



CAYMAN TURTLE CENTRE  
ISLAND WILDLIFE ENCOUNTER

## **CAYMAN TURTLE CENTRE'S** **TURTLE EGG TRANSLOCATION AND NEST IMPLANTATION PROGRAM**

### Historical background

The institution now known as Cayman Turtle Conservation and Education Centre Ltd., trading as Cayman Turtle Centre, began in 1968 as a private enterprise Mariculture Ltd. Since then there have been many milestones in the track record of success of this endeavour to conserve marine turtles by captive breeding, producing turtle meat (to provide a legal, sustainable alternative to illegally poached meat), and releasing captive-bred hatchlings and “head-started” turtles into the wild.

In 1973 the company achieved the world-first successful breeding of marine turtles in captivity: green turtles. In 1984 the company achieved the world-first successful breeding of another marine turtle species in captivity: Kemp’s ridley, as part of a collaboration with conservation authorities in the USA and Mexico.

That same year, the company began releasing “head-started” (one year old) turtles with titanium flipper tags attached, and from 1986 onward those flipper tags were returned from turtles captured in Cuba, Nicaragua, Honduras, USA, Mexico, Belize, and Venezuela, as well as the Cayman Islands. That gave positive proof that our released turtles were surviving and thriving in the wild, several remaining or returning to our islands, and others migrating to help turn around the then-declining populations of green turtles in many parts of the Caribbean basin. Then in the 1990’s the company achieved the second generation of green turtles produced in captivity, confirming the sustainability of the program through multiple generations.

Meanwhile the company had changed hands, first to a family of German investors with a name change to “Cayman Turtle Farm”, and finally in 1983 the Cayman Islands Government purchased it, realizing its importance both to conservation and as a unique tourist attraction.

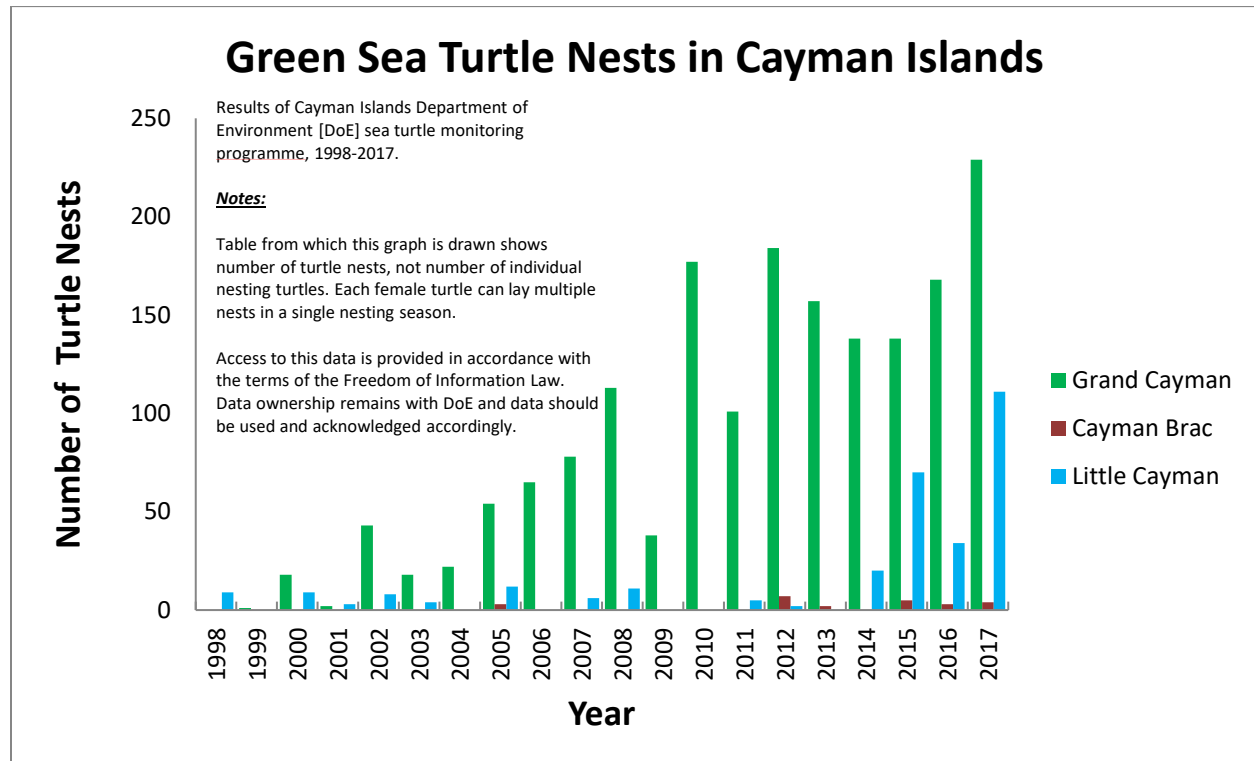
From its initial founding, the company has been engaged in research that benefits captive and wild populations of marine turtles. It remains the only institution of its kind in the world where scientists and students can have access up-close and in person, to captive-bred sea turtles of the full range of ages and life-cycle stages. The company’s conservation and education missions have the opportunity for very broad reach and impact because the company’s site is the most-visited single land-based attraction in the Cayman Islands, and also hosts over two thousand students per year. With over a quarter million visitors each year, it remains consistently popular with tourists arriving both by air and by cruise. The company’s green turtle husbandry provides a reliable source of high-quality turtle meat products, sold at affordable prices, to satisfy the continuing strong local culinary traditions. This availability of farmed meat is proving to be a major contributor to keeping sea turtles in the wild around the Cayman Islands because of its impact in greatly reducing incentives to poach turtles.

Regarding sociocultural sustainability the company is also exemplary: of 105 employees there are only 3 on work permits.

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## Success of Turtle Release Programs

Commencing in 2014, the Cayman Islands Department of Environment, the University of Exeter, and the University of Barcelona conducted studies of socioeconomic and genetic data under the auspices of the UK's Darwin Initiative in a two-part project titled *Socio-Economic Aspects of Sea Turtle Conservation in Cayman Islands*. In brief summary, these scientific studies revealed how important and impactful is our turtle meat production in keeping wild turtles in the wild around our island, and it also revealed that a minimum of 90% of the nesting green turtles in Cayman are attributable to the company's released turtles. This huge accomplishment, finally having clear numerical proof that releasing captive-bred captive-reared head-started and hatchling turtles over the years has made such a positive difference in our marine turtle population, gave us the impetus to expand the scope of our turtle release programs.



## Development of “Turtle Tourism” Initiatives

Commencing in 2016 we set to work on developing a set of “turtle tourism” initiatives involving releases of hatchlings and head-started turtles, thus combining the socioeconomic benefits of adding new experiences to attract visitors to our islands, along with the positive conservation impacts of releasing these turtles to support the wild population:

- Captive-bred egg translocations into tourism property beach nest implantations
- Night-time hatchling releases from beaches near tourism properties
- Daytime hatchling “jump-start” releases in the deep ocean (avoiding near-shore predators), into floating sargassum beds, done from a tourist dive boat
- Tourism property head-started green turtle releases (in 2018 in collaboration with Cayman Airways’ 50<sup>th</sup> Anniversary we expanded this to Cayman Brac and Little Cayman)
- Private sponsored head-started green turtle releases from suitable beaches

## Egg Translocation and Nest Implantation program outline

Because there is no other marine turtle captive breeding facility anywhere else, Cayman is unique in its ability to perform captive-bred egg translocations into nests implanted on beaches in the wild. This program is a way of transferring turtle eggs which have been laid at Cayman Turtle Centre into the wild, by replicating, as carefully as possible, a real-life green turtle nest. None of these eggs are taken from the wild – they have all been laid by captive turtles at the Cayman Turtle Centre, and carefully translocated to the beach where they are placed, one-by-one, in a hole dug in the sand to just the right depth. The actual number of eggs varies, but up to half of the 75-150 eggs in a clutch from a Cayman Turtle Centre nest are translocated to the beach nest. The remaining “sibling” eggs are kept for observation in our hatchery.

By doing this on suitable beaches in front of (or near) tourist accommodation properties around the island, visitors can have what for many is a “once-in-a-lifetime” experience of watching hatchling turtles emerge from their nests in the sand and make their dash down the beach into the sea. Scientists now estimate that only roughly one in a thousand marine turtle hatchlings emerging from a nest will make it to adulthood, with many of the losses most likely occurring in the first minutes, hours or days after their emergence. However various features of the way we do this program help to improve the hatchlings’ chances of surviving this very risky initial phase of their lives.

Each of the three phases of this program provides conservation education opportunities. The egg translocation and nest implantation event takes place in the daytime, so visitors and residents can see turtle eggs up-close and in person, and can observe the careful process of our experts moving them into the nest, during which time there is the opportunity for narration as well as questions-and-answers. The nest site is marked by a ring of wooden poles with an encircling marker rope, and from that we hang interpretive signage that explains various aspects of the nest, the turtles’ lifecycle, and related conservation education, which remain on display for the several days while the eggs complete their incubation period. Then on the night that the hatchlings finally reach the top of the sand to crawl out and down the beach into the sea, there is another opportunity for narration as well as questions-and-answers.

Following is a summary of what is expected at each phase.

### Nest Implantation phase

Our experts will determine the most suitable location on the beach for the nest. The main deciding factors include: minimal lighting impact – or the ability to turn off, obstruct or dim the lighting on the night that the emergence from the nest takes place; distance and elevation from the water’s edge. We already know that the granularity of the beach sand in that area is suitable for turtle nesting.

The implantation will be done on a weekday, during the day. Our experts will bring the eggs from our hatchery in their incubation box at approximately day 50 to 55 (counting days after they were laid). That is one of the time periods during incubation when it is much safer to move the eggs, and to maximise survivability the eggs are kept upright – in the same orientation as they were when they were laid. Our experts will dig the nest hole slightly more than a foot in diameter to a depth between two and three feet, and carefully place the eggs by hand at the bottom of the nest one by one maintaining the correct orientation. It has been found that turtle eggs are sensitive to the levels of moisture in the sand, so they are even provided with a small amount of the sand in which they were originally incubating. Then we carefully continue to cover the eggs and fill the nest hole with the sand taken from the hole.

We mount a protective cordon of short wooden poles in the sand around the nest at a diameter roughly four or five feet with an encircling rope. Around the outside of that circle of poles and extending in parallel to form a path toward the sea, we install plastic edging in the sand as a precaution against early

emergent hatchlings becoming disoriented and crawling away from the sea. A short distance from the nest on the landward side, we will subsequently erect a small portable one-man beach shelter so the Nest Watcher will have shelter in case of rain or mosquitoes.

The setup will be similar to what is shown in the photos below:



### Nest Watching phase

The green turtle eggs typically hatch around day 60, when the hatchlings pierce and pull their pliable shells open and behind them. It will be approximately two to seven more days before the hatchlings slowly make their way together up the column of sand to reach the surface. They will typically wait together, just beneath the sand surface, till the moment one night when they will emerge as a group, within a few minutes of each other, to crawl out onto the sand surface. From day 60 onward, we will have Nest Watchers on duty on shifts, covering from approximately sunset to sunrise. Their task is to watch for signs of sand movement indicating the hatchlings are at or near the surface, and to alert our experts to be on hand for the emergence event which almost always takes place in the dark of night.

### Hatchling Emergence phase



Upon being alerted, one or more of our turtle husbandry experts will come to the site and monitor the progress of the emergence. The period between the first signs of sand movement and the mass “crawl-out” of most of the hatchlings can vary widely: it can be a matter of less than an hour to a few hours as we watch and wait. When the hatchlings finally collectively make their moves to pull themselves up out of the sand and crawl to the sea, typically that is completed for the cohort within 20 minutes or

less, so when that finally occurs it is very exciting and fast-paced!

Sometimes not all the hatchlings come up the same night – occasionally there may be a small number of “stragglers” that come up between one and three nights later. Typically not all the eggs will hatch, so if there are fewer hatchlings than eggs on the first emergence night we leave the protective setup in place for approximately three nights longer in case we need to give any “stragglers” a better chance, before eventually removing the setup from the beach.

### Hatchlings at sea

The hatchlings crawl intently toward the sea guided by instincts that attract them toward light in the shorter wavelength end of the spectrum: they are more sensitive to blue or whitish-blue light, such as starlight and moonlight reflecting from the water surface and the sand in the nearshore shallows, than

they are to red light. In order to avoid disorientation of the hatchlings, it is in the emergence and crawl phases that it is particularly vital to eliminate or minimise artificial illumination from their line of sight other than the soft red lights our experts use if needed.

When each hatchling senses a wave reaching them, they allow it to sweep them down into the sea and then immediately begin their “frenzy swim” phase out through the surf, utilizing the stored energy they have absorbed from their yolk sac. They swim very energetically for the next 24 hours or more, orienting straight into the waves perpendicular to the wave crests, which takes them out toward deeper water where they will be seeking to get into a floating sargassum mat. There are many near-shore birds and fish that prey on hatchlings so the quicker they can get away from the shoreline, shallows and reef environment, the better their chances of survival. The sargassum is habitat for the food they eat at this carnivorous stage of their lives: tiny crustaceans, jellyfish, fish eggs and fish larvae. The sargassum also provides them cover – a place to hide from preying birds above and fish below.

This begins their life in the sea, and typically it will be several years before they return to coastal areas. For green turtles in the wild, it will be two decades or more before they start breeding in Cayman waters and so begin another round of their “circle of life”.

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