Level 2	Threat Level 3	Spatial Extent	Severity	Immediacy	Trend	Certainty
1. Residential and Commercial	1.1 Housing & Urban Areas	1.1.1 Dense housing & urban areas (destruction/alteration of nearshore foraging areas from coastal development)	Choose an item.	Choose an item.	Choose an item.	Choose an item.	Choose an item.
1. Residential and Commercial	1.2 Commercial & Industrial Areas	1.2.1 Commercial & industrial areas (destruction/alteration of nearshore foraging areas from coastal development)	Choose an item.	Choose an item.	Choose an item.	Choose an item.	Choose an item.
1. Residential and Commercial	1.3 Tourism & Recreation Areas	-	Choose an item.	Choose an item.	Choose an item.	Choose an item.	Choose an item.
3. Energy Production & Mining	3.1 Oil & Gas Drilling	3.1.2 Offshore oil development (oil spills)	Choose an item.	Choose an item.	Choose an item.	Choose an item.	Choose an item.
4. Transportation & Service Corridors	4.3 Shipping Lanes	4.3.1 Shipping (ship strikes)	Choose an item.	Choose an item.	Choose an item.	Choose an item.	Choose an item.
5. Biological Resource Use	5.4 Fishing & Harvesting Aquatic Resources	5.4.2 Commercial fishing (bycatch and entanglement)	Choose an item.	Choose an item.	Choose an item.	Choose an item.	Choose an item.
6. Human Intrusions & Disturbance	6.1 Recreational Activities	6.1.4 Recreational boating	Choose an item.	Choose an item.	Choose an item.	Choose an item.	Choose an item.
7. Natural System Modifications	7.3 Other Ecosystem Modifications	7.3.1 Shoreline alteration (shoreline stabilization)	Choose an item.	Choose an item.	Choose an item.	Choose an item.	Choose an item.
7. Natural System Modifications	7.3 Other Ecosystem Modifications	7.3.1 Shoreline alteration (sea walls)	Choose an item.	Choose an item.	Choose an item.	Choose an item.	Choose an item.
9. Pollution	9.2 Industrial & Military Effluents	-	Choose an item.	Choose an item.	Choose an item.	Choose an item.	Choose an item.
9. Pollution	9.3 Agricultural & Forestry Effluents	-	Choose an item.	Choose an item.	Choose an item.	Choose an item.	Choose an item.
9. Pollution	9.4 Garbage & Solid Waste	-	Choose an item.	Choose an item.	Choose an item.	Choose an item.	Choose an item.

9. Pollution	9.6 Excess Energy	9.6.3 Noise pollution	Choose an item.	Choose an item.	Choose an item.	Choose an item.	Choose an item.
11. Climate Change	11.1 Habitat Shifting & Alteration	-	Choose an item.	Choose an item.	Choose an item.	Choose an item.	Choose an item.
11. Climate Change	11.3 Changes in Temperature Regimes	11.3.3 Gradual temperature change (cold-stunning)	Choose an item.	Choose an item.	Choose an item.	Choose an item.	Choose an item.

Table 1: Threats to Kemp’s ridley sea turtle.

Are there regulatory mechanisms that protect the species or its habitat in New York?

Yes: ✓ **No:** ____ **Unknown:** ____

If yes, describe mechanism and whether adequate to protect species/habitat:

The Kemps ridley turtle is listed as an endangered species in New York and is protected by Environmental Conservation Law (ECL) section 11-0535 and the New York Code of Rules and Regulations (6 NYCRR Part 182). A permit is required for any proposed project that may result in a take of a species listed as Threatened or Endangered, including, but not limited to, actions that may kill or harm individual animals or result in the adverse modification, degradation or destruction of habitat occupied by the listed species. It is also protected as a federally-listed endangered species.

In addition, Article 17 of the ECL works to limit water pollution, and Article 14 presents the New York Ocean and Great Lakes Ecosystem Conservation Act. This act is responsible for the conservation and restoration of coastal ecosystems “so that they are healthy, productive and resilient and able to deliver the resources people want and need.” Both of these help to protect the habitat of the Kemp’s ridley turtle. Whether they are adequate to protect the habitat is currently unknown.

Describe knowledge of management/conservation actions that are needed for recovery/conservation, or to eliminate, minimize, or compensate for the identified threats:

NY Marine Rescue Center should continue to carry out stranding and entanglement response for sea turtles. The Center rescues and rehabilitates injured and cold-stunned individuals. Before being released, rehabilitated sea turtles are sometimes given a satellite tag, which helps expand our knowledge on movements and habitat use. 12 individuals were released with satellite tags after being rehabilitated and the data showed they acclimated back to the wild quickly after being released (Robinson et al. 2020). At least 177 sea turtles of any species have been released from New York Rescue operators (Innis et al. 2019). Placing PIT tags and/or satellite tags on as many individual turtles as possible will help to further our knowledge on Kemp’s ridley turtle life history. NY Marine Rescue Center already places satellite tags on many rehabbed and released Kemp’s ridleys, and this practice should be encouraged to continue. It is critical to determine where New York Kemp’s ridleys travel to and nest to help reduce the threats to the population during other stages of its life.

Long-term surveys to monitor the population of loggerheads in New York should be implemented. Sea turtle use of state waters was fairly well established by studies throughout the 1980s and 1990s, but not much work has been done in recent years. Monitoring would allow researchers to garner a better idea of population trends and habitat use of this species in the State, and see if shifts in use have occurred. Additionally, further research into the effects of the various threats listed above on the Kemp’s ridley population in the State should be encouraged. Bycatch rates should be closely monitored, and research into reducing these rates would be beneficial.

In a report from the New York Bight Sea Turtle Workshop (Bonacci-Sullivan 2018), the following research and management recommendations were made: 1) Collect baseline data on presence and residence time; 2) Targeted nearshore aerial and vessel surveys; 3) reconsideration of size limits for tagging due to importance of juvenile turtles; 4) Collect information on the impact of the pound net fishery; 5) create a sea turtle nesting response plan; 6) support stranding-response programs; and 7) increase outreach efforts. It was noted in particular that tagging size minimums can result in the reduction of tagging of Kemp's ridley turtles as they tend to be smaller in size than other targeted turtles.

Education on this species and the importance of reporting ship strikes and entanglements is encouraged.

Action Category	Action	Description
B.3 Outreach	B.3.1.4.0 Public outreach and information	Awareness & Communications
C.6 Design and Plan Conservation	C.6.5.0.0 Conservation Planning	Resource and habitat protection

Table 2: Recommended conservation actions for Kemp's ridley sea turtle.

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