the science of | conservation

Companion Guide for:

Sea Turtles: Threats and Solutions

SEA TURTLES IN FLORIDA

Leatherback *(Dermochelys coriacea)*—the largest and most prehistoric of all species. It can grow to be eight feet long and eight feet wide (including flippers). They tend to nest early in the season (April–May in north Florida), and lay 75–80 racquetball-sized eggs in each nest. They do not have a hard, upper shell (or carapace), but rather a soft, leathery covering that feels almost like a wet bouncy ball. They are considered the most prehistoric sea turtle species, breaking off of the sea turtle family tree millions of years before the other species, and the soft covering is evidence of this. They feed solely on jellyfish.

Green *(Chelonia mydas)*—Named for the color of fat for which they are hunted, they grow to be roughly four feet long. They nest later in the season (late July–August in north Florida), and lay 100–125 golf ball-sized eggs in each nest. These turtles can nest 4–5 times per season every 2–3 years. They have a hard, scute-covered carapace that is characteristic of sea turtles. When young, they are carnivores, eating anything that moves, but as they mature, they become vegetarians, feeding on algae and sea grasses.

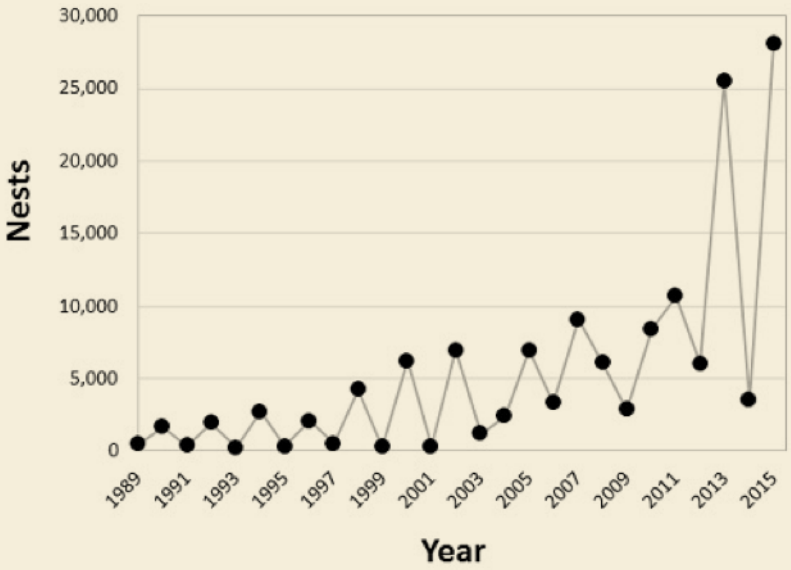
Hawksbill *(Eretmochelys imbricata)*—Named for the pointy, hawk-like beak, these turtles are continually hunted for their hard, beautifully-colored carapace. In Florida, they only nest in the southern part of the state, laying 180–200 golf ball-sized eggs in each nest 2–4 times per season every 2–3 years, and feed primarily on sponges.

Kemp's Ridley *(Lepidochelys kempii)*—The smallest and rarest of all sea turtles throughout the world, these turtles primarily nest in Texas and Mexico, but occasionally 1–2 turtles will nest along the Florida coast. They only nest during the day, unlike all other species of sea turtle who nest under the cover of darkness. They have a hard, scute-covered carapace as well, and their diet is broad consisting of crustaceans, fish, urchins, squid and jellyfish.

Loggerhead *(Caretta caretta)*—Named for their large head, they used their strong jaws to crush through shells and exoskeletons of crabs and mollusks, its main source of food. They nest in the middle of the season (May–July in north Florida), and lay 100–125 golf ball-sized eggs in each nest. These turtles can nest 6–7 times per season every 2–3 years. They have a hard, scute-covered carapace as well.

SEA TURTLE CONSERVANCY

- The oldest sea turtle conservation organization in the world, founded by Dr. Archie Carr, a zoology professor at the University of Florida. www.conserveturtles.org
- 2015 was a record year for green turtle nesting in Florida. A total of 28,088 nests on 26 index nesting beaches.



From: http://myfwc.com/research/wildlife/sea-turtles/nesting/beach-survey-totals/

Figure 1: *Number of Green Sea Turtle nests on Index Nesting Beaches in the state of Florida.*

- Local harvesting of sea turtles by remote communities was sustainable for the sea turtle populations. However, when turtle meat became an international delicacy and demand for it grew around the world, the over-harvesting of turtles started to impact their populations. Florida was a key player in the export of sea turtles around the world. So much so that sea turtle could be found on many restaurant menus throughout the state.
- Endangered Species Act halted the direct harvesting of sea turtles and gave the turtles a chance to rebound their populations.
    - *In 1966, Congress passed the 'Endangered Species Preservation Act' after realizing the quick decline of many of the United States' beloved species. In 1969, an amendment was added to include species in danger of 'worldwide extinction.' The photo used in the video was President Nixon signing this amendment into action, and renaming the Act as the 'Endangered Species Conservation Act.' That 1969 amendment called for a convention of nations across the globe to meet and discuss actions to reduce international trade of wild animals and plants. Those countries met in 1973, and later that year, the 'Endangered Species Act' (ESA) was signed, broadening protection of all threatened species. The Hawksbill, Kemps Ridley and Leatherback turtles were added to the 'Endangered Species Conservation Act' in 1970, and were still protected when the name was changed in 1973 to the 'Endangered Species Act.' The Loggerhead and Green turtles were given protection under the Act in 1978.*
    - *Timeline of ESA 1973: https://www.fws.gov/endangered/laws-policies/timeline.html*
    - *List of protected species and the year they were added: http://www.nmfs.noaa.gov/pr/species/esa/listed.htm#turtles*

- Additional help for the turtles came from Turtle Excluder Devices (TEDs). By 1978, all species of sea turtles that nest in the state of Florida were placed on the list of threatened and endangered species. This prompted action to determine ways to help protect them. Turtles were getting caught in shrimp trawls and drowning, so a device was created that provided an escape hatch for the turtles, while still allowing commercial fishers to catch their fish. This compromise helped lessen the number of turtles killed by fishing nets. http://www.sefsc.noaa.gov/labs/mississippi/ted/history.htm

- 'Turtle safe' lighting also began to be developed as another method to protect nesting females and emerging hatchlings. Sea turtles do not respond to long wavelengths of light (red/amber spectrum), so using these lights along the coast lessens the disturbance of nesting females and emerging hatchlings. Sea turtle hatchlings are attracted to light, which will take them away from the water when they emerge and nesting females are deterred by light, which will keep them from nesting. Florida counties have also instituted 'lights out' programs that require homeowners and businesses along the beach to turn off their white lights during sea turtle nesting season. If caught with a white light, or non-'turtle-safe' light on after dusk, the homeowner will be warned, and multiple offenses may lead to monetary fines.

FLORIDA FISH AND WILDLIFE CONSERVATION COMMISSION (FWC) NESTING PROGRAM *myfwc.com/wildlifehabitats/managed/sea-turtles/*

- The FWC is the state agency that regulates the conservation of animals in the state of Florida by finding compromises that benefit both humans and animals. They use groups that go out and collect data on many species of animals in Florida, including sea turtles. They use the information collected to develop laws and protection mechanisms to regulate interactions between animal and human populations.

- FWC trains and regulates the people that are allowed to work with turtles and nests. Personnel are required to go through training by FWC in the spring of each year in order to monitor sea turtle nests along the beaches in Florida. Each beach has a permit holder, which is the person in charge, that coordinates the schedules of trained personnel that walk each morning looking for nests.

- FWC is also in charge of regulating and enforcing fines and arrests for people who disobey environmental laws, including handling turtles and leaving lights on at night during nesting season.

SEA TURTLE PATROLS

- The primary purpose of the turtle patrols is to provide data for FWC to monitor their populations, and enact and enforce laws and regulations to protect them.

- Every mile of sandy beach in Florida is monitored daily by a group of patrollers searching for nests. Depending on the density of nests, some patrols will document and stake each nest (like in north Florida), while others (mostly in south Florida) will mark every tenth nest because the density is so high

- When we come across a nest, we must complete a checklist (check back for a newer version of this document that has the official checklist attached) and collect vital information including:
    - *Date nest was found*
    - *Species of sea turtle*
    - *GPS location*
    - *House address*
    - *Depth of clutch*
    - *Anything unusual or interesting, such as how she moved along the sand, if she encountered any driftwood, beach chairs, etc.*
    - *Drawing a picture of how she came out of the water and nested.*
    - *Taking, many photos of the nest-marking process.*
- Because turtle nests typically hatch between 50–60 days, when a nest reaches the 45-day incubation mark, we'll mark it with green tape, to keep a close watch on the nest, and look closely for any signs of an emergence.
- After a nest emerges, we document with photos. After 72 hours (3 days), the team will then excavate the nest to determine what exactly happened in the nest. To do this, we categorize what we find into the following categories:
    - ***Hatched eggs****—determined by the number of empty shells.*
    - ***Unhatched eggs****—these are eggs that didn't hatch for various reasons. They may not have been fertilized, i.e. no embryo, or the hatchling may have stopped developing at some point.*
    - ***Live pips****—live turtles that are still in the shell, but have pierced through the shell.*
    - ***Dead pips****—dead turtles that are still in the shell, but pierced through the shell. before dying*
    - ***Live hatchlings****—turtles that came completely out of their shell, but haven't left the nest.*
    - ***Dead hatchlings****—turtles that came completely out of their shell, didn't leave the nest, but died afterward.*
- We wait three days because additional turtles sometimes emerge on successive nights. Not all turtles in a single nest will emerge at once, and we must allow them to emerge on their own as nature intended. Sometimes during the nest excavations/evaluations we encounter live hatchlings. When we do, we release them to continue their trek to the ocean.
- Any time we collect live hatchlings during the nest evaluation, we put them in the bucket to release together when the nest evaluation is complete. We place moist sand in the bottom of the bucket and cover with a towel to simulate (as best we can) the conditions in the nest until they are released.
- Depending on which turtle patrol you speak with, they may have protocols that vary depending on that beach's needs. For example, some beaches may mark nests with orange construction fencing if stray dogs are a problem in the area to discourage them from digging up the eggs.

YEARLY DATA

The approximately 60 day incubation period is illustrated in the 2015 data from the four mile stretch of beach that the Mickler's Landing Turtle Patrol covers. The first nests were documented the first week of May, and the first emergences were documented in early July. The pattern of orange bars (number of emergences) is shifted about two months from the pattern of blue bars (number of nests).

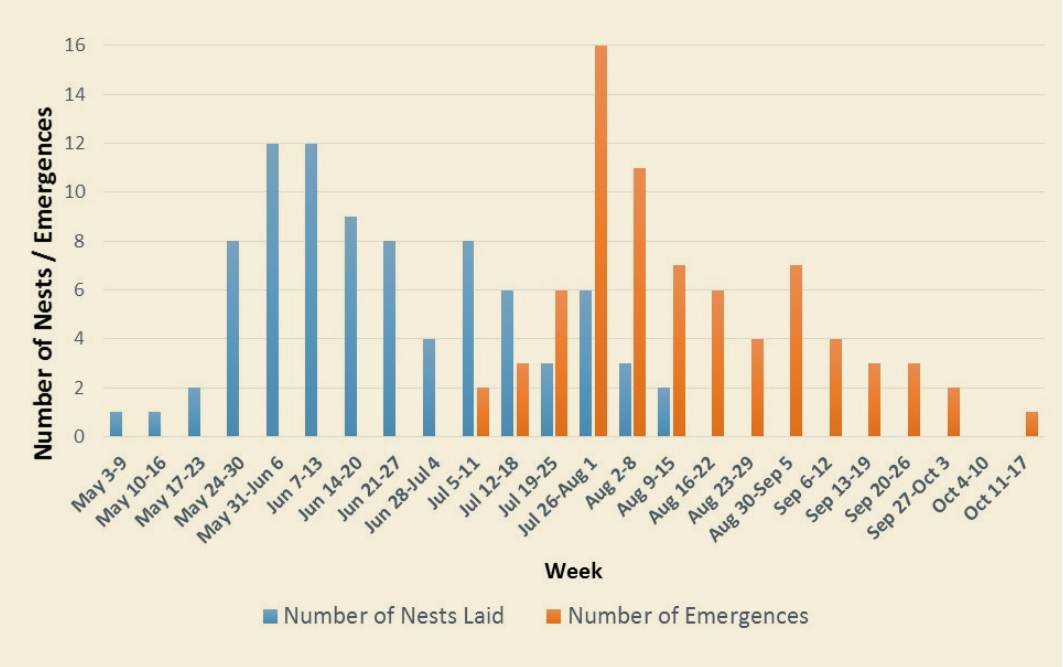


Figure 2: Number of Nests and Emergences per Week in Ponte Vedra Beach, 2015.