

green pages

newsletter of the Department of Environment & Coastal Resources

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MARTIN HAMILTON, REG KEW

The red-orange berries of the Christmas palm provide its namesake by decorating the tree from December to January. Unusual for palms, some of the berries are two or three-seeded.

Oh, Christmas Palm

Helping to ensure the palms are “present” in TCI’s future.

By B. Naqqi Manco, Senior Conservation Officer, Turks & Caicos National Trust
Photos Courtesy Board of Trustees, Royal Botanic Gardens, Kew and TCI National Trust



Call me a Scrooge. I’ve never been big on Christmas. The consumerism, the materialism, the mad rush at supermarkets and stores . . . I’m thankful to live in Kew, North Caicos where the holiday rush means seeing a few banners hung up on telephone poles. I’m normally quite satisfied to not involve myself in the exchange of gifts, but I recently received a Christmas parcel of sorts that

quite pleased me.

The parcel didn’t arrive on Christmas. It was not tied with red ribbons or wrapped in green paper or spangled with sticky bows or glittery snowflakes. It was a tall rectangular cardboard box and glued to its side was a large label in red block letters stating “PLANTS – PERISHABLE.”



In January 2008, the Royal Botanic Gardens at Kew in the United Kingdom sent their Overseas Territories Programme staff to work with the Turks & Caicos National Trust as part of a project to safeguard the native plants of the Turks & Caicos Islands. Paramount in this project was listing all of the plants growing in TCI—native and introduced—and outlining their ranges throughout the country. This data is to be compiled into the IUCN Red Data List for the plants of the Turks & Caicos Islands, which is a botanical conservation reference for the country. Three of Kew’s UK Overseas Territories Programme affiliates, Martin Hamilton, Marcella Corcoran and Stuart Robbins, came to TCI to carry out the work. Also on the agenda was the collection of seeds for Kew’s Millennium Seed Bank, a conservation project of Noah’s Ark sorts, for which the goal is to store at least 10% of the world’s plant species as seed in deep-frozen underground vaults in England. The Seed Bank is a safeguard against extinction of plants in their home countries, and already over 20 of TCI’s plant species are banked as seed in the Seed Bank.

Not all seeds can be banked. One special focus of writing the IUCN Red Data List was to identify populations of rare plants in the TCI, and one of the rarest is a species for which the seeds cannot be banked—they do not respond well to long-term storage, and they do not tolerate freezing temperatures. This plant is one many have seen in landscaping but few have seen in the wild. Various called the Buccaneer palm, the hog plum palm, the wild date palm, here we’ll call it by its most common Turks & Caicos name—the Christmas palm.

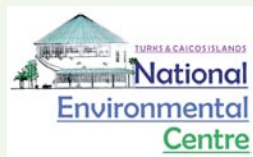
Known to science as *Pseudophoenix sargentii* (literally Sargent’s false date), the Christmas palm is a squat, tough palm with a thick, banded trunk, and foxtail-feathery leaves atop a tightly arranged green stalk. Our Christmas palms are specifically referred to as variety *saonae*, after those growing on Saona Island of Hispaniola, which they most closely resemble. Though the species can grow to over 20 feet high, it rarely exceeds 8 feet in height in TCI. Though it resembles a dwarf version of the Royal palm *Roystonea regia* well known in the swamps of Florida, the Christmas palm



National Trust Sites Steward Judnel “Flash” Blaise shows a mature, fruiting Christmas palm he found in the dense ridge-top scrub of Middle Caicos.

B. NAQOJ MANCO, TCNT

does not grow in rich, lush wet forests as its looks suggest. Instead, it prefers the most unlikely of habitats—the windswept, sun-baked tops of ridges in the Caicos Islands. Growing in areas of nearly no soil amongst cracks in the cap limestone rock of the ridges, these plants depend on their thick trunks to store water in the long periods between meagre times of moist soil. In this habitat where few other plants can grow very large, the stout little palms are able to find their niche as an emergent species in a forest with a four foot high canopy. The Christmas palm is also found throughout the Bahamas in





MARTIN HAMILTON, RBCKEW

The leaflets of the Christmas palm are arranged on four different planes, giving the leaves a bottle-brush, three-dimensional shape.

similar habitats, as well as in the Greater Antilles. The palm meets its northernmost range in the Florida Keys, where the few remaining wild trees are strictly protected in conservation areas.

The Christmas palm was nearly extirpated from its range in the Florida Keys by indiscriminate collection for the ornamental plant trade. The same small root mass that allows it to live in the thin soils of ridge rock also makes it very easy to remove from its habitat and transplant elsewhere. While the palms do transplant well, they are quite slow-growing and the removal of a mature tree from its native ecosystem prevents it from sowing any further seed there. Ridge-top building has further endangered these trees throughout their Bahamian Archipelago range.

Many populations of this palm have become extinct in parts of its range due to unlimited and unmanaged collection for transplanting in landscaping. While the use of native plants in landscaping is admirable, removing such sensitive species from their habitat—wild harvesting—is

not. But the Christmas palm does not have to be removed from its habitat to serve the nursery industry. Each year in late summer, many of the palms produce a structure that resembles a grey-green folded paper fan amongst the lower leaves. This structure opens to reveal hundreds of stiff, waxy, yellow-green flowers with three petals, dripping nectar and attracting bumblebees by day and moths and bats by night. As the flowers get pollinated, they form round, lime-green fruits the size of marbles. By the end of hurricane season in November, many of the palm fruits begin ripening. By Christmas time, most of the trees will be sporting attractive sprays of ruby-red to orange berries, “Christmas balls” decorating the Turks & Caicos Islands’ very own answer to the northern realms’ Christmas trees.

These fruits can be eaten by people (though their taste is not especially pleasing) but they are also eaten by some birds and bats. The palms produce hundreds of fruits on each spray, most single-seeded but some with double or even triple berries containing extra seeds. The



majority of these fruits fall to the ground. The lucky few roll into a crack or fissure in the limestone or into a small soil pocket, where they may get covered with enough organic material for the seed to sprout eventually. Most of the seeds will end up rolling down the ridge into higher scrub, where the sunlight they need to grow is unavailable and where only a very few of these tough little trees will grow.

In January 2008, our team searched the tops of ridges in Middle Caicos to locate populations of these trees in an effort to map their range. When we arrived, the trees were still in their “winters’ dress,” festooned with heavy, drooping sprays of ripe red berries. Recognising that the opportunity to collect seeds was immediate, we carefully mapped each tree with GPS coordinates, collected data about other nearby species, tree height, and stage of reproduction (known botanically as phenology) and collected seeds from several palms. Seed collection ethics dictate that no more than 20% of available seed is collected from a population, so we were careful to be conservative in our collection. This practise is especially important in species such as the Christmas palm, which typically only produce fruit once in a year.

We had to be very careful with the equipment we used as well. Palms are susceptible to a number of viruses, most notably lethal yellowing—the virus that devastates coconut palms. We never use any of our pruners, machetes, or horticultural knives on the palms to collect

specimens—instead we rip or break the leaves by hand. The fruit is hand-picked into new cotton bags. DNA samples were taken from several of the trees, along with their fruit, and these collections were kept separate from one another so the genetic scientists at Kew Gardens could check for variation and difference from other countries’ populations of Christmas palm. After a long day in the field, we returned to the Middle Caicos Conservation Centre with several kilograms of sticky, musky-smelling palm fruit stuffed into red-stained cotton bags.



A stunted Christmas palm growing out of the limestone bedrock on top of a ridge shows how adaptable they are to the thin, ridge-top soils.

MARTIN HAMILTON, RGC KEW



The author collects ripe Christmas palm fruit into a bag for conservation propagation.



MARCELLA CORCORAN, RBG KEW

Pampered by a heated bench and the care of the foremost botanical institution in the world, nearly all of the Christmas palm seeds grew in Kew Gardens' conservation glasshouses.

The next step in the collection process was to remove the seeds from the fruit. Palms often have sticky, mealy fruits that cling tightly to the seed inside, and the Christmas palm must be one of the stickiest and mealiest of all palm fruits. It was National Trust Sites Steward Judnel "Flash" Blaise who discovered that allowing the fruit to dry in the sun for a few days made it rubbery and tough, and it could be scraped off the seed with a paring knife—still difficult and laborious, but far less messy than removing seeds from fresh fruit. Flash spent an hour a day for the next few weeks scraping partially-dried fruit away from seeds—staining his hands red-brown and creating massive piles of scraped dried fruit, which was thoroughly enjoyed by the local village pig. (One of the alternate names for this palm, the hog plum palm, comes from the habit of Bahamians using this fruit to fatten hogs for slaughter for Easter hams.) When the seed had all been cleaned and sorted, parts of the collections, amounting to several hundred seeds, were sent to England for Kew to grow and the remainder were stored in the Middle Caicos Conservation Centre.

In the glasshouses of Kew Gardens, Marcella Corcoran worked with palm specialist Steve Ketley to develop a horticultural protocol of how to best grow the seeds. They were soaked for 48 hours in water, then planted into a coir-sand potting mix about an inch deep (coir is an alternative material to peat moss; it comes from coconut husks and is regarded as more sustainable to use than non-renewable peat). The pots were placed on a heated bench and in six weeks, the first sprouts of the palms began showing through the soil. According to Marcella, after the first shoots appeared, each palm grew its first leaf quickly. Of the several hundred seeds that had been planted, nearly all of them grew.

Some of the palm seedlings were kept by Kew Gardens to incorporate into their collections (in several years, you may be able to visit them in the Palm House or Temperate House) and the rest were prepared for a long trip home. They were carefully removed from their soil, gently washed, and treated with UV light and pesticides to remove all possibly pathogens in a process called phytosanitary certification. The paperwork documenting this certification was sent to the National Trust to present to the Environmental Health Department to verify that no pests or diseases would enter the country with the seedlings. They were then packed in moist, sterile perlite sand and packed into their travel box.

They didn't stay in the travel box for long. Exactly as the Kew team was to return to the TCI to continue work on the Pine Recovery Project (see "Pining Over Extinction," *Times of the Islands* Summer 2007), unforgettable Hurricanes Hanna and Ike were moving toward TCI. The research visit was postponed; the palms were quarantined to keep their phytosanitary status and removed from their travel box to get light. They were watered carefully, as their roots could not get a firm hold in the loose perlite. Finally, the trip was rescheduled and they were inspected, re-packed, and went on their way.

The following day, they were out of their box again. A security breach at Heathrow Airport had caused the Kew team to miss their flight to the TCI, so they angrily returned to Kew where the palm seedlings made their second reappearance in the quarantine house. But the following week, Marcella Corcoran vowed that neither hurricanes nor Heathrow would keep them from getting to TCI, and the palms were unceremoniously carried through customs and back to their ancestral home on Middle Caicos.



This Christmas present was handed to me with a weary sigh and smile by Marcella, satisfied that the seedlings had finally completed their perilous journey despite all odds. The following days, we unpacked the seedlings, planted them in special “palm tubes” and other tall pots to allow their roots to grow deep and strong, and lined them up on our Conservation Centre’s screened porch as their nursery benches and shade lath were built.

As if the palm seedlings hadn’t been through enough, the following morning we found several of them pulled up and cut in half, their tender young trunks chewed up. We figured a rat or mouse must have been eating them, since no insect pest would have been able to uproot them. Our new pine nursery manager Bob McMeekin set a mouse trap, and the following morning, the true identity of the culprit was identified. The mousetrap had been sprung, but was empty—of both bait and mouse—but beside the trap was the neatly cracked-off thumb of the pincher of a Great Blue land crab! A brisk search by the Kew researchers revealed a crab with a missing thumb—irrefutable evidence—and he was exiled from the porch as a punishment for his taste for “hearts of palm!”

After the crab fiasco, we hastened the building of the nursery benches and shade cloth, and moved the 300-some seedlings into their new home. We also began soaking the remainder of the seeds we had stored (well over 400 of them) to grow them in accordance with the horticultural protocol Kew’s experts had written. These palms will take about ten years to mature, but they will be able to be planted out in gardens in as little as two years.

The National Trust will continue to collect seed following the strict protocols to protect the palms and their



Top: Finally unpacked from their travel box and back to their ancestral home, the Christmas palm seedlings grown by RBG Kew await potting up at the Middle Caicos Conservation Centre. **Bottom:** From left: The author, TCNT Administrative Operations Coordinator Jannay Arthur, TCNT Executive Director Ethlyn Gibbs and Pine Nursery and Project Manager Bob McMeekin observe the Christmas palm seedlings in the Middle Caicos Conservation Centre pine nursery.

habitat, and we will hopefully grow many more seedlings in the future. The one and a half to two years it takes to grow the palms large enough to plant in landscaping (so they’re safe from heart-of-palm eating crabs!) makes the timing right for the Christmas palms to be the perfect Christmas present—a present that might get even me to grudgingly budge away from being a Scrooge. ❁

MARCELLA CORCORAN, RBG Kew



A large male Curly-tailed lizard basks atop a Turks Head cactus on Big Ambergris Cay.

Scaling Millennia

What can lizards teach us about TCI's history?

Story & Photos By R. Graham Reynolds

"What's that!", I declare out loud. "Scurrying under the bush?" It is just a blur of scales and flying sand. I crouch down and inch forward toward the buttonwood bush, each movement an exaggerated, slow-motion ordeal that threatens to pitch me off bal-

ance. I ease around the far side, hoping the creature hasn't found a burrow to disappear into. As I reach the shady side of the buttonwood— "Aha!" A small, stout lizard sits motionless in the shade, his beautiful yellow and brown scales revealing his identity.



Easing off my backpack, I reach for my telescoping fishing pole. The fishing line on the end, tied into a slip-knot, has become tangled. I slowly correct the shape of the loop and begin to extend the tip of the pole towards the reposing reptile. The fishing line loop slowly descends over the lizard's head, pitching and yawing in the slight breeze, then down to his shoulders. In a flash, I pull on the pole, the lizard takes off, and the knot tightens securely around his shoulders. I leap to my feet, finally exhaling, bring the catch to my hand and gently release the knot. My first specimen!

My quarry is the handsome, though diminutive, Turks & Caicos Curly-tailed lizard, known scientifically as *Leiocephalus psammotromus*. These small saurians are common in the Turks & Caicos Islands, though this particular species is found nowhere else in the world.

You may have seen these wonderful creatures as you walk about the bush on Provo, but have you ever stopped to watch them? They are constantly exhibiting a complex array of behaviors and are masters of communication. Watch as a male, identified by the yellow and black bars on his shoulders and back, goes about his daily routine. He basks in the sun, alternating between light and shade to maintain a proper body temperature. A female approaches, and he begins to preen. He sidles over towards her, demonstrating his masculinity by bobbing his head and raising up on his front legs. But wait, trouble brews. Another male is approaching! The suitor's head begins to bob vigorously, warning the intruding male that his presence is not welcome. They begin to size each other up from a respectable distance, each eyeing the other and showing how many head bobs and push-ups they can perform before tiring. Meanwhile the female, oblivious to the adolescent machismo, decides to gather a breakfast of small insects and berries. The intruding male takes one step too close, and the resident male explodes after him in a fury, chasing him several meters away.

The resident male returns triumphant only to find his female visitor is more interested in food than his bravado. Just then, a passing bicyclist catches his attention, and he begins to signal that the bicycle is not welcome in his territory. But what a mighty foe! He has no chance against this



MATTHEW MEMILLER



Top: The author uses a telescoping fishing pole to gently capture Curly-tailed lizards on Long Cay.
Bottom: A hatchling Curly-tailed lizard investigates the author's boot during a lunch break on Long Cay.

intruder, and instantly curls his tail up over his back several times in quick succession before beating a hasty retreat to the cover of a bush. Other lizards in the area take note of the curled tail—a sign of imminent danger, and themselves retreat. It's a whole daytime drama happening beneath the bush!

The Turks & Caicos Islands are famous for their special assemblage of beautiful creatures. From flamingoes to coral reefs to iguanas, visitors from all over the world enjoy catching a glimpse of the wildlife that makes the Islands Beautiful by Nature. The Islands are especially endowed with some incredible reptiles, like the iguanas over on Little



MATTHEW NIEMILLER

This young female Curly-tailed lizard watches the author from a rock pile on North Caicos. Her slightly curled tail indicates that she is a bit uncomfortable with the photo session.

Water Cay. On small islands such as these, reptiles reign over the terrestrial fauna. They are particularly well adapted to hot and harsh climates, and in isolation from other islands they have diversified into a kaleidoscope of unique forms.

The Curly-tailed lizards, with relatives throughout the Greater Antilles, are a very conspicuous part of the reptilian fauna. They live on most islands in the Turks & Caicos, but are notably missing from some, such as Grand Turk, Salt Cay, and South Caicos, where long periods of human habitation and their pets have led to the lizards' local demise. While their loss on these islands is regrettable, given enough time many island populations alternately go extinct or are recolonized from neighboring islands.

The Turks & Caicos Islands have undergone some major changes in the last 20,000 years, when the sea level was more than 100 meters lower than today and the Caicos Bank and the Turks Bank were each a single large island. Since that time, rising sea levels have caused the low-lying areas to be flooded, leaving just the former hilltops exposed, which now constitute the Islands as we know them.

The reptiles, marooned on the high ground, have similarly been split asunder into populations on the remaining islands. Occasionally these populations are lost due to hurricanes or any number of chance events. Similarly, these large disturbances may sweep lizards off of islands, where they float or cling to debris in the sea until arriving on a dif-

ferent island. During the recent history of the Turks & Caicos, the Islands have been alternately flooded and exposed multiple times, causing shuffling of individual populations of the Curly-tail lizards. The question is—how many times and how can we tell?

One option is to ask the lizards themselves! Well, OK, not literally, but scientifically. Lizards, like all living things, contain DNA, a biological molecule that carries the blueprints to make living organisms. DNA changes over time, even within and between populations of lizards, such that closely related lizards have similar DNA and distantly related lizards have relatively different DNA. Changes in connectivity of populations of lizards, through time, is recorded by the accumulation of similarities and differences in their DNA, thus tracking the movement of lizards as islands are split and reconnected by rising or falling seawater. So, by looking at certain bits of DNA, we can actually reveal the history of islands, as recorded by lizards! Who would have thought that such small saurians could teach us so much?

As a Ph.D. student and researcher at the University of Tennessee, USA, I have been coming to the Turks & Caicos Islands for the last few years to study the DNA of the Curly-tailed lizards and other reptiles here. My colleagues and I are investigating how islands influence changes in DNA over time, and hence how the history of islands and lizards may be predicted through clever and thorough analysis. By capturing lizards on all the islands where they occur and



taking a small tissue sample (don't worry, it doesn't hurt them!), we can obtain enough DNA to begin to decode the histories in which we are interested.

In addition, we can begin to ask of the DNA some very important conservation questions. For instance, let's say there is an endangered iguana that only lives on a few islands that we hope to protect. If financial and other reasons only allow us to protect one island, what is the chance that the iguana will be safe long-term? We can ask this question of the DNA. First, we see whether the single population has enough genetic diversity to survive long-term. Second, we can look for the recorded history of populations of the iguana in the DNA and determine whether these iguanas are subject to being periodically naturally extinguished from some islands. If this is the case, this species of iguanas as a whole requires that the island that has lost its iguanas be recolonized by a nearby island to ensure overall survival. In a harsh world of low-lying tropical islands, the iguanas might be hedging their bets against local disaster by spreading out on several islands. If we detect this to be the case, then protecting only one island may not be sufficient to ensure the long-term survival of the species.

The perfection of this technique on a common animal such as the Curly-tailed lizard will allow us to extend the

research to endangered animals and to decide what type of protection they need. Once again, the Curly-tail lizards can teach us so much!

It is my hope that when you next encounter a Curly-tailed Lizard, perhaps you might take a moment to ponder the beauty and complexity of the little creature, and to wonder at the wealth of historical information that she carries around inside of her! ☼

R. Graham Reynolds is a Ph.D. student and herpetologist at the University of Tennessee, Knoxville, USA. You may see more of his work on reptile conservation and genetics at the National Environmental Centre on Providenciales.

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Returning visitors . . . again

Photos By Peter Richardson

Back in 2005, we wrote about the amazing migration of Ruddy Turnstones that travel from the Arctic and Chesapeake Bay to our Islands every winter. Highlighted in that article were a couple of Turnstones called NHL and ETH, because it was easy to read the coded letters on their little green leg tag.

This past November, turtle researcher Peter Richardson, down for another visit, saw NHL again, and in the very same place! It seems that NHL and his friends like the Tiki Hut restaurant in Turtle Cove so much



Ruddy Turnstone ETH (as identified by the green band) and company have returned to Turtle Cove from the Arctic and Chesapeake Bay for yet another winter season.

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Turtles in the TCI: working towards a sustainable harvest

By Amdeep Sanghera, Peter Richardson and Tom Stringell
Photos By Peter Richardson

With their extensive coral reefs and vast swathes of sea-grass-covered banks and tidal creeks, the low lying Turks & Caicos Islands provide valuable feeding grounds for large numbers of Green and Hawksbill turtles. Archaeological digs tell us that humans have exploited the Islands' rich turtle bounty for food since the archipelago was first colonised in about 700 AD. After Europeans discovered the Islands in the 15th century, the Taino Indian settlers' subsistence turtle harvest would likely have been replaced by commercial harvests, with turtle meat and shell exported from the TCI right up until the Great Depression in the 1930s.

Nowadays, the economic value of TCI's turtle harvest is relatively unimportant, as most fishers depend on the more lucrative conch and lobster export markets. But despite an apparent decline in the demand for turtle meat, many folk in TCI still like to eat it, especially the sweet-tasting Green turtles. A few fishermen still harvest turtles intentionally to satisfy local demand from restaurants and private customers alike, while many other fishermen opportunistically take turtles if



Hawksbill turtles, often seen soaring effortlessly over TCI's coral reefs, continue to be harvested for food. The sustainability of this harvest will be subject to further study.

they encounter them when fishing for other species. This opportunistic fishing by many fishers can lead to a significant harvest, and recent catch estimates based on fisher interviews suggest that the annual harvest in TCI may be up to approximately 2,000 turtles per year. This could be one of the largest legal turtle harvests in the Caribbean, but because few fishers depend on what is perceived as a largely incidental harvest, this fishery has received little attention, with little effort expended on monitoring or management.

The sustainability of this harvest remains unclear, so this year a new collaborative project to further understand TCI's turtle fishery has been set up by the Department of Environment & Coastal Resources (DECR), the UK's Marine Conservation Society (MCS) and the University of Exeter, with help from the School for Field Studies (SFS) on South Caicos. The new project will work towards a more sustainable approach and aims to engage fishers in the



DECR conservation wardens practice taking measurements on this 135 pound Hawksbill turtle found dead and washed up on a Providenciales beach right after Hurricane Ike.



research, monitoring and eventual management of this traditional fishery. The project will assess the state of TCI's turtle populations and will comprehensively assess the turtle harvest, including biological, economic



This turtle has been weighed, measured and had a small skin sample taken for genetic research. She is about to be released.

and social evaluations. MCS is leading on the social research side of the project, and resource use social scientist Amdeep Sanghera will be based for the next two years in South Caicos as the MCS project field officer. The University of Exeter's Tom Stringwell will be working with the DECR on the biological data collection and analysis, with SFS providing additional support. MCS Ambassadors Anne and Simon Notley are not only funding the project, but will be actively involved, using their boat to access the more remote nesting beaches and foraging grounds.

After two years of fieldwork, the project's findings will be used to recommend detailed amendments to TCI's fishery laws and help the DECR draw up a sustainable turtle fishery management plan. The DECR is keen to collect as much information as possible about TCI's turtles to contribute to the project's findings.

So, if you see turtles at sea, find them washed up dead on a beach, find a turtle nest or witness a turtle being caught and landed, please let the DECR know as soon as possible, as these reports will provide valuable insights into the status and use of one of the TCI's most wonderful natural resources. Contact 649 243 4895. *

Returning visitors (continued)

that they come back to it every year. They're still stealing french fries and have even learned a new trick. They have figured out how to open sugar packets by pecking them with their pointed beak, then inserting their bill inside the hole to spread them open. Oddly, though, they seem to prefer the lo-cal sweeteners to real sugar! It might be that they're attracted to the bright pink and blue packets rather than the plain white or brown ones containing real sugar.

Turnstones are probably the most common shore-bird in the Islands. There is a resident population, but they are joined every winter by thousands more who have made the 4,000 mile trip from their Arctic Canada breeding grounds every year.

Welcome back NHL and all your Canadian friends! Hope TSA didn't make it too rough for you! *



The returning Ruddy Turnstones seem enamoured of Tiki Hut french fries and sweetener packets when they congregate at Turtle Cove. They have made the 4,000 mile flight from their Arctic Canada breeding grounds at least four times.