

# SWOT

report

Volume III


The State of the World's Sea Turtles



**WHERE THE HAWKSBILL'S ARE**

THE TURTLE MOTHER AND OTHER INDIGENOUS TALES  
THE HAZARDS OF PLASTIC | A LEATHERBACK'S LONGEST VOYAGE | AND MORE...



Hawksbills are often seen by divers and snorkelers because of their tendency to swim near coral reefs. © BRIAN SKERRY / NATIONAL GEOGRAPHIC IMAGE COLLECTION 

*“SWOT Report* is not just a magazine  
but the public face of a global movement.”



## Foreword

**W**hat do I know about sea turtles? Scientifically speaking, not a lot. I know I've seen them when snorkeling in Hawaii. I know they're much more graceful in the water than I am. I know they are really old and really cool. And I know they deserve a chance.

More importantly, I also know a lot about how to captivate audiences—like *SWOT Report* is doing. And I know that photography, when it is made honestly and used intelligently, has the power to elevate any subject off of the flat plane of written observation and into the hearts and minds of readers. It is fitting that I started my career as a photographer and designer in Missouri, the United States' "show-me" state, since that basic credo has inspired my own mission to help various publications

**"Photography, when it is made honestly and used intelligently, has the power to elevate any subject off of the flat plane of written observation and into the hearts and minds of readers."**

present the world in an engaging blend of words, photographs, and graphics. Don't just tell it; show it.

*SWOT Report* was brought to my attention recently by one of *SWOT*'s founders, Rod Mast, and by Cristina Mittermeier, the creator of the International League of Conservation Photographers (ILCP), a group of professional photographers whose images are featured throughout this magazine. This *SWOT Report* begins with a photo essay of some of the greatest sea turtle imagery that exists today. A great photograph is one that straddles a line between journalism and art, uniquely weighted one way or another but never entirely devoid of either. The new partnership between *SWOT* and the ILCP taps into some of these great images, created by the world's best natural history photographers. *SWOT Report* uses honest photos of sea turtles to tell the story of marine conservation to an audience who can make a difference for the future of the ocean.

I get what this publication is doing. It's not just a magazine but the public face of a global movement. This magazine, much like the one for which I work, delivers its messages to the public through carefully crafted words and thoughtful imagery. The messages herein are optimistic and exemplary. The focus is neither doom nor gloom, despite that sea turtles and their ocean homes face numerous threats. Rather, *SWOT Report* provides proof positive that there are ways to prevent the extinction of these graceful reptiles that have been with us for many millennia, setting a tone of hope and success that is vital to the conservation movement as a whole.

David Griffin  
Director of Photography / Senior Editor  
*National Geographic* magazine



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FRONT COVER: Look very closely at the turtle on the cover of this year's magazine, and you may notice something odd. This hawksbill is missing one of her back flippers. Dive staff members at White Sands Island Resort in the Maldives believe she is the same turtle they rescued near South Ari Atoll, where this photograph was later taken. When they rescued the turtle, she was ensnared in a plastic bag with her back flipper tightly entangled in the plastic. Although they were not able to save her flipper when they cut her free, she is still commonly seen near this dive site and appears to be living a normal, healthy life.

© STEVE JONES / WWW.MILLIONFISH.COM; THIS PAGE: A tribesman in Myanmar's Mergui Archipelago in the Andaman Sea holds a green turtle. © NICOLAS REYNARD / NATIONAL GEOGRAPHIC IMAGE COLLECTION; AT RIGHT: The average size of an adult hawksbill is approximately 2.5 feet in length and 95 to 165 pounds, although some may reach up to three feet in length and weigh up to 300 pounds. Hawksbills are found throughout tropical and subtropical regions of the Atlantic, Pacific, and Indian Oceans. © CAROLINE ROGERS

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Back cover The State of the World's Sea Turtles at a Glance



**Find Mr. Leatherback!** How many times can you spot Mr. Leatherback's distinctive silhouette in this issue of *SWOT Report*? Check the SWOT website at [www.SeaTurtleStatus.org](http://www.SeaTurtleStatus.org) for the correct answer! See page 30 for a hint.

# Sea Turtles *through the Lens*

Any person who has encountered a sea turtle in the wild or at a rescue center can tell you just how moving such an encounter can be. These captivating creatures have survived millions of years on Earth but are now widely threatened, struggling for survival against human-induced threats. Their story has evoked many powerful narrative and visual works of art in recent years.

The following images represent that body of craftsmanship, capturing—through the camera lens and through personal accounts of the photographic experience—the unique character of each of the seven species of sea turtle.



© MICHELE BENOY-WESTMORLAND 

## ▲ Green turtle (*Chelonia mydas*)

*“Just weeks before my book Ocean Duets went to press in 2006, I was finally able to photograph my turtle pair during an assignment in Tahiti. There, the Le Méridien Bora Bora Resort encompasses a large open lagoon where the hotel staff cares for immature turtles before releasing them into the wild. When these two young turtles swam into my camera frame, it made for a very happy ending to my turtle quest.”* —Michele Benoy-Westmorland



© TYRONE TURNER / NATIONAL GEOGRAPHIC IMAGE COLLECTION

### ▲ Kemp's ridley (*Lepidochelys kempii*)

*"Each year, to help the Kemp's ridley turtle population that nests along the Gulf of Mexico, the U.S. National Park Service incubates the turtles' eggs laid on Padre Island National Seashore in Texas and later releases the hatchlings into the Gulf. In July 2005, I was at the Texas seashore photographing for a National Geographic story about the coastline of the United States (July 2006) and stayed longer just to photograph this wonderful event."* —Tyrone Turner

### ➤ Leatherback (*Dermochelys coriacea*)

*"In most places on Earth, it is rare to see a leatherback nest in broad daylight. On Grande Rivière beach on Trinidad's north coast, however, there are so many nesting turtles that they can be seen nearly every morning during the nesting season. To be face to face with a 1,500-pound turtle is a moving and truly primordial experience. This photograph, taken one morning in May 2007, hopes to capture that feeling and show a perspective that few people ever see."*

—Brian J. Hutchinson



© BRIAN HUTCHINSON / CONSERVATION INTERNATIONAL

➤ **Flatback**  
(*Natator depressus*)

*"Numerous birds of prey such as white-bellied sea eagles and brahminy kites soar above the nesting beach at Bare Sand Island in the Northern Territory of Australia in search of hatchling turtles. This little flatback hatchling was lucky to escape the predators on its journey down the beach as we chanced upon it during our turtle research in August 2004."*

—Andrea Whiting



© ANDREA WHITING



◀ **Loggerhead**  
(*Caretta caretta*)

*"Sea turtles are most often seen by humans not in the turtles' natural habitats, but in rescue facilities, such as this Projeto TAMAR visitor center in Praia de Forte in Bahia, Brazil. Turtles are brought here after being rescued from fishing gear injuries, ingestion of debris, or other threats. At the TAMAR visitor centers, however, only turtles raised in captivity are exposed to the public for environmental education purposes. This photograph, taken with the lens half submerged, portrays one of the most important aspects of such facilities: the opportunity for visitors to make an emotional connection to sea turtles as they learn about conservation."*

—Enrico Marcovaldi

© ENRICO MARCOVALDI / PROJETO TAMAR IMAGE BANK





## ◀ Olive ridley (*Lepidochelys olivacea*)

*"In September 1995, while on assignment for National Geographic to document the incredible synchronized mass nesting of olive ridley turtles at Costa Rica's Ostional Wildlife Refuge, I witnessed tens—perhaps hundreds—of thousands of turtles sweeping onto the shore to bury their eggs in the sand. This event, known as an arribada, which is Spanish for "arrival," occurs each month on only nine beaches around the world and exclusively with olive ridleys."* —Steve Winter

## ∨ Hawksbill (*Eretmochelys imbricate*)

*"Swimming along a wall in waters near Indonesia's Komodo National Park, I saw these two hawksbill turtles move toward each other, then take positions on the reef wall. They touched noses, inspected each other, and then left, swimming in opposite directions."* —Norbert Wu

© STEVE WINTER / NATIONAL GEOGRAPHIC IMAGE COLLECTION 



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# The Departure of the **TURTLE MOTHER**



**A**long Nicaragua's Miskito Coast lives the legend of the "Turtle Mother," a magic rock that once was situated on the shores of Turtle Bogue—the lone volcanic mountain in Costa Rica called *Cerro Tortuguero* that is one of the Caribbean's most important green turtle nesting beaches today. According to this story, at the start of each nesting season, the rock—which was shaped like a turtle and faced the sea—turned to point toward land. When it turned, the villagers knew that the turtles were coming ashore and that they could begin to harvest the turtles' meat and eggs. When the season's last hatchlings had emerged from their nests and scampered down to the sea, the turtle rock would turn back around to face the sea.

It was commonly stated that long before Turtle Mother was discovered in Tortuguero, the magic, turning rock existed in Great Sandy Bay in the Miskito Keys. But when people ate too many turtles and harassed the rock—trying to forcibly turn her ashore or move her from her perch—the Turtle Mother vanished, taking her turtles with her. Simultaneously, the sandy beach washed away, leaving only rocks. The old timers claimed there were a number of Turtle Mother rocks around the Miskito Keys, associated with headlands and areas of high relief, each guiding in separate populations of turtles.

Most of the old turtle hunters from the Cayman Islands, Tortuguero, and the Miskito Keys claimed they last saw the rock in the late 1940s, sitting on the beach near the mountain. As exploitation of the turtles escalated, the rock moved onto the mountain. At the height of the calipee (sea turtle cartilage) trade, when the green turtles were butchered and left to rot on the beach, the Turtle Mother rock vanished completely into a cave on Cerro Tortuguero. After villagers tried to find her inside the cave, a landslide buried the entrance.

The Turtle Mother legend has remained amazingly consistent since I first heard it in 1973. In a war-torn community where rumors run rampant, consistency of any tale is unusual. Nevertheless, the size, shape, and type of rock in this legend have remained generally the same.

A new twist, however, was added to the lore in 1988 when I again visited the Miskito Coast. Fishermen in the area stated that they had heard that “the rock was broken.” Some said that when the rock was last seen, a foot or flipper had disjoined; others said that it had a crack in it. They believed that scientists, writers, and tourists had caused it to break by studying it. Allegorically, I believed the breaking of the rock symbolized the deterioration of the Miskito culture itself—cracked from war, dislocation, malnutrition, and misery.

For years, the Turtle Mother legend seemed to be an isolated mythological oddity, restricted to the Miskito Coast of Central America. Then, in 1991, Dr. Jeanne Mortimer advised me of a similar legend in Malaysia. There, a large rock that sat on a hill, calling leatherbacks to the beach, was deteriorating, causing turtle populations to decline.

A visit to Rantu Abang in the state of Terengganu on Malaysia’s east coast confirmed that there was indeed a large rock. The 3-meter slab of limestone lay shattered atop a hill overlooking the ocean. Unlike the ethereal Turtle Mother of the Miskito Coast, this rock could be seen and touched. It did look like a turtle—with a broken head and limbs.

My guides informed me that this rock was called the “Turtle Father.” Another rock, submerged in the nearby Rantu Abang River, was known as the “Mother of the Turtles.” When the turtles came to nest each year, they would swim by to visit that rock. Extensive siltation and runoff from rainforest deforestation have buried the rock, however, and changed the mouth of the river, so the migrating turtles can no longer come.

The Seri tribe of Sonora, Mexico, is one indigenous culture that maintains its strong traditional, cultural ties to sea turtles. A four-day ceremony celebrating the ancient leatherback turtle is one of the Seris’ most sacred traditions. Since 1981, the Seris had been unable to perform this ceremony in their home community, due to declines in the leatherback population. Mayra Olivia Estrella Astorga (at right) is one of five Seris who, in 2006, traveled across the Gulf of California to the Baja California Sur peninsula to perform the traditional ceremony with leatherback hatchlings. Ancient cave paintings—including illustrations of turtles—found near Loreto in Baja California Sur were likely created by Seri ancestors more than 750 years ago. Seri elder Alfredo Lopez (at left) appreciates the story these relics tell about his people’s age-old veneration of leatherbacks. © OCEAN REVOLUTION



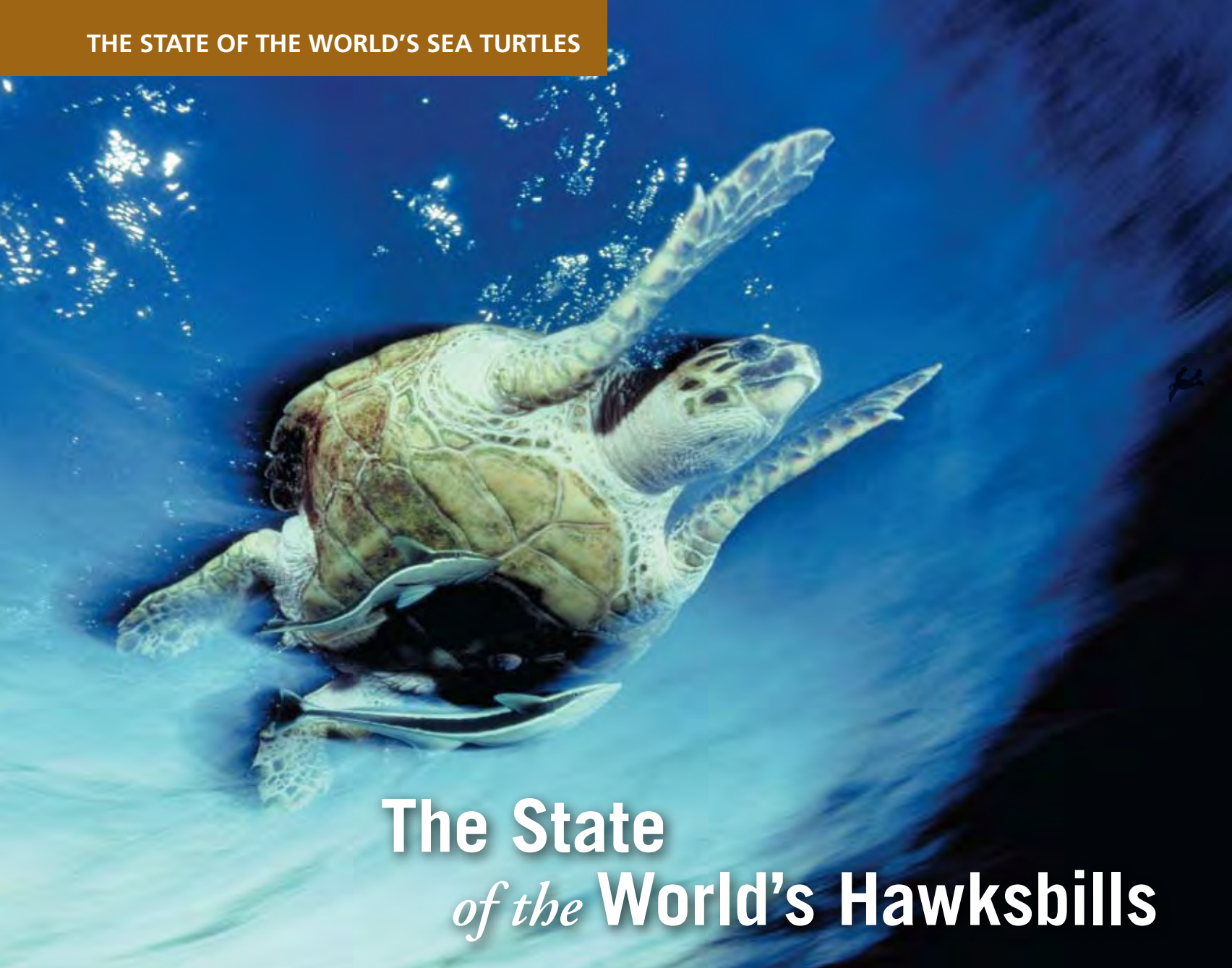
The local people said that environmental exploitation had also caused the rocks to break. Poaching of too many eggs, deforestation, slash-and-burn agriculture over the past 30 years, and a million tourists gawking at the leatherbacks had caused the Turtle Father to shatter into a dozen pieces and the Mother of the Turtles to vanish into the mud.

Versions of this legend exist throughout the Pacific. Dr. George Balazs, a turtle biologist, noted to me a similar legend in the Hawaiian Islands. A large stone at a hotel on Hawaii was called “Pohaku Honu,” meaning “Turtle Stone.” If the stone was cared for properly, legend said, the turtles in Hawaiian waters would be large, plentiful, and tasty.


The Turtle Mother lore is a manifestation of a greater mythology—the world rests on the back of a colossal turtle. Generations of people in the Asia-Pacific region and the Americas once held that belief.

The question must be asked: If we continue to exploit the turtle and spoil the world, will the creature beneath our feet become disgruntled and take a dive? Or is she already sinking slowly down into the depths, washing all our garbage and human trappings off her shell—a new allegory for rising sea levels and climate change? If so, take heart, for one day, the turtle must come back to the surface for air. The broken turtle rock can heal, and life can begin anew.

*Jack Rudloe is one of America’s foremost nature writers. For more than 40 years he has scoured the seas, exploring sea life and helping to protect marine species in six well-received books, including Search for the Great Turtle Mother and The Sea Brings Forth.*



# The State *of the* World's Hawksbills

A hawksbill turtle propels itself through waters off the coast of Israel. © DAVID DOUBILET 

The hawksbill sea turtle has been one of the most persecuted of the world's sea turtles; hunted not only for its meat and eggs like other sea turtle species, it is further cursed by its beauty. The mottled, translucent shell plates—called *scutes* by scientists and *bekko* by Japanese artisans—have been coveted for centuries as raw material for jewelry, spectacle frames, spurs for fighting roosters, and furniture embellishments.

The 2007 IUCN Red List of Threatened Species assessment of global hawksbill populations reveals that hawksbills still endure this menace and many others. They are especially threatened in the Indian and Pacific oceans and along the mainland Caribbean Coast. Historic and recent accounts indicate extensive declines—estimated at 90 percent globally—in all major oceans during the past 100 years. Much of the decline occurred in the 20th century, driven by intense international trade in *bekko*. (See “Trade Routes for Tortoiseshell,” p. 24–25.) Although the volume of international trade has declined significantly in the past 10 to 15 years, it remains an active menace, especially in Southeast Asia and the Americas.

A relatively new threat is the massive trade in large stuffed hawksbills, intentionally netted in Southeast Asian waters, preserved with formaldehyde aboard Chinese vessels, and sold intact as adornments in Asia. Accidental capture in fisheries is another major concern. Meanwhile, hawksbills continue to suffer intense levels of



In addition to mapping the hawksbill nesting sites of the world, the SWOT Team has added another year of data (2006) to the global maps of leatherback and loggerhead nesting sites that were featured in volumes I and II of *SWOT Report*. These maps are now featured in interactive and downloadable formats on the SWOT website, [www.SeaTurtleStatus.org](http://www.SeaTurtleStatus.org).

egg exploitation in many areas; in Southeast Asia, egg take often approaches 100 percent.

Habitat destruction may turn out to be an even greater threat. Hawksbills nest in some 60 of the 108 countries whose waters they ply—mostly on tropical beaches—with unregulated coastal development, especially for tourism, becoming a huge problem. Oil exploration and seaborne pollution threaten hawksbill habitats in the Middle East and other parts of the Indo-Pacific. Likewise, the global scourge of climate change looms large, given hawksbills' dependence on coral reefs vulnerable to altered water temperatures and the potential loss of nesting beaches to rising waters.

Because much of the available data on global hawksbill populations come from protected sites, the actual rate of their decline is likely underestimated. What we do know is that hawksbill populations continue to decline at many sites, including important rookeries in eastern Mexico, northeastern Australia, and Indonesia.

With protection, however, some populations have stabilized, and a few are increasing at protected islands in the Caribbean and Indian oceans. Meanwhile, public awareness is at an all-time high, and international and regional agreements are addressing the issues at the governmental level. These are certainly causes for optimism that bring the solutions for hawksbill recovery into clear focus. If careful attention is paid to preserving beaches, curtailing the trade in bekko and stuffed turtles, stopping egg take, addressing fisheries bycatch, and eliciting the broad human behavioral changes that will reduce pollution and halt climate change, the hawksbill can find its way along the road to resurgence.

*Dr. Jeanne A. Mortimer is a sea turtle biologist and conservationist who has worked in some 20 countries during the past 30 years. She coauthored (with Marydele Donnelly) the forthcoming IUCN Hawksbill Red List Assessment for the IUCN Marine Turtle Specialist Group.*

Globally, hawksbill turtles have declined an estimated 90 percent in the past 100 years, but conservationists retain hope for this species as new solutions are developed. © ERIC MADEJA



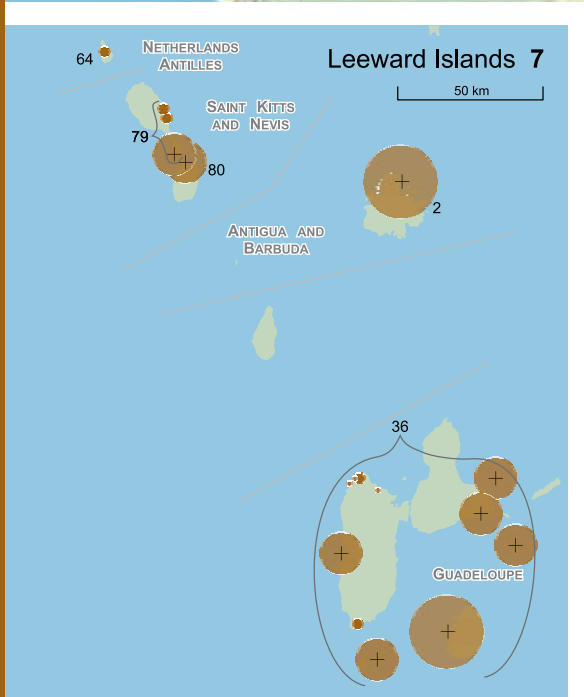
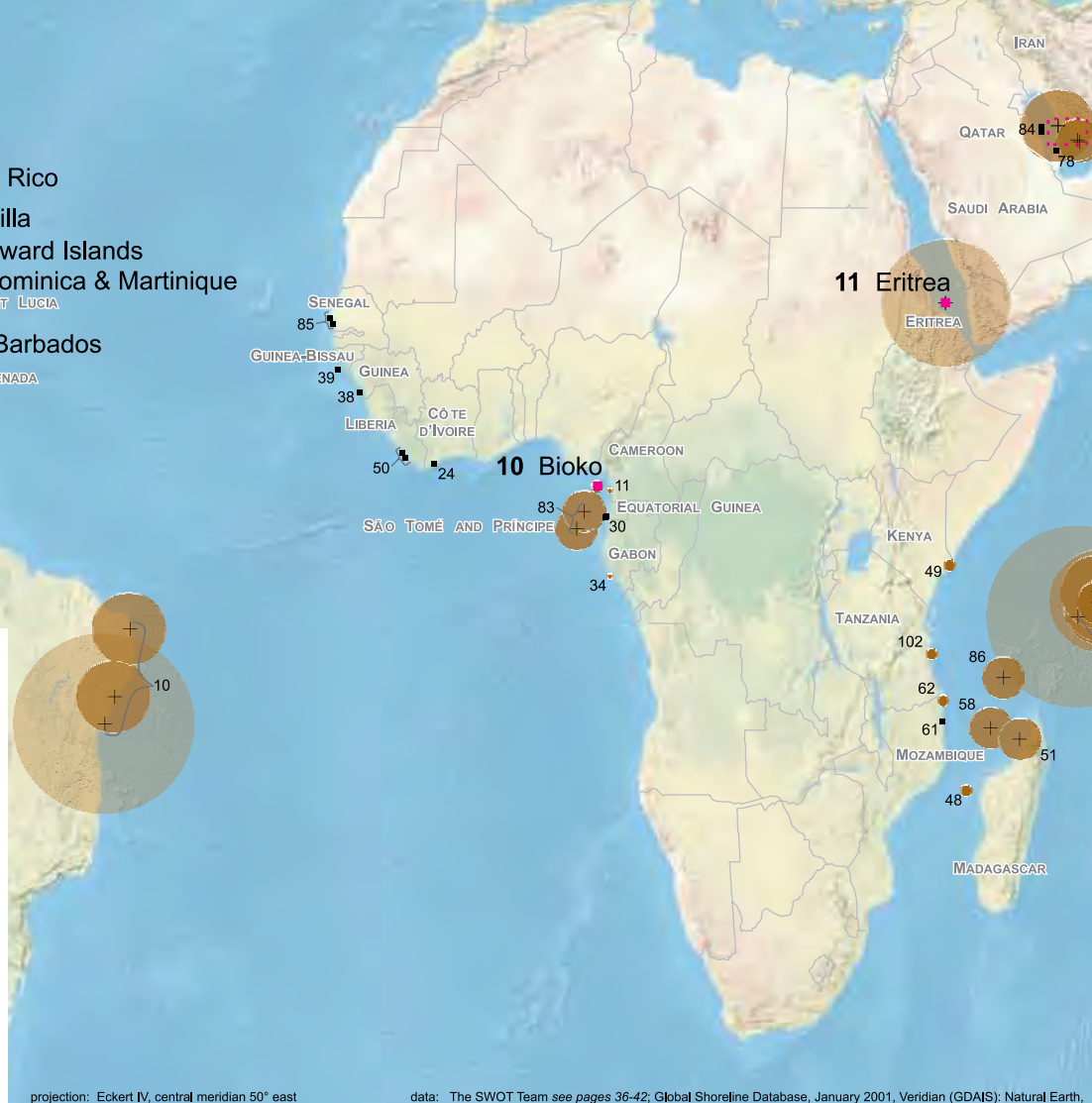
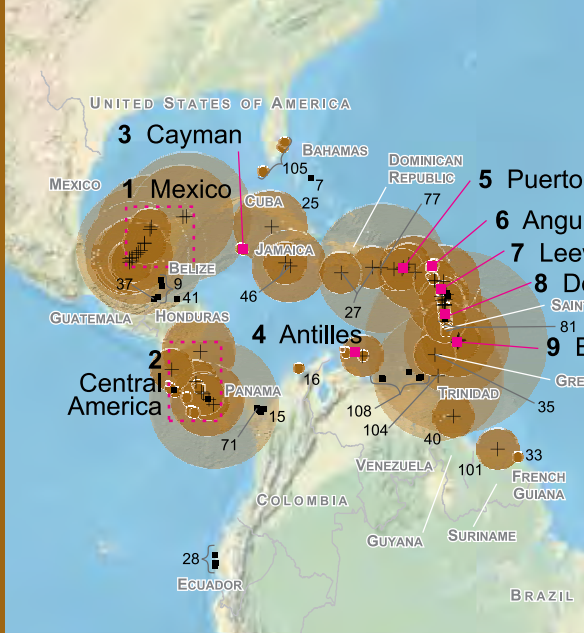
## The Global Hawksbill Nesting Map

Hawksbills are well known for their tendency to nest on remote and obscure tropical beaches. Perhaps the result of centuries of exploitation, they appear determined to nest wherever humans are not. This presents real challenges to the people who monitor hawksbills' nesting populations or wish to globally map their nesting distribution. Special recognition is therefore warranted for the hundreds of data contributors that are listed in the citations of this publication (pp. 36–42)—not only for their determination to study and protect these animals in all of their remote habitats, but for their willingness to work together as the “SWOT Team.” They have created the linchpin of this report, the foldout map that is SWOT's (and the world's) first global depiction of hawksbill nesting sites, featuring 2006 data.

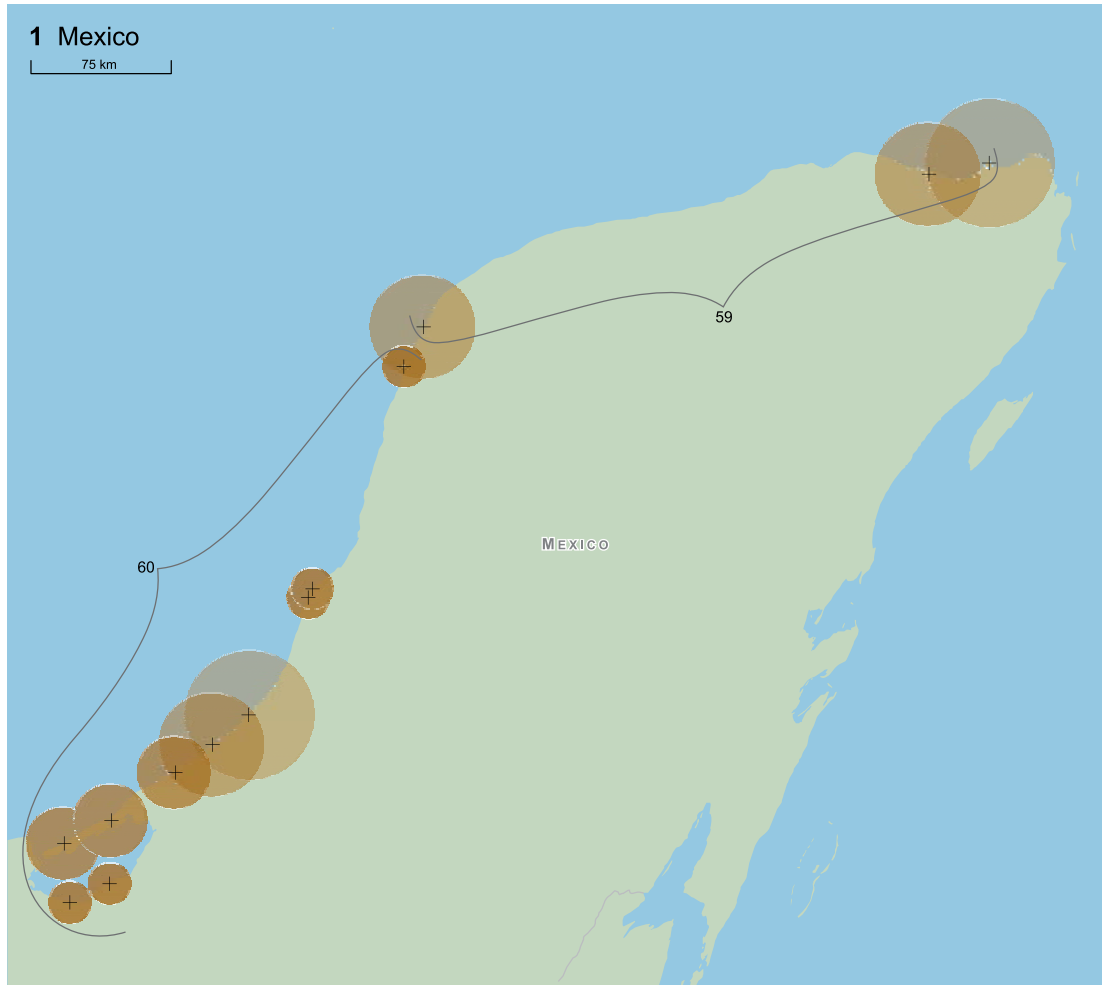
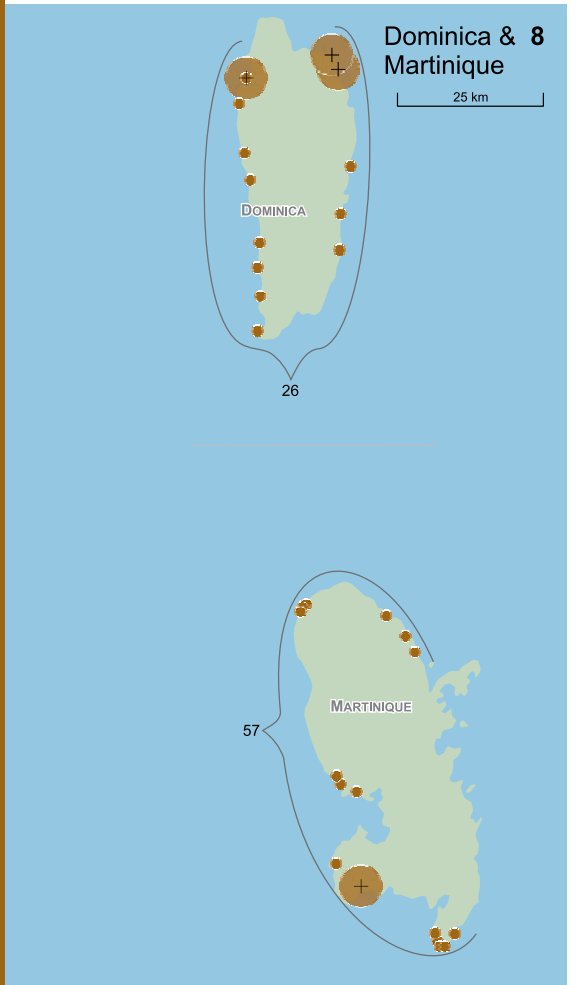
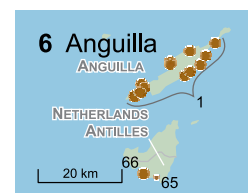
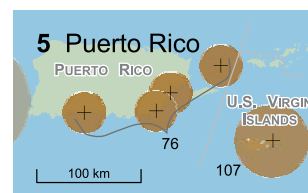
Compiling these data and mapping the hawksbill's global nesting distribution has provided its own set of challenges and has been as much a lesson in geography as anything. Thoughtful consideration has gone into the preparation of the map, with mapping protocols based on the standards developed by the SWOT Scientific Advisory Board in 2006.

This map demonstrates the number of nests recorded or estimated at every available nesting site in the 2006 or 2005–2006 season. All points are numbered to correspond with their original sources (pp. 36–42). Where nest counts were not available, the number of nesting females was converted into an estimated number of nests using a bracketed conversion figure of 3 to 5 nests per female, taken from Mortimer and Donnelly's forthcoming *IUCN Hawksbill Red List Assessment*. Similarly, when only crawl counts were available they were converted into an estimated number of nests using a conversion figure of 1.8 crawls per nest, also from Mortimer and Donnelly. In total, 348 hawksbill nesting sites were recorded from 110 sources.

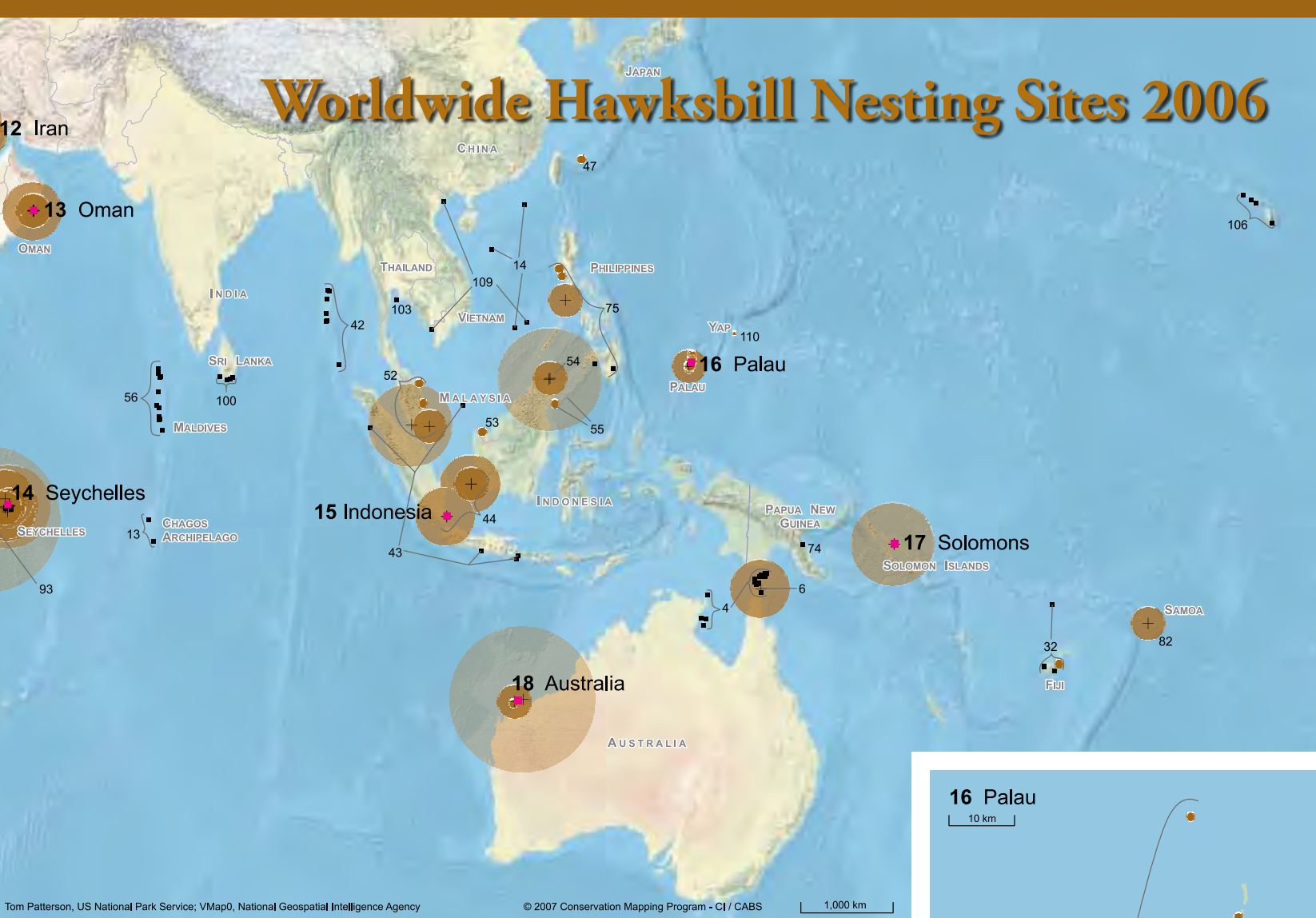
*Alec Hutchinson is data coordinator for SWOT and director of nesting beach projects for PRETOMA. Brian J. Hutchinson is program officer of Conservation International's (CI) Sea Turtle Flagship Program and of the IUCN Marine Turtle Specialist Group. Kellee Koenig is GIS specialist and outcomes mapping cartographer for the CI Center for Applied Biodiversity Science.*



projection: Eckert IV, central meridian 50° east      data: The SWOT Team see pages 36-42; Global Shoreline Database, January 2001, Veridian (GDAIS); Natural Earth,



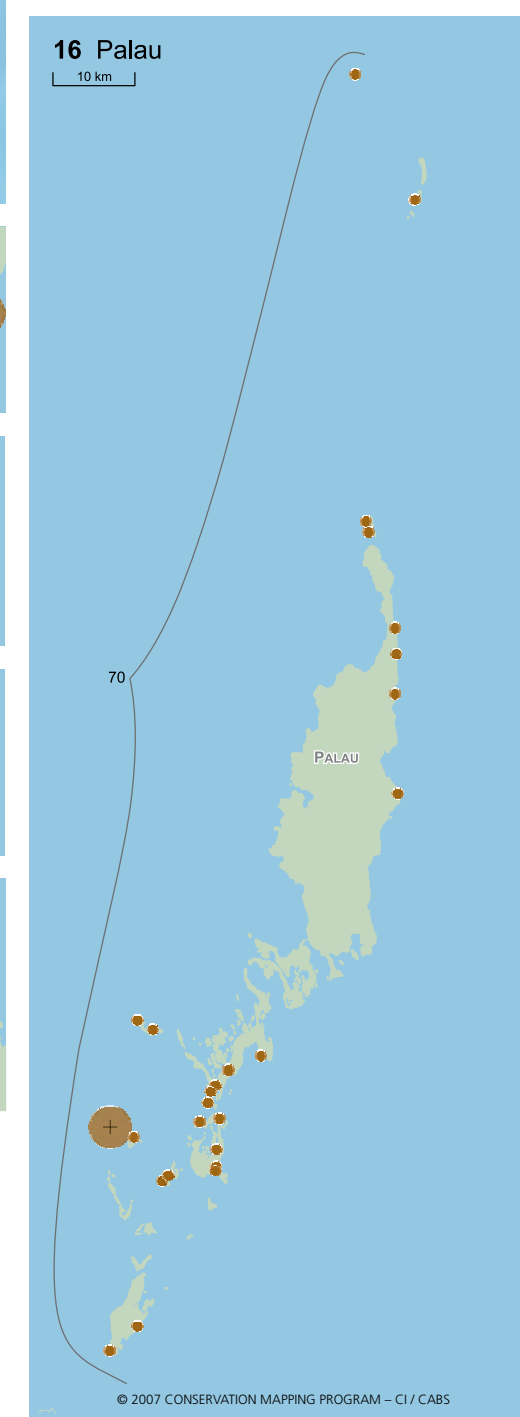
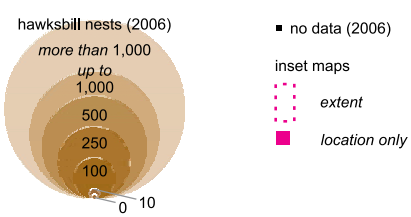
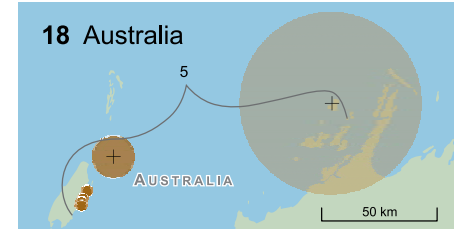
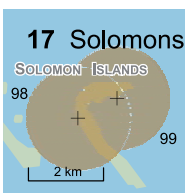
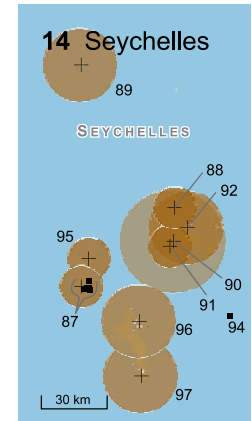
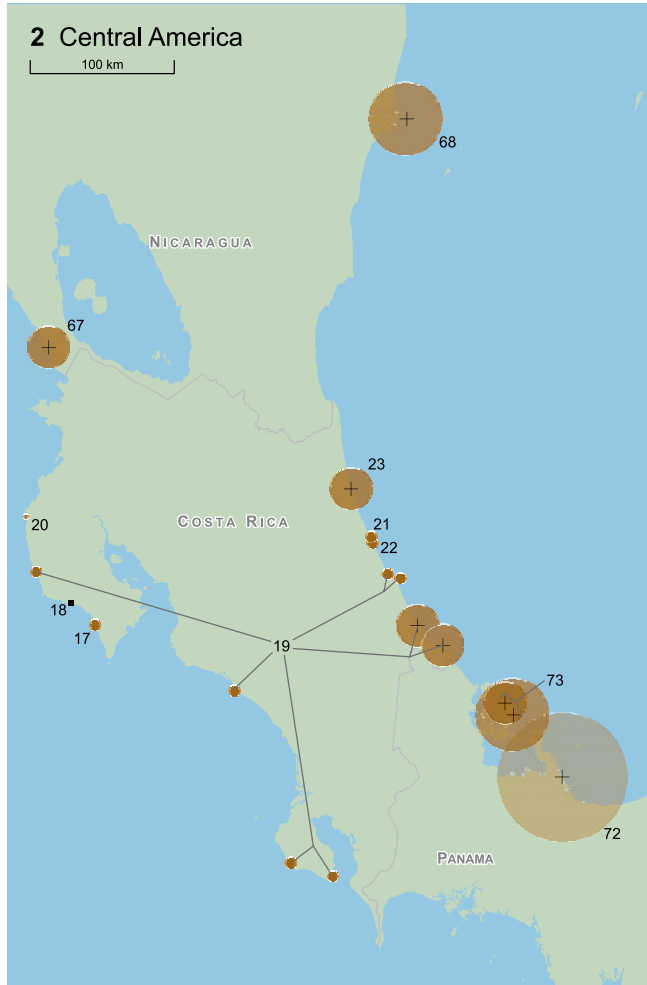
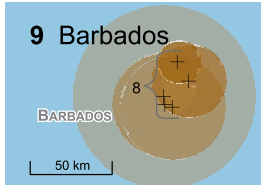
# Worldwide Hawksbill Nesting Sites 2006



Tom Patterson, US National Park Service; VMap0, National Geospatial Intelligence Agency

© 2007 Conservation Mapping Program - CI / CABS

1,000 km



© 2007 CONSERVATION MAPPING PROGRAM - CI / CABS

# The Road to Conservation

*Sea turtles fulfill their ecological roles on a healthy planet where all peoples value and celebrate their continued survival.*

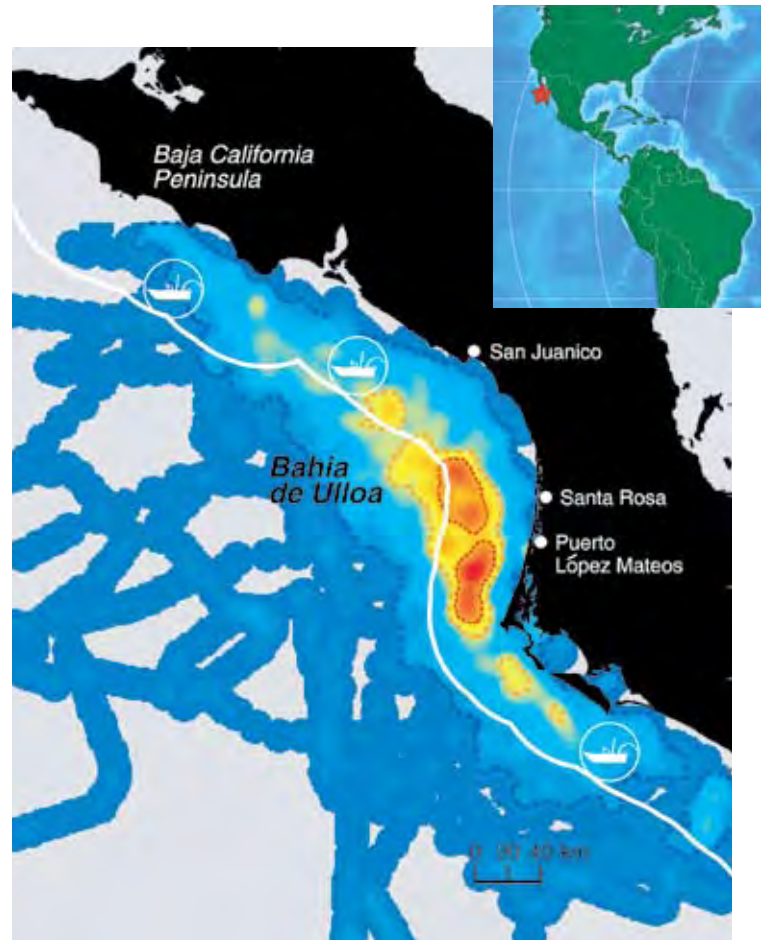
—Vision Statement of the IUCN Marine Turtle Specialist Group

If you don't know where you are going, then any road will get you there. A clear vision of global sea turtle conservation is where the road begins.

Conservation of sea turtles is not simple. It is confounded by turtles' vast marine distributions, the many unsolved mysteries of their natural history, and the fact that sea turtles and the hazards to their survival are not distributed evenly over the face of the planet. *Climate change*, for instance, could spell the total loss of nesting beaches in the Maldives, but not so everywhere. *Direct take* of turtles is a serious issue in the Kei Islands of Indonesia, but not in the southeastern United States. *Coastal development*, *fishing impacts*, and *marine pollution and pathogens* all exact their toll on sea turtles with varying degrees of intensity, depending on the site, season, and species. Given the different approaches needed in different situations and the relative urgency of them all, conservationists must be strategic in their approach.

Being strategic means choosing priorities, balancing reactive efforts with proactive efforts, and constantly checking progress and redirecting the work on the basis of new information. Principal among the IUCN Marine Turtle Specialist Group's global priority-setting tools are assessments to determine sea turtles' extinction risk for the IUCN's *Red List of Threatened Species*. The aforementioned five hazards, the "top 10" list of the most threatened sea turtle populations, and the "key unsolved mysteries" (see [www.SeaTurtleStatus.org](http://www.SeaTurtleStatus.org) to learn more) are other useful prioritization tools derived from the group's "Burning Issues" workshops. Furthermore, SWOT gathers and synthesizes global-scale data with the aim to measure trends and help frame priorities for sea turtle conservation. Countless other nonprofit organizations and governments also look at national and local priorities for sea turtle conservation, and the literature is rife

Though arguably still the most endangered sea turtle species on Earth, an IUCN ranking of "critically endangered" has helped to focus conservation attention on the Kemp's ridley, which is now on the road to recovery. © NPS PHOTO



Identification of high-use areas for loggerheads off Baja (shown in orange and red) using satellite telemetry has stimulated efforts to create protected zones, an example of how innovative research tools help to set priorities for conservation. FIGURE COURTESY OF HOYT PECKHAM, DAVID DIAZ, ANDREAS WALLI, GEORGITA RUIZ, LARRY CROWDER, AND WALLACE J. NICHOLS, FROM THE ARTICLE "SMALL-SCALE FISHERIES BYCATCH JEOPARDIZES ENDANGERED PACIFIC LOGGERHEAD TURTLES" IN *PLoS ONE*, ISSUE 10, OCT. 2007.

with action plans, recovery plans, strategies, and templates that view the challenge from different angles and on varying scales.

The best prioritization template for sea turtle conservation will comprise parts of all these various schemes, but adaptability must be at its core. This implies perpetually reviewing and upgrading priorities—evaluating the most important species and populations on which to focus, the life stages most vulnerable to the most threatening hazards, and the conservation actions that will yield the greatest results and the greatest "bang for the buck" investments.

Even as we strategize in workshops and behind computers, "just do it" must remain the conservationist's credo. Conservation cannot wait for the perfect strategy to be penned. Actions that do no harm and employ the precautionary principle must be constantly pursued, because what we learn from doing the work of conservation will be the greatest source of wisdom in adapting our strategies for the future.

**Roderic B. Mast** is co-chair of the IUCN Marine Turtle Specialist Group, vice president of Conservation International's Sea Turtle Flagship Program, and an avid fan of Mr. Leatherback.







# The Hawksbill's Distinctive Diet

Coral is sometimes included in the hawksbill turtle's diet, as shown in this photo taken at a reef near Rangiroa Atoll in French Polynesia. © LAURENT BALLESTA / L'OEIL D'ANDROMÈDE

In strange company with a few species of fish and nudibranchs, the hawksbill turtle is one of very few animals that feeds principally on sponges. It is the largest vertebrate and only reptile to feed on this prey. Spongivory, or feeding on sponges, is rare, presumably because of the significant defenses of sponges, such as siliceous (glass) spicules, indigestible spongin fibers, and an array of chemical compounds.

In the Caribbean, hawksbills prey on only a few of more than 300 sponge species found in the region. The turtles feed primarily on sponges that lack spongin fibers, but many of these sponges do contain large amounts of glass spicules. Other items in the hawksbill's Caribbean diet are algae, corallimorpharians (coral-like anemones), zooanthids, and tunicates, but in only a few cases have these items constituted a significant part of its diet.

Gut samples of hawksbills from numerous localities in the Indian and Pacific oceans have revealed sponges as the turtles' predominant food item, suggesting that spongivory may be a worldwide feeding habit. Nonetheless, hawksbills in Australia's Northern Territory consume significant amounts of marine algae, seagrasses, and mangrove fruits.

Possibly as a result of what they eat, hawksbills are occasionally toxic to humans. In scattered cases, consumption of hawksbill meat has been conclusively linked to mass poisoning events that killed or severely sickened scores of people. Blue-green algae that are symbiotic with sponges, as well as secondary compounds present in sponges, are among the suspected causes of the poisonings, but definitive evidence is lacking.

Young hawksbills appear to feed at the ocean's surface on plants and animals associated with the drift community, including *Sargassum* algae, fish eggs, tunicates, and goose barnacles. Unfortunately, young turtles also frequently consume bits of plastic and tar balls that float on the surface.

Reproductive female hawksbills also deviate from the sponge-dominated diet, greatly reducing their overall intake of food and

consuming calcium carbonate rubble, possibly as a source for calcium to shell their eggs.

Although they occupy a variety of habitats, hawksbills are most closely associated with coral reefs, where they play a key role in the ecosystem's health. Using their sharp, hawk-like beaks to penetrate the sponges' outer armor, they expose the soft internal parts to other sponge-eating animals. The turtle's peculiar dietary habit also helps to keep sponge populations in check, freeing up space on the reefs for other organisms to settle and grow.



This electron micrograph shows the intestinal epithelia of a hawksbill turtle with embedded sponge spicules. © ANNE MEYLAN

*Anne Meylan is a senior research scientist at the Florida Fish and Wildlife Conservation Commission in St. Petersburg, Florida, U.S.A.*

*Scott Whiting is a marine vertebrate scientist in the marine biodiversity group of the Department of Natural Resources, Environment and the Arts, of the Northern Territory Government of Australia.*

# Hawksbill Genetics Explained

**M**olecular genetics offers a valuable set of tools for unraveling the mysteries and histories of many species. These tools have developed rapidly during the past decade, allowing scientists to gain insight into previously intractable questions. In the case of the hawksbill turtle, molecular genetics has described evolutionary patterns, stock identities, geographic distributions, and the presence of hybrids. Genetic techniques have drastically improved our understanding of hawksbill biology and, in turn, have enhanced our ability to manage the species.



A female hawksbill can mate with several males within one reproductive season; males might also have multiple mates within the same season. © R.P. VAN DAM

## Recent Discoveries about Hawksbills from Genetic Studies

- Hawksbill lineages in the Indo-Pacific and Atlantic oceans are evolutionarily distinct, a notion that was established previously on a morphological basis but later discarded.
- Hawksbills, with their unique diet of sponge, belong to a carnivorous sea turtle lineage that aligns them with the loggerhead and ridley subfamilies.
- Hybridization between hawksbills and olive ridleys, loggerheads, or green turtles is sporadically observed, especially in areas where hawksbill populations have declined greatly. In Bahía, Brazil, however, hawksbill-loggerhead hybrids apparently have integrated into the normal population, constituting about 40 percent of the rookery.
- Nesting hawksbill populations are not closed, as previously thought. Rather, they share developmental and foraging grounds with individuals from multiple genetic stocks, and they migrate internationally, returning to their natal beaches to reproduce. These characteristics highlight the need for regional and multinational management schemes that take into account both nesting and foraging grounds.
- Distinctions exist among multiple nesting stocks within geographic regions. For example, there are at least 15 different nesting populations in the Caribbean region.

Clearly, genetic studies have uncovered numerous crucial clues about hawksbill populations worldwide. However, more information—particularly stock identifications for nesting populations in certain regions (for instance, the Eastern Atlantic and Indian oceans)—is necessary to solve many remaining hawksbill mysteries and to develop sound policies to conserve this species globally.

*Alberto Abreu* is head of the genetics laboratory at the Mazatlán Research Unit of the Instituto de Ciencias del Mar y Limnología (UNAM). *Robin LeRoux* is a research fisheries biologist with the National Marine Fisheries Service, Southwest Fisheries Science Center's Marine Turtle Research Program.

## Known Genetic Stocks of the Hawksbill Sea Turtle

In the **Pacific Ocean**, four main genetic stocks have been identified:

- Eastern Pacific (perhaps extending from Mexico to Panama)
- Northeastern Australian
- Sabah, Malaysian
- Solomon Islands

In the **Indian Ocean**, at least five genetic stocks have been identified:

- Arabian Peninsula
- Northern Red Sea
- Peninsular Malaysian
- Seychelles and Chagos Islands
- Western Australia

In the **Western Atlantic Ocean and the Caribbean Sea**, all populations analyzed to date have proven distinct. Although six stocks await final analysis, nine distinct stocks have already been identified:

- Antigua
- Barbados
- Belize
- Brazil
- Costa Rica
- Cuba
- Mexico
- Puerto Rico
- U.S. Virgin Islands

In the **Eastern Atlantic Ocean**, at least one stock occurs around the regionally important rookeries in the Democratic Republic of São Tomé and Príncipe and in Equatorial Guinea, principally on the Island of Bioko, although hawksbill nestings have been rare in recent years.

# Pacific Leatherback Sets Long-Distance Record



This map illustrates the migration of one female leatherback turtle, after nesting in Jamursba-Medi, Papua, Indonesia, to foraging grounds off the coast of Oregon, United States—a distance of 20,558 kilometers (12,774 miles). © STEPHEN NASH / CONSERVATION INTERNATIONAL

**I**t has long been known that leatherbacks are the most widely distributed marine reptile on our planet. They have been seen in the frigid waters off Argentina, southern Chile, and Tasmania and are not uncommon in the subarctic northern latitudes off Alaska, Nova Scotia, and the North Sea. Adults migrate periodically from these temperate foraging habitats to tropical breeding grounds, and a growing body of scientific research is yielding information on the migratory routes and geographic links between these areas. In the Pacific, where leatherback populations continue to decline, we urgently need to understand where these creatures spend their lives at sea in order to mitigate human-induced threats.

The National Marine Fisheries Service, Southwest Fisheries Science Center, leads a program with international partners in Indonesia, Papua New Guinea, and the Solomon Islands. The program uses increasingly sophisticated molecular, genetics, and satellite-tracking tools. Early genetics results showed that the leatherbacks living in the North Pacific, including waters near the U.S. west coast, are part of the western Pacific breeding population.

Those results have now been confirmed by a trans-Pacific satellite track of a nester, tagged on Jamursba-Medi beach in Papua, Indonesia, which made the trans-Pacific odyssey to the foraging area off the coast of Oregon, United States, and back westward. This female leatherback was tracked for 647 days over a minimum distance of 20,558 kilometers (12,774 miles) before the signal was lost. This distance

set a new record for sea turtles—among the longest documented migrations between breeding and foraging areas by any marine vertebrate (see map at left).

Additional research is showing that nesters from the western Pacific metapopulation, the last sizable nesting population remaining in the Pacific, migrate through areas in the Philippines, South China Sea, and Japan, into the Southern Hemisphere. As such, sea turtle populations are often the shared responsibility of several nations. The urgency for protecting leatherbacks in the Pacific, in particular, has served as a catalyst to develop an internationally coordinated conservation strategy.

In July 2007, the second Bellagio Sea Turtle Conservation Initiative workshop convened in Terengganu, Malaysia, to develop a strategic plan to guide the prioritization and long-term financing of Pacific leatherback turtle conservation and recovery objectives. Forty-five experts on sea turtles, fisheries, conservation, and finance from 10 countries gathered to discuss the priorities for the western Pacific leatherback nesting populations as one component of a broader pan-Pacific plan.

The Pacific leatherback turtle has drawn teams of dedicated people to its cause. The conservation fund planned during this workshop will make it possible for stakeholders to engage in long-term planning and avoid the risk that critical conservation investments made in some years will be lost in others when funding is low.

Meanwhile, we continue to track leatherbacks and other sea turtle species to discover what areas are most critical to their survival.

*Dr. Peter Dutton leads the Marine Turtle Research Program at the National Marine Fisheries Service, Southwest Fisheries Science Center.*

*Scott Benson is a marine vertebrate ecologist at the National Marine Fisheries Service, Southwest Fisheries Science Center. Creusa “Tetha” Hitipeuw is marine turtle conservation program coordinator for WWF-Indonesia.*

Leatherbacks can dive up to a mile deep and can cross thousands of miles of ocean in a year. © TAMAR - IBAMA



# ¡CAREY!

## *Where Have the Eastern Pacific Hawksbills Gone?!*

**M**ake a list of the world's most endangered sea turtle populations. Is the eastern Pacific hawksbill on it? If not, it's no surprise. Essentially nothing is known of the biology, distribution, abundance, or conservation needs of this enigmatic population. Until recently, virtually nothing had been done to study what remains of these animals in the eastern Pacific, hunted nearly into extinction long before the start of the modern sea turtle conservation movement.



In 2005, the IUCN Marine Turtle Specialist Group recognized the lack of information about this population, listing it among global-scale “critical research and conservation needs.” According to communities and conservation projects in the region, some hawksbills do still remain in the eastern Pacific, but no one knows how many or if there are enough remaining to bring them back from the edge.

The Sea of Cortez, or Gulf of California, Mexico, has produced more recent sightings than anywhere in the eastern Pacific and is known to have hosted significant numbers of juvenile and adult

hawksbill turtles in the past—so much so that hawksbill fisheries once thrived in the coastal towns of La Paz and Loreto. Records in La Paz suggest that hawksbill turtle shell was an important component of the regional economy in the early 1900s. Fishermen from the region say that in the 1940s and 1950s the three-man crew of a single fishing canoe could capture five to seven hawksbills in one night.

Miguel del Barco, an 18th-century Jesuit missionary-naturalist who traveled the western coast of the Sea of Cortez, wrote of coastal indigenous people who caught hawksbills from their rafts



local name of the hawksbill, and similar to the common Spanish exclamation “¡caray!” used to express excitement or surprise.

In its first phase, as of January 2008, the investigators leading the project have begun interviewing local community members, establishing a sighting network, poring over historical archives, and monitoring the region’s coastal waters to begin to fill the information gaps, raise local awareness and solve the mysteries of the hawksbill population in the Sea of Cortez.

Of more than 20 coastal communities visited thus far, all have been highly supportive. Community members have reported recent hawksbill sightings to ¡CAREY! staff on more than a dozen occasions already—observations that often previously went undocumented or were recorded but subsequently lost.

Boding well for the turtles, more hawksbills are being reported now than were reported several decades ago—a result of the increased protection afforded to sea turtles in the early 1990s, many local fishers believe. As explained by Juan de la Cruz, a former turtle hunter from a small fishing village just south of Loreto, “Thirty years ago it was almost impossible to see a hawksbill, because hunting of the species was rampant. Once the laws were established, the market for penca [tortoiseshell] died, and seeking hawksbills became too risky. If people wanted to eat turtle meat, they trapped other turtles that were easier to capture.”

In addition to generating data and calling local and international attention to this fragile population, future plans of the initiative include evaluating hawksbill populations in other areas of the eastern Pacific by replicating the efforts undertaken in the Sea of Cortez and for establishing a region-wide hawksbill information and sighting network.

Many questions remain, but the mysteries of this forgotten population are beginning to reveal themselves. By shedding light on the biology and conservation status of the eastern

Pacific hawksbill, ¡CAREY! will provide critical information for local and regional conservation management plans that will ultimately determine the feasibility of the turtles’ recovery in this region of the world—hopefully transforming their vanishing act into a comeback.

*Alexander Gaos and Ingrid Yañez, a husband and wife team, are conservation scientists spearheading the Eastern Pacific Hawksbill Initiative with the Grupo Tortuguero. Wallace J. Nichols (wallacejnichols.org) is a senior scientist at Ocean Conservancy and research associate at California Academy of Sciences.*

Hawksbills once commonly inhabited the waters of the Sea of Cortez but today could be in threat of local extinction. The Eastern Pacific Hawksbill Initiative is now carefully investigating just how endangered that sea turtle population is. © STEVE JONES / WWW.MILLIONFISH.COM



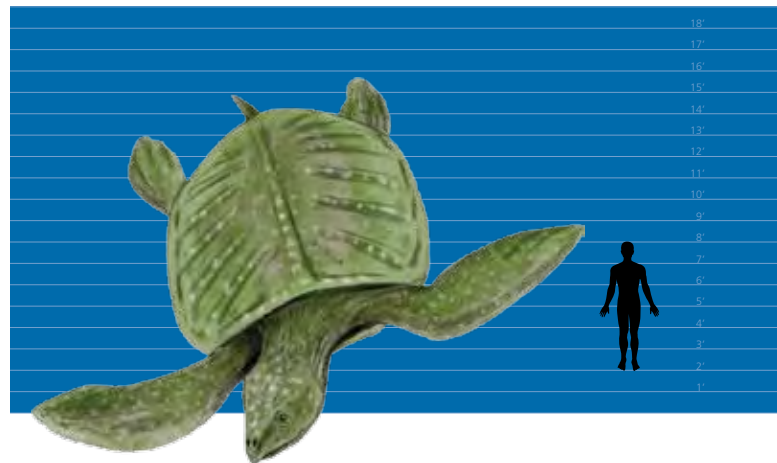
This hawksbill was captured in September 2007 at Isla Pardito, a small island north of La Paz in the Sea of Cortez. Local fisherman Gilberto Cuevas (shown) and staff at the organization Niparaja are some of the first participants to report hawksbills to the ¡CAREY! network. Several hawksbill sightings have already been recorded at Isla Pardito. © JUAN SALVADOR ACEVES

and canoes, saying, “[They] have the additional profit of the shell which, when there is someone to buy it, they sell. From this carey, they make [in Guadalajara] little boxes for snuff, cigarettes, and other various small things.”

Three hundred years later, the Eastern Pacific Hawksbill Initiative is beginning its work, village by village, in search of the lost hawksbills of the Sea of Cortez. Conducted in collaboration with the Grupo Tortuguero, a grassroots conservation organization with 500 individual partners in communities along the coast of northwestern Mexico, the initiative is referred to as “¡CAREY!”—the

# Modern Meaning in an Ancient Turtle Nest

Late Cretaceous seas contained giant swimming marine reptiles, including mosasaurs (9 meters in length), plesiosaurs (18 meters in length), and sea turtles (nearly 5 meters in length) that joined toothed, diving birds and flying reptiles that fed on the abundant vertebrates, bivalves, ammonites, squids, and other invertebrates. Most of these behemoths accompanied the dinosaurs in the late Cretaceous mass extinction event that killed off 75 percent of the plants and animals on Earth—but *not* the sea turtles. Fossils prove sea turtles' abundance in the Western Interior Seaway—across western North America from the Gulf of Mexico to the Arctic Ocean—during the Cretaceous period, and a hypothesis formed in 1996 suggested that turtles nested on sandy beaches there.



These two images show cross-sections of the fossilized sea turtle nest (above) from the late Cretaceous period located in Fox Hills Sandstone, Colorado, and a modern loggerhead turtle nest (bottom) on St. Catherines Island, Georgia. Both are collapsed nests with eggs remaining in the egg chamber.

© GALE BISHOP; ABOVE RIGHT: The illustration above is an artist's rendering of *Archelon ischyros*, a sea turtle from the Late Cretaceous period of North America. © ARTHUR WEASLEY / WIKIPEDIA COMMONS (GNU FREE DOCUMENTATION LICENSE)

In 1997, in the Cretaceous Fox Hills Sandstone near Limon, Colorado, my colleagues and I helped to prove that hypothesis true. During an industrial study of ghost shrimp burrows to help delineate heavy mineral deposits in the area, my colleagues showed me an enigmatic sedimentary structure. Almost immediately, I recognized the structure as a fossilized sea turtle nest! Inside the partially collapsed nest were preserved egg impressions.

When we discovered the egg chamber, a nearby covering pit, and cross-section of a sea turtle crawlway leading away from the nest, I realized with astonishment that we had located a shoreline in the Cretaceous Western Interior Seaway and discovered the first documented suite of fossil sea turtle nesting structures.

The covering pit, a surface disturbance dug by the turtle to camouflage the neck of the egg chamber, provided fascinating evidence that Cretaceous sea turtles had already evolved defenses against destruction of their nests by their predators, the dinosaurs. Modern sea turtles use this same technique, making covering pits in the sand to disguise their eggs from wild hogs, raccoons, foxes, birds, and other predators.

This nest is the first and only known fossilized sea turtle nest. More significantly, it indicates that the camouflaging behavior of ancient sea turtles had already evolved and been integrated into the nesting behavior of sea turtles 70 million years ago.

*Gale A. Bishop, geologist, paleontologist, and conservationist, is Emeritus Professor of Geology at Georgia Southern University, where he taught from 1971 to 1999. He founded the St. Catherines Island Sea Turtle Program in Georgia, which he has directed since 1990. He now splits his time between sea turtle conservation in Georgia and science education reform in Iowa. Fredric L. Pirkle, is an economic geologist with Gannett Fleming Inc. of Jacksonville, Florida, whose additional input to this article is appreciated.*

# Traditional Sensibility in the Andamans

During a visit to India's Little Andaman Island in January 2006, members of the Andaman and Nicobar Islands Environmental Team met a man named Tai, an elder of the Onge community who lives within a tribal reserve along the island's west coast. Team members explained their intent to study the impact of the recent tsunami on sea turtles and asked Tai if he had any information on how the turtles had been affected. After recounting how he and others had escaped the tsunami, Tai told a story that highlights the important human relationship with nature that often exists within traditional communities.

Following the tsunami, the Onge women craved sea turtle meat and asked the men to go hunting. They did, and returned with a few green turtles, which feed in nearby seagrass beds.

The turtles, however, were very lean and lacked the fat and thick flesh that the Onge women desired. The women were disappointed. The community concluded that because the nearby seagrass beds had been damaged by the tsunami, the turtles were not finding enough food to stay healthy and fat. As a result, the women decided that despite their hunger for sea turtle meat, the men should not hunt again until the seagrass beds had recovered and the turtles had returned to feed and regain their health. Since then, Tai said, the men had stopped hunting not only turtles, but dugongs, which also feed on the grasses.

The Andaman and Nicobar Islands are home to many indigenous communities who live traditional lifestyles of hunting, gathering, and small-scale cultivation. These islanders are exempt from the Indian Wildlife Protection Act and are allowed to use wildlife for sustenance, but not for sale. Their traditional lifestyles and direct relationships with nature provide an enlightening contrast to more recently settled communities in this same island group.

There are many other threats to sea turtles in the area, such as ghost fishing nets, poaching, and beach loss attributable to sand mining—most of these brought on by recent settlers or by changes in traditional



Consumption of sea turtles is not uncommon among peoples of the Andaman Sea. Here, Nicobari villagers from Chingen on Great Nicobar Island prepare a green turtle for eating. © KARTIK SHANKER

lifestyles. The Onges' story highlights the simple wisdom of this community in managing resources effectively. It reminds us that conservation is not only about looking forward to new management systems, but also about looking back to traditional ideas and practices.

*Manish Chandi is a member of the Andaman and Nicobar Islands Environment Team.*

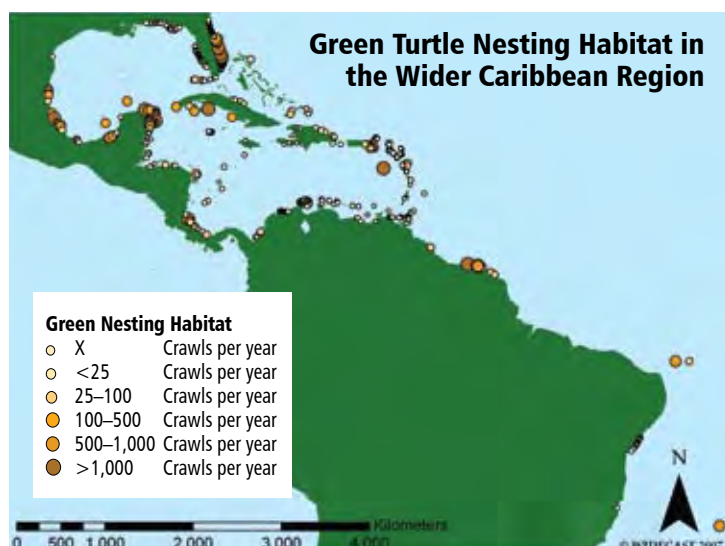
## Where Do Sea Turtles Nest in the Caribbean Sea?

In a recent assessment, the Wider Caribbean Sea Turtle Conservation Network (WIDECAS) answered the question definitively. Current nesting grounds for six sea turtle species, including 592 sites for the green turtle (shown in the map at left), were georeferenced and mapped in collaboration with The Nature Conservancy, the United Nations Environment Programme—Caribbean Environment Programme, the Pegasus Foundation, the U.S. Fish and Wildlife Service, and more than 100 data contributors in the Caribbean region.

The study concludes that Caribbean green turtles typically nest in small colonies. More than half of all known nesting beaches receive fewer than 25 crawls (including successful and unsuccessful nesting attempts) each year. At 141 sites (23.8 percent of the total sites), current data are insufficient to estimate annual crawl abundance, although these colonies are also likely to be very small.

The 32 beaches (5.4 percent of total beaches) reporting more than 500 crawls per year are mostly distributed along the continental margins of the wider Caribbean region. Tortuguero, Costa Rica, recorded more than 50,000 crawls in the 2005 nesting season—by far the region's largest green turtle nesting colony.

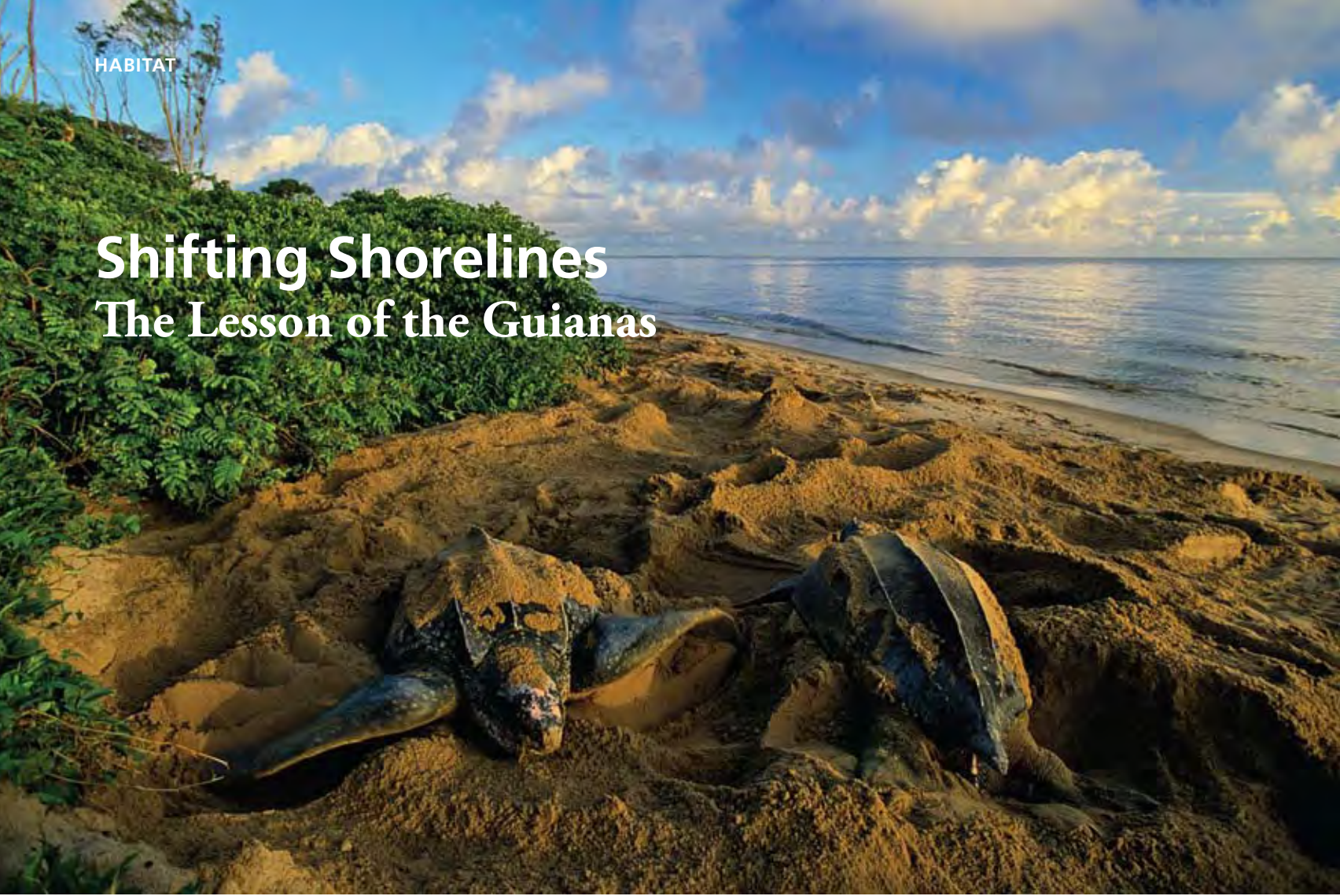
The database—which will soon be accessible through OBIS-SEAMAP at <http://seamap.env.duke.edu/>—significantly expands conservationists' understanding of habitat use, helping them monitor stock recovery and safeguard the turtles' habitat in new and collaborative ways.



*Text and map courtesy of Wendy Dow and Karen Eckert at WIDECAS*

# Shifting Shorelines

## The Lesson of the Guianas



Two leatherbacks camouflage their nests on Les Hattes beach, in front of the village of Yalimapo in French Guiana. © OLIVIER GRÜNEWALD

Nearly a decade ago, I made a trip through the Guianas—three small, tropical countries on the northern coast of South America. From Georgetown, Guyana, I traveled east into Suriname and on to Cayenne, French Guiana. I traveled outward by small aircraft and returned overland by a complex formula of taxis, minibuses, and river ferries. I passed villages galore, with crowds of people of seemingly every race on Earth waiting for ferries or bargaining for vegetables. I journeyed through agricultural areas and sugar estates. The languages changed at every border—English Guyana-style, then Dutch and Taki-taki, and then French and Creole.

But from the air, I was reminded how truly narrow that coastal band of human development really was. For hours as I flew, the impact of humans on the landscape was essentially invisible, the lumpy green carpet of the forest broken only by rivers. What a prize, I thought to myself, in a world where human overpopulation is overwhelming natural resources almost everywhere.



But sea turtles had first brought me to this coast in 1964. I was intrigued by an adult olive ridley on exhibit in the Georgetown museum. What on Earth was a Pacific ridley doing in the western Atlantic Ocean? This was a first. The rumor in the city was that sea turtles nested at Shell Beach, and so I went there. By the time I arrived, the turtle hunters had done their work for the season. Everywhere lay shells and skulls of slaughtered turtles—hawksbills, greens, and ridleys—and one or two old leatherback skulls. However, these carcasses represented the first vouchered nesting records for all four species for South America. I returned the next year during nesting season and tagged mostly hawksbills. The hawksbills were unusually large, but the green turtles were huge—twice the weight of greens from Tortuguero in the western Caribbean.

In later years, I worked the beaches of eastern Suriname, where I saw not only my first nesting leatherbacks, but also the olive ridley arribada at Eilanti, a small beach overlooking the broad Marowijne estuary. Later still, following a tip-off from fishers, my colleagues and I discovered the Holy Grail of nesting sites—the open-sea beach of Silébache in French Guiana, where approximately 300 turtles nested each night.





Forty-three years later, I still work with turtles of the Guianas. I have remained intimately involved with the Guyana effort, now an Arawak-run project—an excellent example of local stakeholder involvement. I have witnessed vast changes. Shell Beach washed away years ago, and the turtles have rotated through a series of other beaches. Each season, we set up conservation camps on two or more important beaches, as opportunity presents. The leatherback is now the most abundant turtle by far, while ridleys have mostly left the scene. We have seen a progressive, although unsteady, upsurge in nesting, and we are still trying to understand the 2000 season, when we had about 10 times more turtles than ever before—nearly all leatherbacks.

In Suriname, some beaches have disappeared, while others have shifted, grown, or stabilized. The Galibi River beaches are stable, with important leatherback colonies. The ridleys have mostly left Eilanti—now choked with silt behind a mud bank—and are relocating to Montjoly beach, east of Cayenne, and to Brazil. For several years in the 1990s, a new beach—Samsambo—in front of the Eilanti mud banks was colonized by leatherbacks.

Since the “discovery” of French Guiana’s leatherbacks in the late 1960s, the country has been known to be the home of one of the largest leatherback nesting colonies in the world. Leatherbacks lost their open-sea beach to erosion around 1973, forcing most of the nesting into the Mana River mouth. Today, however, leatherback nesting in French Guiana has rebounded along all the oceanfront beaches, with 60 percent of turtles nesting on the open coast and 40 percent on the more protected estuarine and river beaches.

The lesson of the Guianas is that we cannot know the parameters of a turtle population after a single visit, a single month, or even a single year. Turtles are here for the long haul, having endured rising sea levels and similar drastic changes many times throughout their ancient histories. They have survived by making adjustments. We, as conservationists,

must prepare for changes. We must adapt, we must make adjustments, and—like the turtles themselves—we must be in it for the long haul.

*Peter C. H. Pritchard is one of the world’s foremost experts on turtles and tortoise and founder of the Chelonian Research Institute.*

## Good News for Greens Beach Protection Works

For centuries, the world’s largest marine herbivore, the green turtle, was exploited for eggs and meat until it teetered on the edge of extinction. Now, thanks to sustained conservation efforts, encouraging news has emerged for this megaherbivore: long-term nesting beach protection works.

In a recently released study, Milani Chaloupka and his coauthors, while researching green turtles in Australia, Costa Rica, Japan, and the United States, analyzed nesting data from six of the world’s major green turtle rookeries for which there are reliable long-term data of 25 years or more. The analysis showed that green turtle nesting on four beaches in the Pacific Ocean (Ogasawara, Japan; French Frigate Shoal, Hawaii, U.S.A.; and Heron and Raine Islands, Australia) and two beaches in the Atlantic Ocean (Archie Carr National Wildlife Refuge, Florida, U.S.A. and Tortuguero, Costa Rica) have increased by an estimated 4 to 14 percent each year during the past two to three decades. The increases in nesting varied considerably among the rookeries, most likely because historical and current exploitation of green turtles is different at each site.

These results should be celebrated as they demonstrate that green turtle populations and presumably the green turtles’ ecosystem roles can be recovered in spite of drastic population declines in the past. Green turtles and their nests at all of the study sites have been protected for decades, underscoring the fact that conservation works—that the hard work of the researchers, community members, park rangers, and other conservationists who have spent tens of thousands of hours patrolling these six nesting beaches to protect sea turtles has paid off. The study gives hope to those working on other nesting beaches that their efforts will generate positive results if the conservation work continues for several years.

The authors of the study offer a word of caution. This good news is not *ultimate* news. Green turtles and nests are still poached at some of the studied sites, which could threaten the populations’ long-term recovery. Furthermore, some important green turtle nesting populations are probably still reduced from their past numbers and will require ongoing protection to ensure their full recovery.

Even so, in a world brimming with grim reports about our planet’s health, this study’s testimony that conservation works is a beacon of light for turtles and conservationists alike.

*For more information, read the article “Encouraging outlook for recovery of a once severely exploited marine megaherbivore” by Milani Chaloupka, Karen A. Bjorndal, George H. Balazs, Alan B. Bolten, Llewellyn M. Ebrhart, Colin J. Limpus, Hiroyuki Suganuma, Sebastian Troëng, and Manami Yamaguchi in Global Ecology and Biogeography (www.blackwellpublishing.com/geb).*



A new study reinforces that long-term protection of green turtle nesting sites is a successful conservation effort, with populations increasing by 4 to 14 percent over the past 20 to 30 years at protected beaches. © LUCIANO CANDISANI 

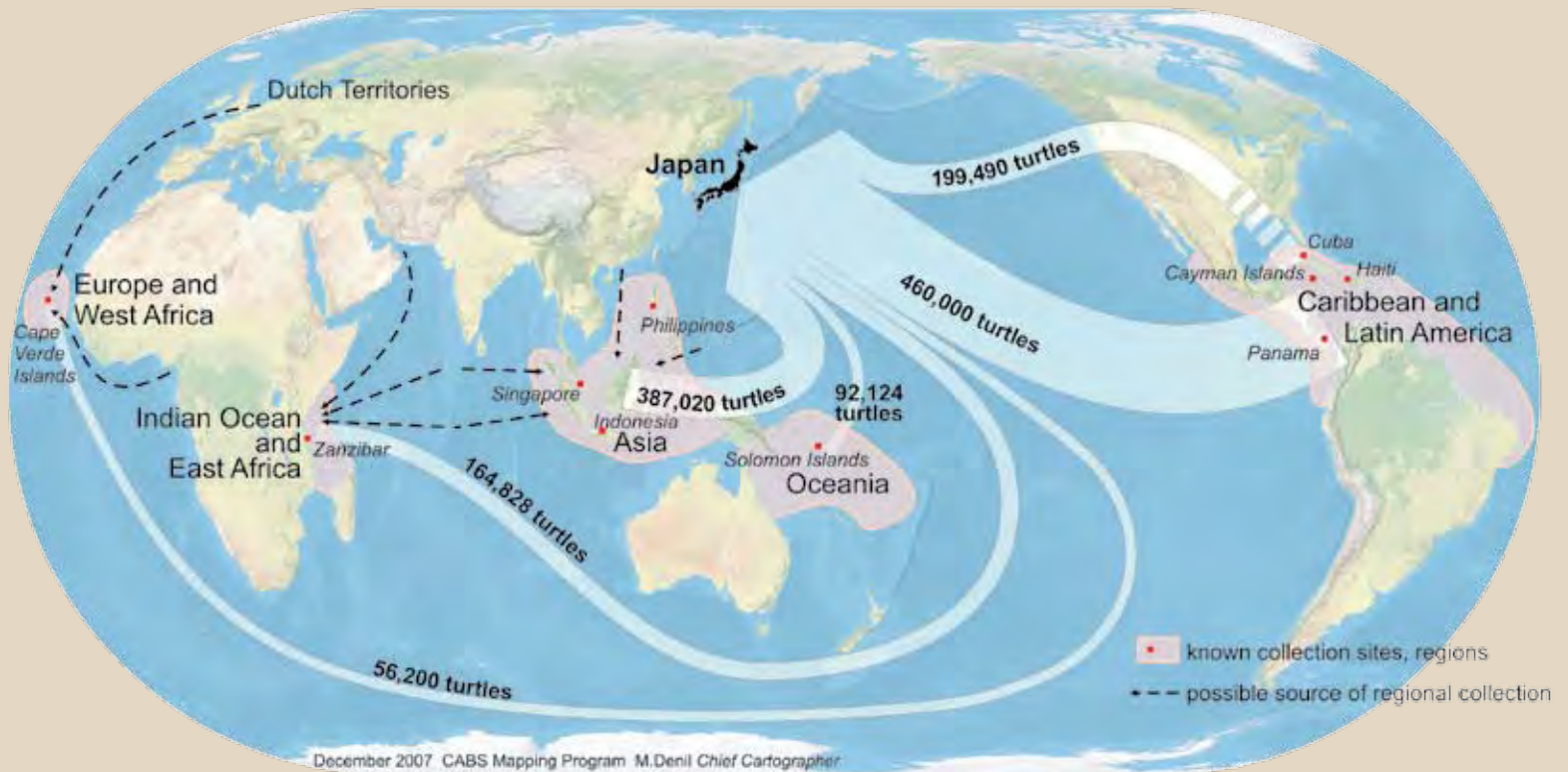
# Trade Routes for Tortoiseshell

Prized since ancient times, tortoiseshell has been surrounded by legend for millennia. Old World trade routes moved this precious commodity to the Arabs, Chinese, Egyptians, Greeks, Romans, and Sinhalese along the coasts by praus, across continents by caravan, and in the open sea by flotillas of sea nomads. During the Middle Ages, throughout centuries of European discovery, and into the 19th century, the global tortoiseshell trade flourished. Since 1700, the Japanese have been renowned as the world's best tortoiseshell, or *bekko*, artisans.



On the shores of Lake Nam Tso on the Tibetan Plateau, at the highest altitude saltwater lake in the world and closer to Mount Everest than to the nearest ocean, a Tibetan woman proudly displays her *bekko* bracelet. © RODERIC B. MAST; INSET: In November 2007 Didiher Chacón of WIDECASST led an investigation and confiscation of illegal tortoiseshell items sold by vendors in Puntarenas, Costa Rica. Among the items confiscated were these pieces of jewelry. © WIDECASST

## Japanese *Bekko* Imports by Region, 1950–1992



Hawksbill shell has been traded throughout the world for millennia. The Japanese have figured prominently in the trade of this commodity, which they call “*bekko*.” The figure above depicts Japanese *bekko* imports from 1950 to 1992, using Japanese customs statistics. Japan was the world’s major importer of hawksbill shell during the 20th century; its imports did not cease until the end of 1992. Major locations of export in each region are marked with red dots. Data on *bekko* volume were compiled and converted to approximate numbers of turtles from Japanese government trade statistics (from Mortimer and Donnelly’s forthcoming *IUCN Hawksbill Red List Assessment*).

During the past 100 years, millions of hawksbills have been killed to supply luxury and craft markets around the world. In the early decades of the 20th century, warnings in the Caribbean and in Asia to end wanton hawksbill killing and intense egg collection went unheeded. Excessive exploitation has had an enduring effect on the world’s hawksbill populations and is central to understanding and predicting current population trends. As the largest market for *bekko* in the 20th century, Japan imported shells from nearly 2 million hawksbills from 1950 to 1992—more than 1.3 million large turtles and 575,000 stuffed juveniles. Although the global trade is much reduced after decades of conservation, it remains an ongoing and pervasive threat in the Americas, Asia, and parts of Africa.

The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) came into force in 1975. By 1977, it prohibited international tortoiseshell trade among its signatory nations. At that time, at least 45 countries were involved in exporting and importing raw tortoiseshell. As trading nations ratified CITES, the volume of trade diminished.

Trading did not stop for several decades, however, because Japan took an exception or reservation to the ban when it joined CITES in 1980. By 1992, international pressure forced Japan to end its tortoiseshell imports. Although Japan agreed to retrain hundreds of *bekko* artisans, it has not followed through on this commitment and has

supported several unsuccessful efforts to reopen the international tortoiseshell trade. The standing *bekko* stockpile should now be exhausted, but the industry remains intact, and demand for tortoiseshell jewelry, eyeglass frames, and other items is high. The Japanese government continues to fund hawksbill research with the aim to reopen the trade. In early 2007, it announced its intention to support the *bekko* industry for another five years.

Despite the important progress in reducing global trade and the increases in some hawksbill nesting in areas where populations have received long-term protection, many of today’s populations are declining or remain depleted. Numerous nesting populations have neither stabilized nor begun to recover.

Better management and law enforcement are keys to the future of the species, and an educated public is the hawksbill’s greatest ally in preventing exploitation for *bekko*. Although worldwide awareness campaigns with pleas not to buy tortoiseshell products are helping to stamp out this archaic practice, greater international enforcement efforts are also needed to end the trade in the 21st century.

*Marydele Donnelly is the international policy director for Caribbean Conservation Corporation. She has worked on hawksbill trade issues since 1988.*

# Mass Turtle Poaching: A Case Study from Southeast Asia

Just when it seemed that conservation efforts were turning the tide against declining sea turtle populations in Southeast Asia, a newer and bigger threat than ever imagined has emerged: illegal and unregulated poaching of sea turtles by vessels from China and Vietnam. Turtle poaching has gone on for centuries, but in 2007, such a noteworthy increase occurred that we now must look more closely to determine the severity of this practice.

How much poaching goes unrecorded or undetected? How severe are the impacts on turtle populations? What drives this trade, and how can it be curtailed? What we know is already quite alarming.

In March 2007, Malaysian authorities seized a Chinese trawler in waters off the Sabah (Borneo) Coast. More than 200 protected green and hawksbill turtles were onboard, and only 20 were still alive. Just a week earlier, Malaysian officers had stopped a fishing trawler in a nearby area and discovered more than 70 green and hawksbill turtles onboard, most of them dead.

In May 2007, newspapers reported the shocking news that 397 dead turtles were discovered by Indonesian authorities aboard a Chinese vessel in the Derawan Archipelago in East Kalimantan. In a disturbing twist, authorities believe that the boat crew purchased the turtles from local fishers, because of the short time the Chinese vessel had spent in the area and the large number of turtles the crew had amassed. Also in May 2007, a mysterious abandoned vessel was found floating off the coast of China. Dubbed “Noah’s Ark,” it held some 5,000 rare animals, including turtles. This find exposed one of the most lucrative and destructive wildlife smuggling routes in the world—from the threatened jungles of Southeast Asia to the restaurant tables and markets of southern China.



An illegal Chinese fishing vessel with 397 dead turtles aboard was seized in East Kalimantan, Indonesia, in May 2007. The captain of the boat was later sentenced to 4 years in prison by the Tarakan Court in East Kalimantan, and 22 members of the vessel’s crew were deported to China. © WWF-TNC JOINT MARINE PROGRAM, BERAU

These latest accounts, however, are not news to Indonesian, Malaysian, or Philippine conservationists, who have been documenting turtle poaching for years. In June 2003, Bali police arrested five suspected turtle poachers and rescued 120 green turtles in a boat raid. In May 2004, Malaysian authorities apprehended 12 Chinese nationals in a vessel in Malaysian waters with 160 dead turtles onboard. In June 2005, researchers discovered a hidden turtle net with almost 150 turtles entangled and drowned. In February 2006, marine police in Bali, Indonesia, seized a boat loaded with 158 green turtles after being alerted by local fishers.

Similarly, Philippine authorities have apprehended numerous poachers originating from China and Vietnam. From as far back as 2002, vessels loaded with sea turtles, live reef fish, and sharks have been apprehended. Some incidents occur within areas of rich biological diversity, such as the Philippines' Tubbataha Reef Natural World Heritage Site. One of the most recent incidents occurred within the Turtle Islands Wildlife Sanctuary, where a Chinese vessel was found with more than 100 sea turtles. The story, if one tracks back long enough, is alarming.

What concerns Philippine conservationists most are the large numbers of hawksbill turtles that are being landed by the poachers. Fishers on apprehended vessels have the skills and materials to stuff and polish hawksbills onboard so they are ready for the curio trade when the vessels reach their home ports. Hawksbill shells are also fashioned into a variety of items, such as jewelry, violin bows, and guitar picks, all finding their way to countries as far away as the United States (see "Trade Routes for Tortoiseshell," pp. 24–25).

Green turtles are largely slaughtered for their meat, which is kept in ice storage. Dynamite and cyanide have also been taken as evidence in the seizures, creating concern that poachers are not only affecting sea turtles but also destroying coral reefs and other marine ecosystems.

Given that most of the apprehended vessels originate from Hainan province in China and that China is a signatory of the Convention on International Trade in Endangered Species and other protective treaties, conservationists are calling on the Chinese government to make significant and urgent inroads into curbing this illegal trade.



Stuffed, shellacked hawksbill turtles such as this one are often illegally caught in Southeast Asian waters to be sold as ornamentals in Asia. © VERONICA STEVANIA ANJANI

Research also must be conducted to fully understand the market forces at play in illegal wildlife trade and to design economic deterrents to such trade.

Beyond these measures, the Association of Southeast Asian Nations must strengthen its enforcement through collaborative initiatives that build on the many existing formal arrangements to protect turtles. Combating these destructive practices requires a multinational, multisector approach that will address this urgent, tragic situation.

*Nicolas J. Pilcher is co-chair of the IUCN Marine Turtle Specialist Group and executive director of the Marine Research Foundation, based in Malaysia. Professor Chan Eng Heng heads the Turtle Research and Rehabilitation Group at Universiti Malaysia Terengganu. Romeo Trono is the executive director of the Sulu-Sulawesi Seascape project and the Philippines program for Conservation International. These three authors collaborate often on the issues addressed in this article.*

## Big Conservation Impact from a Small Island

On a remote island in Indonesia's Raja Ampat archipelago, the Ayau people have pledged to forgo the main dish of their typical Christmas feast this year and every year: green turtle.

The Ayau community of 2,000, on an outlying island northwest of Papua, Indonesia, is a major consumer of turtle eggs and meat in Raja Ampat, especially during religious and *adat* (traditional) events. Traveling to nesting sites at Sayang and Piai Islands, also in Raja Ampat, for many years they poached 100 or more turtles and the eggs they carried for a single religious event each year. In the photo shown at right, in a symbolic ceremony to express their new commitment to sea turtle conservation, the Ayau turtle hunters burned a net used to capture the turtles.

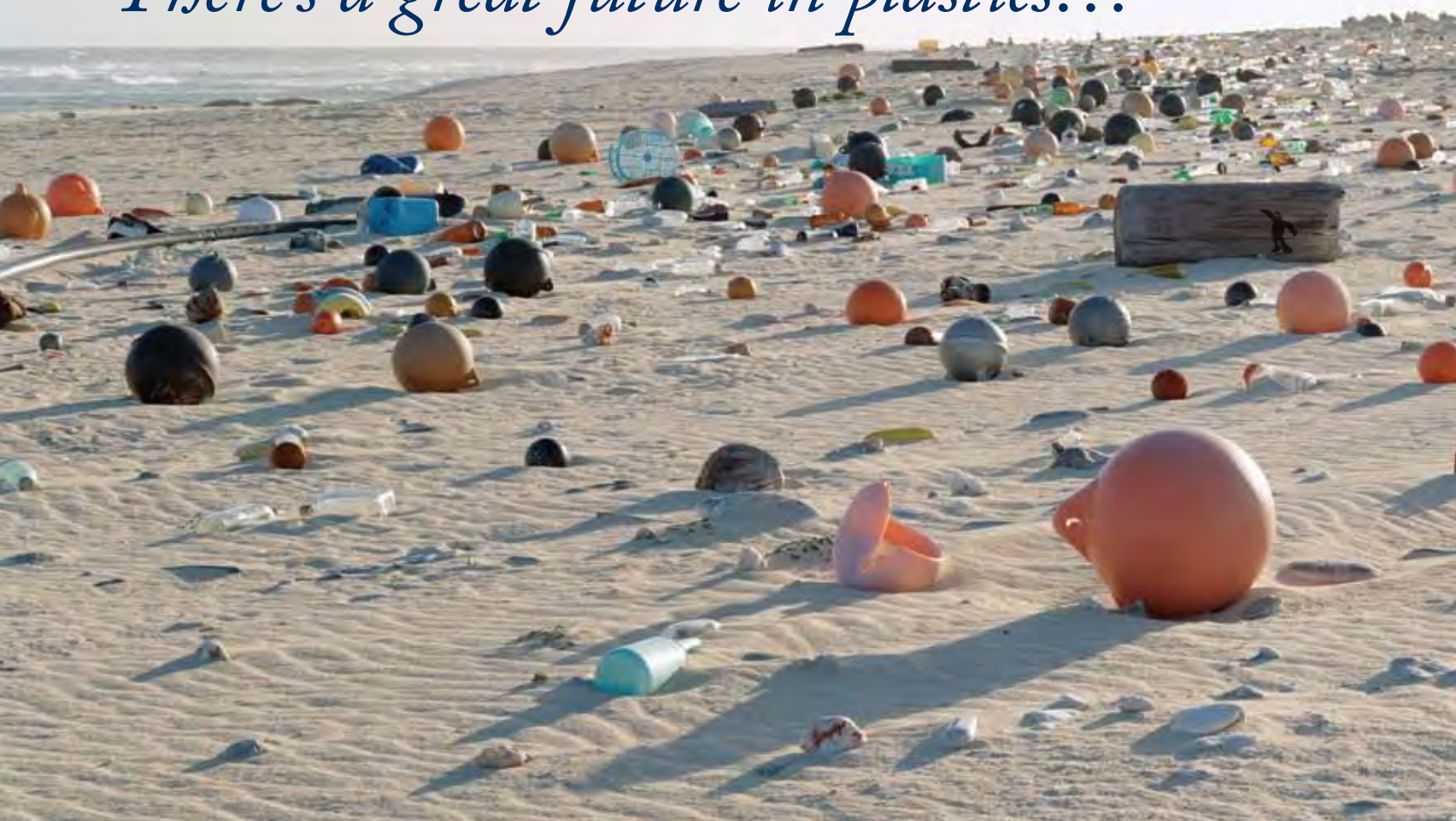
The local Raja Ampat government and Indonesia's national government have declared Sayang and Piai Islands as one of seven marine protected areas within the archipelago. These commitments by the governments and the Ayau community are positive steps toward protecting one of Indonesia's remaining sea turtle rookeries. In 2007, approximately 1,000 nests laid on Sayang and Piai Islands were protected from poachers.

The Ayau community, with the help of Papua Sea Turtle Foundation, Conservation International, and private donors, is now seeking a protein alternative for the previously relished turtle meat, such as establishing a small pig farm on the island. Taking their commitment one step further, the Ayau have begun reaching out to other island communities about also ceasing their turtle consumption.



© CONSERVATION INTERNATIONAL-INDONESIA

“There’s a great future in plastics...”



**Mr. McGuire:** I just want to say one word to you—just one word.

**Ben:** Yes, sir.

**Mr. McGuire:** Are you listening?

**Ben:** Yes, I am.

**Mr. McGuire:** “Plastics.”

**Ben:** Exactly how do you mean?

**Mr. McGuire:** There’s a great future in plastics. Think about it. Will you think about it?

**Ben:** Yes, I will.

When Walter Brooke, as Mr. McGuire, spoke those words to Dustin Hoffman in his legendary role as Benjamin Braddock in the classic film *The Graduate*, audiences would not have known just how enduring the future of plastics would be. Quite likely, the very same plastics discarded in 1967, the year *The Graduate* took moviegoers by storm, still persist in landfills and in the ocean today. In fact, plastics now make up 60 to 80 percent of all marine debris—a percentage increasing at an alarming rate—with dire consequences for marine wildlife, including sea turtles.

Whether you live far inland or near the coasts, your actions have an impact on marine pollution. About 80 percent of marine debris, including plastics, comes from land-based sources such as landfills, industrial facilities, recreational activities, and sewage and storm runoff. These wastes can be carried great distances to the coasts and oceans by rivers, storm drains, and winds.

The other 20 percent of marine debris comes from merchant and passenger ships; offshore oil and gas platforms; fish farming operations; and other recreational, commercial, and military craft.

Plastics are popular because they are strong, durable, lightweight, and inexpensive. Unfortunately, these same characteristics also make plastics a danger to the environment, as they are persistent and easily carried on winds and currents. Aside from the direct physical impacts of plastic debris, the production of plastics, which are petroleum based, is also resource intensive and may contribute to climate change.

Sea turtles and other marine species are affected by plastic debris. The impacts of plastics on sea turtles fall into two main categories: entanglement and ingestion. Sea turtles entangled in plastic straps, ropes, lines, and nets can become trapped beneath the ocean surface and drown or may suffer injury or interference with their regular behaviors.

Ingestion of plastic fragments is also a real risk for sea turtles. Evidence suggests that turtles—especially young ones—feed indiscriminately, and plastic pieces often collect with passive drifting food sources. When ingested, some small plastic pieces can pass through the gut, but larger pieces completely block the digestive passages, and sharp-edged fragments cause internal injuries and infections. Plastic particles can also accumulate in the gut, where they suppress hunger and may lead to death.

An informal survey of professionals studying sea turtle stranding shows that the threats to sea turtles from plastic debris vary considerably around the world. More systematic studies are needed to explain these differences and to explore the possible ecosystemwide effects of marine plastic debris.

Despite some noteworthy efforts to reduce marine pollution (see “Leatherbacks—Going Faster Than You Think” on pages 30–31), the problem is growing. Fortunately, we, as individuals, can have a profound, positive effect by taking simple steps to reduce, recycle, and clean up:



- **Reduce.** Decrease your consumption of single-use, disposable plastic products. Bring your own reusable bags to the store, use refillable water bottles instead of single-use bottles and containers, and avoid products that use excessive packaging.
- **Recycle.** It is nearly impossible to avoid plastic altogether. When you do use plastic, be sure to recycle it. If you don't have a recycling program in your town, school, or workplace, request one! The demand for recyclable PET (polyethylene terephthalate, made from natural gas and petroleum) plastic is so high and the supply so low that recyclers are looking everywhere for new sources.
- **Clean up.** The Ocean Conservancy's International Coastal Cleanup ([www.coastal-cleanup.org](http://www.coastal-cleanup.org)) is one successful effort in which volunteers around the world collect trash from local coasts and waterways.

*Roz Cohen, now retired, was a biological oceanographer with the National Oceanic and Atmospheric Administration. She currently volunteers with Conservation International's Sea Turtle Flagship Program. She gratefully acknowledges those who responded to her survey with valuable data, images, and insights that contributed to this article.*

## Plastics by the Numbers

- More than 2.27 billion kg. (5 billion lbs.) of PET (polyethylene terephthalate) plastic products were manufactured in the U.S. in 2005.
- In the U.S., less than 25% of plastic bottles are recycled.
- Anywhere from 500 billion to 5 trillion plastic bags are used worldwide each year. Americans alone use about 380 billion plastic bags, sacks, and wraps each year.
- According to the city of San Francisco, less than 1% of plastic bags are recycled worldwide; 2% are recycled in the U.S.
- Roughly 6.4 million tons of marine litter are deposited in oceans and seas each year.
- 60% of trash on beaches is plastic. 90% of debris floating in the ocean is plastic.
- More than 13,000 pieces of plastic litter are floating on every square kilometer of ocean today (46,000 pieces per square mile).
- On a single day in 2006, volunteers with the Ocean Conservancy's International Coastal Cleanup helped clean 55,619 km. (34,560 mi.) of shoreline and removed about 3.18 million kg. (7 million lbs.) of trash; divers collected 103,079 kg. (227,250 lbs.) of debris from the riverbed and seafloor.
- In the North Pacific gyre, there are about 3 kg. (6 lbs.) of plastic for every 0.5 kg. (1 lb.) of zooplankton in the water column.
- Discarded plastic fishing gear and other plastic marine debris kill more than 1 million seabirds and 100,000 marine mammals and sea turtles each year.
- Worldwide, at least 267 species are affected by marine debris.

As far as the eye can see, marine debris litters the windward side of Laysan Island (Kauo) in the Northwestern Hawaiian Islands—from the book *Archipelago* by David Liittschwager and Susan Middleton.  
© DAVID LIITTSCHWAGER AND SUSAN MIDDLETON



# Leatherbacks— Going Faster Than You Think

In April 2007, scientists, corporations, conservation partners, publicists, and educators joined together to host a creative new kind of conservation awareness campaign: **the Great Turtle Race**. This major international event was organized by The Leatherback Trust, Tagging of Pacific Predators, Costa Rica’s Ministry of Environment and Energy, and Conservation International.

In the race, satellite tags on 11 female leatherbacks tracked the turtles’ migratory movements from the “starting line” at Playa Grande, Costa Rica, to the “finish zone” near Ecuador’s Galapagos Islands, where the leatherbacks forage. Ten of the turtles were sponsored by a corporation or other institution.

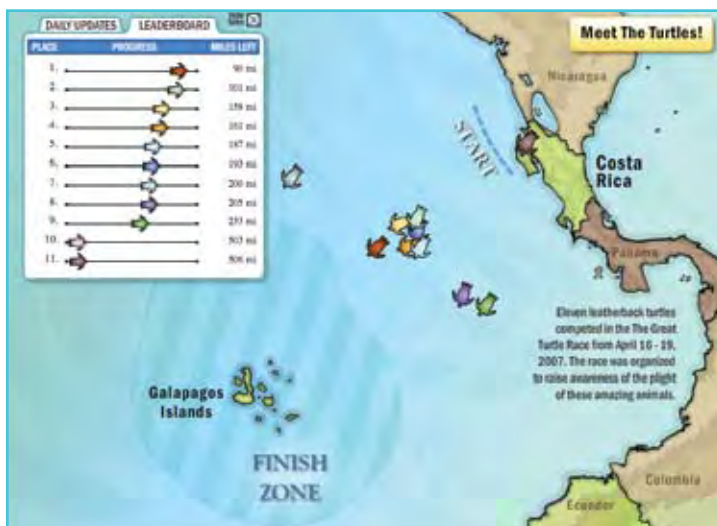
The eleventh turtle was named Stephanie Colburtle in honor of comedian Stephen Colbert. When notified of the tribute, Colbert introduced Stephanie and the Great Turtle Race to his audience of approximately one million fans on his hit Comedy Central show, “The Colbert Report,” providing updates on Stephanie’s progress throughout the race.

As a result of this and the hundreds of articles, television news reports, radio interviews, and online blogs covering the 14-day event, the Great Turtle Race captured the hearts, consciences, and fundraising dollars of U.S. and international audiences, reaching more than 28 million individuals in North America and more than 100 million internationally.

All of this was a great boon for leatherback turtles, which are “going faster than you think.” Leatherbacks are 100 million-year-old, massive sea animals that survived the dinosaurs but are now dangerously close to extinction. Their numbers have decreased at Playa Grande from

thousands of nesting turtles 10 years ago to fewer than 100 in the past five years. This online event raised funds to protect Playa Grande and raised awareness about what we humans can do—no matter where they live—to help protect sea turtles in our daily actions.

Stay tuned for a second Great Turtle Race, set to take place in May 2008. Keep an eye on [www.greatturtle.com](http://www.greatturtle.com) to find out more and cheer on your favorite turtle!

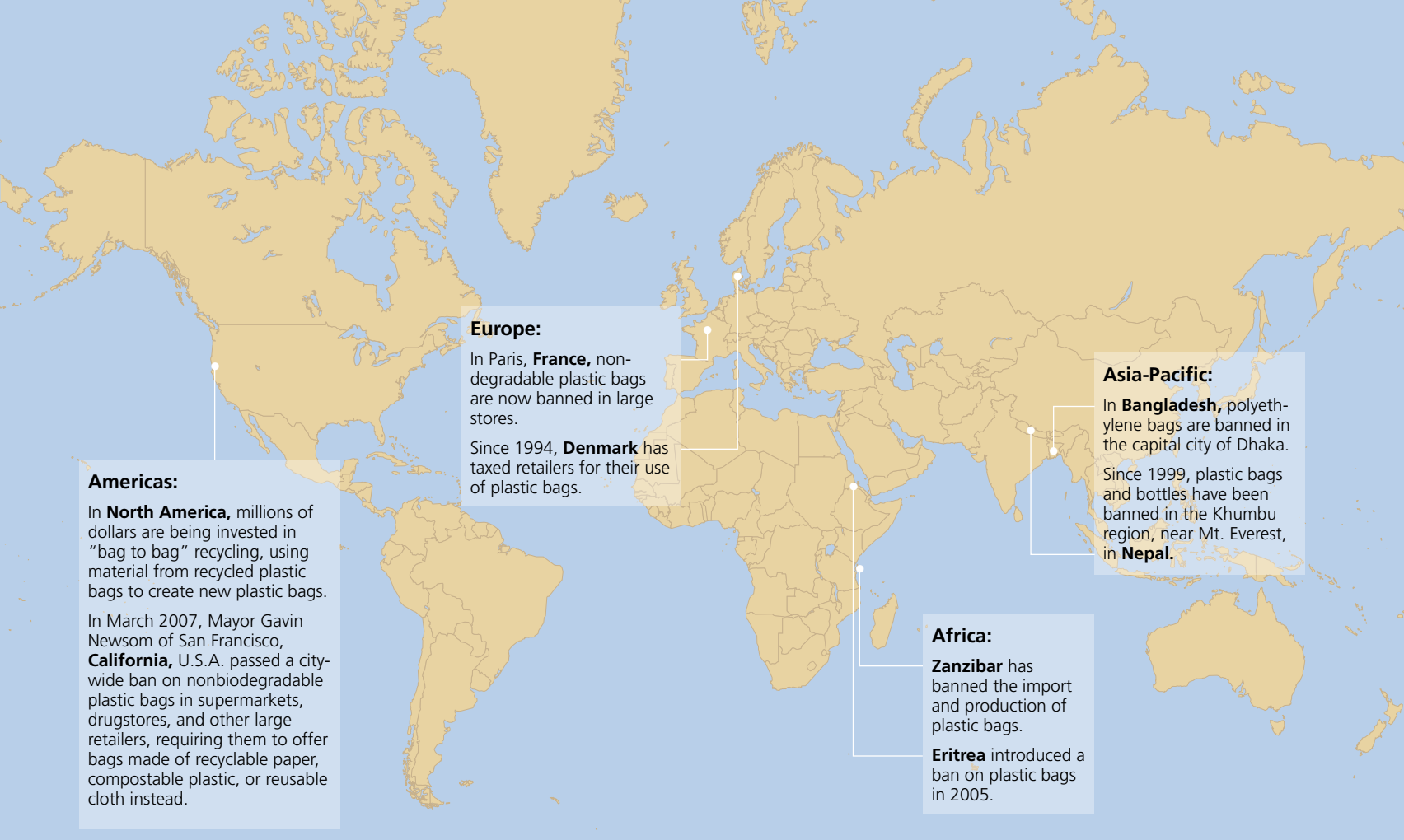


The turtles’ movements were updated every few minutes on this animated map on the homepage of [www.greatturtle.com](http://www.greatturtle.com), hosted by Yahoo!.



HHNT: All leatherback's silhouette is hidden in 11 different places in this issue of SWOT Report—in rock formations, in the water, and alongside his turtle friends. See the SWOT website for all 11 hiding places!





**Americas:**

In **North America**, millions of dollars are being invested in “bag to bag” recycling, using material from recycled plastic bags to create new plastic bags.

In March 2007, Mayor Gavin Newsom of San Francisco, **California**, U.S.A. passed a city-wide ban on nonbiodegradable plastic bags in supermarkets, drugstores, and other large retailers, requiring them to offer bags made of recyclable paper, compostable plastic, or reusable cloth instead.

**Europe:**

In Paris, **France**, non-degradable plastic bags are now banned in large stores.

Since 1994, **Denmark** has taxed retailers for their use of plastic bags.

**Asia-Pacific:**

In **Bangladesh**, polyethylene bags are banned in the capital city of Dhaka.

Since 1999, plastic bags and bottles have been banned in the Khumbu region, near Mt. Everest, in **Nepal**.

**Africa:**

**Zanzibar** has banned the import and production of plastic bags.

**Eritrea** introduced a ban on plastic bags in 2005.

Plastic bag policies are being implemented in many different locations around the world. These are a few examples.

**Did you know that each year, thousands of sea turtles choke on plastic bags after mistaking them for jellyfish, a favorite food?**

During the Great Turtle Race, race fans and I spread the word about the dangers of plastic pollution for sea turtles like me and for other animals in the ocean. As a result, more than 17,000 people have taken a personal online pledge to reduce their personal plastic consumption!

Governments and corporations around the world are also beginning to take note of this important issue. The map above shows a few examples, and I’d like to say “thanks!” and “great job!” to all of the leaders who are doing their part to reduce plastic pollution.

Be sure to read the article about plastic marine debris on pages 28–29 of the magazine to learn more about why plastics are so dangerous to ocean critters and how your daily actions can make a difference!



RIGHT: The turtle known as Billie, sponsored by Offfield Center for Billfish Studies, took first place on Day 11 of the Great Turtle Race, followed by Stephanie Colburtle and GITI Tires’ Champira in second and third places, respectively, on Day 12.

BELOW: Each time Stephen Colbert included the Great Turtle Race in his comedy sketches on “The Colbert Report,” website hits at [www.greatturtlerace.com](http://www.greatturtlerace.com) skyrocketed.



# Reaching Out around the World

## 2007 SWOT Outreach Grants

One of the most successful aspects of the SWOT initiative has been the implementation of a small fund for grants to organizations wishing to incorporate *SWOT Report* into outreach efforts in communities around the world. For the second consecutive year, these grant recipients have sparked inspiration not only in their target audiences, but also in the editorial team of *SWOT Report*, which oversees the grants. We thank you for your efforts.



A ranger for the Nicaraguan Ministry of Environment holds eggs from the turtle nests damaged by poachers. © KIM WILLIAMS-GUILLEN / PASO PACIFICO

### Paso Pacífico — Nicaragua

Paso Pacífico's sea turtle outreach and education campaign in San Juan del Sur, Rivas, Nicaragua, is aimed at communities surrounding the La Flor Wildlife Refuge, an important olive ridley and leatherback nesting ground. Paso Pacifico strives to increase local appreciation for sea turtles and their environment and to enhance cooperation among La Flor reserve managers for the benefit of the sea turtles and sustainable tourism. With SWOT Outreach Grant funds, workshops were held in the communities of La Tortuga, Ostional, and Escaemequita, sharing lessons from volumes I and II of *SWOT Report*, to emphasize the importance of community involvement. Sixty-five participants, including fishers and youth from the community, were introduced to the sea turtle species of the region and the conservation challenges they face. Individual meetings to explain the campaign were held with community leaders, members of the municipal government, and the Nicaraguan Ministry of Environment. Paso Pacifico plans to continue efforts to promote coastal and marine conservation through various ecotourism, educational, and community-led turtle monitoring programs.

### Sea Turtle Conservation Project — Lebanon

In a country where recent war has complicated daily life, Mona Khalil has been successful in creating the Sea Turtle Conservation Project in south Lebanon. The program raises awareness and helps to protect the sea turtle nesting beach of El Mansouri–El Koliala. Mona's SWOT Outreach project was targeted at volunteers on the beach. Initially, students from other regions of the country were enlisted to help protect the nesting beaches, but because of the recent war, they were unable to take part. Tourists on seaside holidays and soldiers stationed on the beach, however, were available and willing to lend a hand in monitoring and cleaning up the beach. Local teachers began to disseminate conservation information from sources



Soldiers stationed at El Mansouri–El Koliala beach engage in conservation efforts. © MONA KHALIL

such as *SWOT Report, Vol. II*—which featured an article by Khalil about El Mansouri–El Koliala—to their students and communities, raising awareness about the importance of protecting the nesting beach. Several groups of special needs children were also given the opportunity to assist in the release of sea turtle hatchlings. Despite rigorous challenges, Khalil's relentless effort has increased the conservation consciousness of nearby communities, government authorities, and foreign visitors, mitigating the hazards to turtles in their nesting habitat.



The sea turtle tagging crew on Gielop Island, Ulithi Atoll, finds an entertaining way to demonstrate how to measure a turtle's carapace. © OCEANIC SOCIETY

## Oceanic Society — Micronesia

The Ulithi Sea Turtle Conservation Project, conducted through the Oceanic Society, is located on Falalop Island, Ulithi Atoll, Yap, Micronesia. With SWOT Outreach Grant funds, sea turtle education programs for the local community and visiting ecotourists were enhanced by educational materials from *SWOT Report*. Educational outreach focused on regional sea turtle conservation activities that were created for teachers, students, and community leaders on Falalop Island. As a means of expanding outreach efforts, a Sea Turtle Information Workshop was held for educators from the whole of Yap state, attracting more than 30 participants, who received copies of *SWOT Report* and educational supplies to add to their schools' libraries. Funds from SWOT supported educational exchanges between ecotourists and community members employed by the sea turtle project. The SWOT grant, in combination with ecotourist donations, also facilitated a Sea Turtle Scholarship awarded to an outstanding Ulithi student to cover high school tuition fees. These programs have generated a greater commitment to the efforts of the local population involved in sea turtle conservation.

## ProTECTOR — Honduras

Using the SWOT Outreach Grant, Protective Turtle Ecology Center for Training, Outreach and Research (ProTECTOR) conducted two workshops at the Reef House Resort on the island of Roatan in Honduras. The workshops were designed to facilitate positive change among indigenous fishers of the Bay Islands. Workshop attendees, who varied in age from schoolchildren to retired fishers, learned to understand the critical links between tourism and marine conservation. Group discussions and open forums were held to discuss alternatives to harvesting turtles and their eggs as a source of income. The workshops resulted in the development of a plan for a conservation-based craft market that will combine community development, tourism interest, and conservation of sea turtles and the sea. Furthermore, a grassroots movement was launched among the attendees to facilitate a change from "poachers to ProTECTORs" within many communities.



Longtime fisher Gustav Bodden reads through *SWOT Report* for advice on sea turtle conservation at the first Fishermen's Conservation Workshop held in Oak Ridge on the island of Roatan in Honduras. © ProTECTOR



Puppets such as this Chennai fisherman and sea turtle are used to educate children about marine conservation issues. © MADRAS CROCODILE BANK TRUST

## Madras Crocodile Bank Trust — India

The coast of Chennai in southern India has been a historically important nesting area for sea turtles. Recognizing the importance of educating and sensitizing local Chennai schoolchildren, the Madras Crocodile Bank Trust (MCBT) seeks to integrate those children into its Awareness Programs for Conservation of Sea Turtles. Using funds from its SWOT Outreach Grant, MCBT inaugurated its educational program at Bhuvana Krishnan Matriculation Higher Secondary School in the state of Tamil Nadu. There, nearly 200 children, ages 12 to 15, and their teachers enjoyed MCBT's puppet theater, poster exhibition, and slideshow about conservation of Chennai's olive ridley turtles. The bank plans to extend its program to several local schools in the coming months, contributing copies of *SWOT Report* to each school's library.

Visit [www.SeaTurtleStatus.org](http://www.SeaTurtleStatus.org) to apply for a 2008 SWOT Outreach Grant!



## PROGRESS REPORT: Fishers Reduce Bycatch in the Eastern Tropical Pacific

An olive ridley turtle off the Pacific coast of Costa Rica is hooked on a longline. © SAM FRIEDERICHS

The impacts of fisheries are among the five top hazards to sea turtles worldwide according to the IUCN Marine Turtle Specialist Group. One of the gravest fishery concerns is that of incidental capture, or bycatch, which accounts for the deaths of tens of thousands of turtles annually—deaths that are unintended, unwanted even by the fishers involved, and preventable. With years of data, world opinion, and technology combining to make the problem solvable, the fight against sea turtle bycatch may be reaching its tipping point at last.

Among Eastern Tropical Pacific countries, for instance, three years of collaborative engagement of fishers, nonprofit organizations,



Bycatch is one of the greatest current threats to sea turtles, including olive ridleys (shown in this photo). Solutions that effectively reduce catch rates and do not put fishermen out of business are socially acceptable and likely to be sustainable. © ALVARO SEGURA / WWF

researchers, and government agencies have led the way toward a profound transformation in the longline fishing industry. Nearly 300 vessels, 1,200 fishers, and 300 captains now participate in a bycatch reduction program. Eighty-six vessels now fully use turtle-friendly circle hooks and best fishing practices, and many more are making the shift.

This regional effort was initiated in 2003 in Ecuador by fishers, WWF, the Inter-American Tropical Tuna Commission, the National Oceanic and Atmospheric Administration, and the Ocean Conservancy, as reported in *SWOT Report, Vol. I* (2005). The effort has expanded to a network of partners in Colombia, Costa Rica, Ecuador, El Salvador, Guatemala, Mexico, Panama, and Peru, actively seeking solutions to bycatch problems and making changes that ensure the sustainability of their fisheries.

In the coming three years, this network will reach at least 2,000 artisanal longline vessels—a testimony to the fishers' willingness to prevent sea turtle bycatch and to adopt an ecosystem perspective toward the business of extracting ocean resources. The change is timely, amid an international market that increasingly demands sustainably sourced seafood.

Sea turtle bycatch is a major issue in longline fisheries targeting mahi mahi, swordfish, tuna, and other large fish. To achieve solutions, fishers deploy experimental fishing lines and act as onboard observers to collect scientific information, including turtles' interactions with the fishing gear. More than 1,000 experimental fishing trips and 1.6 million set hooks feed the regional database to test the gear's ecological and economic performance. One important conclusion has been that circle hooks are less harmful for turtles than J-hooks.

Most fishers are satisfied with the gear change, because in addition to reducing marine turtle mortality, large circle hooks and J-hooks have similar catch rates of tuna. However, catch rates of mahi mahi may be reduced by certain circle hooks in some fisheries. Continued research will refine the solutions to best suit the industry and to protect the turtles.

By far the most important achievement of this program to date has been the development of a trusting relationship among the fishing industry, non-profit organizations, and government agencies in focusing on the common goal of bycatch reduction.

*Carlos Drews is WWF's marine program and species coordinator for Latin America and the Caribbean. His work with sea turtles during the past four years addresses community well-being, bycatch, and climate change with a regional perspective and includes publications on the economic value and livelihoods value of turtles.*

# Make Love, Save Turtles



Many tourists visit Florida each year with Mickey Mouse and Shamu on their minds. The Marco Island Marriott Beach Resort and Spa and the Harbor Beach, Fort Lauderdale, Resort and Spa are giving some Florida tourists another animal to consider: sea turtles. These tourists, however, are in the mood for something a bit more risqué than Disney's Magic Kingdom or Sea World.

During sea turtle nesting season, these two resorts market to couples looking for romantic getaways with puckish promotions such as their "Fertile Turtle" and "Nocturnal Nesting" promotions. Playing on sea turtles' age-old reputation for fertility and virility (after all, it is rumored that turtles can copulate for as long as two weeks), these promotional packages include fertility-enhancing teas, couples massages with pregnancy-promoting aromatherapy, aphrodisiac-infused cocktails, and romantic moonlight beach walks for couples hoping to fertilize eggs of their own.

The night walks, guided by park rangers, offer guests the opportunity to witness sea turtles nesting. Meanwhile, the resorts take precautions to protect the turtles and their nesting habitats with turtle-friendly black exterior light bulbs and blackout drapes in guest rooms. At the Harbor Beach property, agents from the U.S. Environmental Protection Agency survey the beach each morning to ensure that nests laid overnight are taped off. A portion of the proceeds from the Marco Island property's "Fertile Turtle" package goes to the



At the Marco Island Marriott Beach Resort and Spa, the "Fertile Turtle" package includes a couples massage with chasteberry aromatherapy. Chasteberry is an herb that purportedly increases fertility by stimulating the pituitary gland, which regulates the body's production of estrogen, progesterone, and testosterone. © MARCO ISLAND MARRIOTT BEACH RESORT

National Save the Sea Turtle Foundation, which educates children about sea turtle conservation.

Both the "Fertile Turtle" and the "Nocturnal Nesting" packages have been well received, with numerous guests inquiring about each package. The hotels that have been successful in fostering loggerhead turtle conservation will offer these packages again in the summers ahead.

# SWOT Data Contributors

## Definitions of Terms

**Nests:** A count of the number of nests laid by hawksbill females during the monitoring period.

**Nesting females:** A count of observed nesting female loggerheads during the monitoring period.

**Crawl:** A female hawksbill's emergence onto the beach to nest. These counts may or may not include false crawls.

**False crawl:** An emergence onto the beach by a female hawksbill that does not result in a nest.

**Estimated nests:** An estimate of the number of hawksbill nests laid in a season. Methods of estimation vary.

**Monitoring effort:** The level of effort used to monitor nesting on a given beach.

**Year:** The year in which a given nesting season ended (e.g., data collected between late 2005 and early 2006 are listed as year 2006).

## Hawksbill Data Citations

### Guidelines for Data Use and Citation

The hawksbill nesting data below correspond directly to this report's feature map (pp. 11-12), organized alphabetically by country and beach name. Every data record with a point on the map is numbered to correspond with that point. These data have come from a wide variety of sources and in many cases have not been previously published. Data may be used freely, but must be cited to the original source as indicated in the "Data Source" field of each record. Only original data are reported here—not the converted values that were sometimes used in the feature map. For more information on data conversions, see the sidebar on p. 13.

In the records below, nesting data is reported from the last complete nesting season in 2006 from all available beaches. For those beaches from which recent data were not available, the most recently available data are reported.

### Important Note about Hawksbill Data

Great effort has gone into providing sufficient information with each data record to allow the quality and source of the record to be fairly evaluated. While every attempt has been made to ensure the accuracy of these data, absolute accuracy cannot be guaranteed. Information on monitoring effort and its relativity to the nesting season are reported where available in order to allow for a more complete evaluation of the data.

## ANGUILLA, BRITISH OVERSEAS TERRITORY

### Data Record 1

**Data Source:** Gumbs, J. 2008. Hawksbill nesting in Anguilla: Personal communication. In *SWOT Report—The State of the World's Sea Turtles*, vol. 3 (2008).

**Nesting Beaches:** Barnes Bay, Cove Bay, Junk's Hole Bay, Limestone Bay, Long Bay, Mead's Bay, Mimi Bay, Savannah Bay, Windward Point, Sandy Hill Bay, and Shoal Bay East

**Year:** 2006 **Count:** 5–10 estimated nests at each

**Nesting Beaches:** Blackgarden Bay and Captain's Bay

**Year:** 2006 **Count:** 1–5 estimated nests at each

**Comments:** At present, there is no nesting beach monitoring program in Anguilla. Nesting numbers are estimated annual averages based on historical data.

**SWOT Contact:** James Gumbs

## ANTIGUA AND BARBUDA

### Data Record 2

**Data Source:** Munhofen, J., and S. Ramirez. 2007. *Tagging and Nesting Research on Hawksbill Turtles (Eretmochelys imbricata) at Jumby Bay, Long Island, Antigua, West Indies*. Jumby Bay Hawksbill Project, WIDECAST. Unpublished report.

**Nesting Beach:** Pasture Bay

**Year:** 2006 **Count:** 224 nests, 62 nesting females

**Beach Length:** 450 m

**Monitoring Effort:** Nightly patrols covering the entire beach were conducted between June 15 and November 15, 2006. Nesting season is June to mid-November, with its peak in August.

**SWOT Contacts:** Peri Mason and Jim Richardson

## ARUBA

### Data Record 3

**Data Source:** Van der Wal, E., and R. Van der Wal, Turtugaruba (Aruban Foundation for Sea Turtle Protection and Conservation). 2008. Hawksbill nesting in Aruba. In *SWOT Report—The State of the World's Sea Turtles*, vol. 3 (2008).

**Nesting Beach:** Arashi Beach

**Year:** 2006 **Count:** 0 nests **Beach Length:** 0.6 km

**Monitoring Effort:** Daily morning patrols covering the entire beach were conducted between June 1 and October 15, 2006.

Although no hawksbill nesting was recorded in 2006, hawksbills have been known to nest at this site in past years. Nesting season is June to November.

**Nesting Beach:** Baby Beach

**Year:** 2006 **Count:** 5 nests **Beach Length:** 100 m

**Monitoring Effort:** Nightly patrols covering the entire beach were conducted between August 1, 2006 and January 20, 2007. Nesting season is June to November, with its peak in September and October.

**SWOT Contacts:** Edith and Richard Van der Wal

## AUSTRALIA

### Data Record 4

**Data Source:** Limpus, C. J., and J. D. Miller. 2000. *Final Report for Australian Hawksbill Turtle Population Dynamics Project*. Queensland, Australia: Queensland Parks and Wildlife Service, and the Japan Bekko Association.

**Nesting Beaches:** Albany Island, Aukane Island, Bet Island, Bourke Island, Boydong Island, Dadalai Island, Layoak Island, Mimi Island, Mt. Adolphus Island, Saddle Island, Zuizin Island, and an unnamed island, Queensland

**Comments:** Nesting data from 2006 were not available. Aerial surveys combined with on-the-ground counts in February 1997 found that these 12 islands in the Torres Strait and Northeastern Queensland each hosted between 100 and 500 nesting hawksbills annually. An additional 28 islands in this region were found to have an estimated 10–100 nesting hawksbills per year, and another

27 islands were found to have an estimated 1–10 hawksbill nesting females per year. Limpus and Miller (2000) estimated that the total hawksbill nesting population in Queensland was approximately 4,000 nesting females annually.

**Nesting Beaches:** Dayman Island, Hawkesbury Island, and Long Island, Torres Strait, Queensland

**Comments:** Nesting data from 2006 were not available. Aerial surveys combined with on-the-ground counts in February 1997 found that these three islands each hosted more than 500 nesting hawksbills annually.

**Nesting Beaches:** Outer English Company Islands and the northeastern, northwestern, and southeastern areas of Groote Eylandt and nearby islands, Northeastern Arnhem Land, Northern Territory

**Comments:** Nesting data from 2006 were not available. Aerial surveys combined with on-the-ground counts in 1997 documented 12 sites in Northeastern Arnhem Land that are each estimated to host more than 100 nesting hawksbills annually. Nesting on these beaches is concentrated in the four general areas listed above: the outer English Company Islands, the northeastern area of Groote Eylandt Island, the northwestern area of Groote Eylandt Island, and the southeastern area of Groote Eylandt Island.

### Data Record 5

**Data Source:** Pendoley, K., Howitt, L., Speirs, M., and A. Viternbergs. 2008. Hawksbill nesting in Western Australia. In *SWOT Report—The State of the World's Sea Turtles*, vol. 3 (2008).

**Nesting Beach:** Bivalve Beach, Pilbara, Western Australia

**Year:** 2006 **Count:** 1 tagged female **Beach Length:** 0.6 km

**Nesting Beach:** Mushroom Beach, Pilbara, Western Australia

**Year:** 2006 **Count:** 2 tagged females **Beach Length:** 1.2 km

**Nesting Beach:** YCN, Pilbara, Western Australia

**Year:** 2006 **Count:** 2 tagged females **Beach Length:** 1.1 km

**Nesting Beach:** YCS, Pilbara, Western Australia

**Year:** 2006 **Count:** 2 tagged females **Beach Length:** 0.9 km

**Monitoring Effort:** Nightly patrols were conducted at each of the above beaches from November 22 to December 21, 2006.

Nesting season is September to December, with its peak in October and November.

**Nesting Beach:** Rosemary Island, Western Australia

**Year:** 2006 **Count:** 423 tagged females **Beach Length:** 2.2 km

**Monitoring Effort:** Nightly patrols were conducted from October 13 to 27, 2006. Nesting season is September to December, with its peak in October and November.

**Nesting Beach:** Varanus Island, Western Australia

**Year:** 2006 **Count:** 22 tagged females **Beach Length:** 320 m

**Monitoring Effort:** Nightly patrols were conducted from October 26 to November 9, 2006. Nesting season is September to December, with its peak in October and November.

**SWOT Contact:** Kellie Pendoley

### Data Record 6

**Data Source:** Bell, I. P. 2006. *Milman Island Nesting Studies 8th to 29th January 2006*. Queensland Parks and Wildlife Service.

**Nesting Beaches:** Cairncross Island, Crocodile Island, Douglas Island, and Sinclair Island, Queensland

**Comments:** These islands, near Milman Island, were not monitored during 2006, but they are known to host low-density hawksbill nesting.

**Nesting Beach:** Milman Island, Queensland

**Year:** 2006 **Count:** 229 confirmed nests, 112 nesting females

**Beach Length:** 2.4 km

**Monitoring Effort:** Nightly patrols were conducted from January 8 to January 29, 2006. These counts should be considered minimum values; the nesting season was well advanced before the monitoring period.

**SWOT Contacts:** Ian Bell, Kirstin Dobbs, and Colin Limpus

## THE BAHAMAS

### Data Record 7

**Data Source:** (1) Bolten, A. 2008. Hawksbill nesting in Bahamas: Personal communication. In *SWOT Report—The State of the World's Sea Turtles*, vol. 3 (2008). (2) Mortimer, J. A., and M. Donnelly. Forthcoming. *Eretmochelys imbricata*. In IUCN 2008, *2008 IUCN Red List of Threatened Species*.

**Comments:** Nesting data from 2006 were not available. There is scattered low-density nesting throughout the approximately 700 cays of the Bahamas. Although there is no monitoring, rough estimates place between 500 and 1,000 hawksbill nests each year throughout the Bahamian Archipelago.

**SWOT Contacts:** Karen Bjørndal and Alan Bolten

## BARBADOS

### Data Record 8

**Data Source:** Horrocks, J., Krueger, B., and J. Beggs. 2008. Hawksbill nesting in Barbados. In *SWOT Report—The State of the World's Sea Turtles*, vol. 3 (2008).

**Nesting Beach:** Bath Beach

**Year:** 2006 **Count:** 102 nests **Beach Length:** 0.9 km

**Monitoring Effort:** The entire beach is patrolled each morning year-round. Peak nesting is May to September.

**Nesting Beach:** East Coast Beaches

**Year:** 2006 **Count:** 59 nests **Beach Length:** 9 km

**Monitoring Effort:** Beaches were patrolled weekly from March 1 to July 31, 2006. Peak nesting is between March and July.

**Nesting Beach:** Needham's Point Beach

**Year:** 2006 **Count:** 354 nests **Beach Length:** 1.1 km

**Monitoring Effort:** As an index beach, it was patrolled all night, every night, from May to September, twice every night from October to November, and once every week from December through April. Nesting is year-round, with its peak from May to September.

**Nesting Beach:** South Coast Beaches

**Year:** 2006 **Count:** 261 nests **Beach Length:** 4.5 km

**Monitoring Effort:** Beaches on the South Coast were patrolled twice every night during the peak nesting season from May to September, every night from October to November, and once every week from December to April.

**Nesting Beach:** West Coast Beaches

**Year:** 2006 **Count:** 1,044 nests **Beach Length:** 22 km

**Monitoring Effort:** Beaches on the West Coast were patrolled twice every night during the peak nesting season from May to September, every night from October to November, and once every week from December to April.

**SWOT Contacts:** Jen Beggs, Julia Horrocks, and Barry Krueger

## BELIZE

### Data Record 9

**Data Source:** (1) Dow, W. E., and K. L. Eckert. 2007. *Sea Turtle Nesting Habitat—A Spatial Database for the Wider Caribbean Region*. Wider Caribbean Sea Turtle Conservation Network (WIDECAST) and The Nature Conservancy. WIDECAST Technical Report No. 6.

Beaufort, North Carolina. (2) Mortimer, J. A., and M. Donnelly. Forthcoming. *Eretmochelys imbricata*. In IUCN 2008, *2008 IUCN Red List of Threatened Species*. (3) Smith, G. W. 1992. Hawksbill turtle nesting at Manatee Bay, Belize, 1991. *Marine Turtle Newsletter* 57:1–5.

**Nesting Beaches:** Manatee Bay, Sapodilla Cays, and South Water Caye

**Comments:** Nesting data from 2006 were not available. These areas are known to support hawksbill nesting.









## THE SWOT TEAM

**Nesting Beach:** Anse à Prunes (southeastern coast)  
**Year:** 2006 **Count:** 2 nests, 5 nesting activities  
**Beach Length:** 0.54 km

**Nesting Beach:** Anse à Voile (northern Caribbean coast)  
**Year:** 2006 **Count:** 4 confirmed nests, 4 crawls  
**Beach Length:** 260 m

**Nesting Beach:** Anse Charpintiere (northeastern Atlantic coast)  
**Year:** 2006 **Count:** 2 nests, 5 false crawls **Beach Length:** 0.845 km

**Nesting Beach:** Anse Colas (middle Caribbean coast)  
**Year:** 2006 **Count:** 2 crawls **Beach Length:** 250 m

**Nesting Beach:** Anse Couleuvre (northern Caribbean coast)  
**Year:** 2006 **Count:** 1 confirmed nest, 9 crawls  
**Beach Length:** 340 m

**Nesting Beach:** Anse Lévrier (northern Caribbean coast)  
**Year:** 2006 **Count:** 5 crawls **Beach Length:** 200 m

**Nesting Beach:** Anse Meunier (southeastern coast)  
**Year:** 2006 **Count:** 1 nest **Beach Length:** 1.5 km

**Nesting Beach:** Anse Trabaud (southeastern coast)  
**Year:** 2006 **Count:** 1 nest **Beach Length:** 1.5 km

**Nesting Beach:** Dizac Diamant (southern coast)  
**Year:** 2006 **Count:** 11 nests, 14 false crawls, 12 crawls  
**Beach Length:** 2.9 km

**Nesting Beach:** Grande Anse d'Arlet (southern Caribbean coast)  
**Year:** 2006 **Count:** 1 nest **Beach Length:** 0.9 km

**Nesting Beach:** Grande Anse Loraine (northeastern Atlantic coast)  
**Year:** 2006 **Count:** 9 nests, 1 false crawl **Beach Length:** 1.65 km

**Nesting Beach:** Grande Anse Salines (southeastern coast)  
**Year:** 2006 **Count:** 9 nests, 44 crawls, 16 nesting activities  
**Beach Length:** 1.23 km

**Nesting Beach:** Grande Terre (southeastern coast)  
**Year:** 2006 **Count:** 3 nests, 4 nesting activities  
**Beach Length:** 0.59 km

**Nesting Beach:** Madiana (middle Caribbean coast)  
**Year:** 2006 **Count:** 4 crawls **Beach Length:** 200 m

**Nesting Beach:** Plage de la Française (middle Caribbean coast)  
**Year:** 2006 **Count:** 1 nest **Beach Length:** 150 m

**Nesting Beach:** Rade de Sainte Marie (northeast Atlantic coast)  
**Year:** 2006 **Count:** 2 nests **Beach Length:** 1.2 km  
**Monitoring Effort:** The above beaches in Martinique were monitored at varying levels, ranging from daily or nightly patrols, to semi-weekly patrols, to one-time observations during various portions of the nesting season. Nesting season at all beaches is May to September, with its peak in June.  
**SWOT Contact:** Claire Cayol

### MAYOTTE, FRENCH OVERSEAS COLLECTIVITY

**Data Record 58**  
**Data Source:** Bourjea, J., and S. Ciccione. Hawksbill nesting in French Overseas Territories: Personal communication. In *SWOT Report—The State of the World's Sea Turtles*, vol. 3 (2008).  
**Nesting Beach:** Mayotte Island  
**Comments:** Nesting data from 2006 were not available. An estimated 30 nests are laid per year on Mayotte Island.  
**SWOT Contacts:** Jérôme Bourjea and Stephane Ciccione

### MEXICO

**Data Record 59**  
**Data Source:** Cuevas, E., Canul-Rosado, D., Tzeek-Tuz, M., Muñoz-Terán, K., and F. Loyo-Buenfil. 2006. *Reporte Final de Actividades de Conservación en las Playas de Anidación de Celestún y El Cuyo en Yucatán e Isla Holbox en Quintana Roo, México*. Mérida, Yucatán, Mexico: Pronatura Península de Yucatán. Unpublished report.  
**Nesting Beach:** Celestún, Reserva de la Biosfera Ria Celestún, Yucatán  
**Year:** 2006 **Count:** 348 nests **Beach Length:** 24 km

**Nesting Beach:** El Cuyo, Reserva de la Biosfera Ria Lagartos, Yucatán  
**Year:** 2006 **Count:** 286 nests **Beach Length:** 31 km  
**Nesting Beach:** Isla Holbox, Área de Protección de Flora y Fauna Yum Balam, Quintana Roo  
**Year:** 2006 **Count:** 602 nests **Beach Length:** 24 km  
**Monitoring Effort:** Nightly patrols of the entire beach were conducted from April 1 to August 31, 2006, at each of the three beaches above. Nesting season is April to August, with its peak in June.  
**SWOT Contact:** Eduardo Cuevas

### Data Record 60

**Data Source:** CONANP, and Comité Estatal para la Protección y Conservación de las Tortugas Marinas del Estado de Campeche. 2008. Hawksbill nesting in Campeche, Mexico. In *SWOT Report—The State of the World's Sea Turtles*, vol. 3 (2008).  
**Nesting Beach:** Chacahito, Campeche  
**Year:** 2006 **Count:** 35 nests **Beach Length:** 8.1 km

**Nesting Beach:** Ensenada, Campeche  
**Year:** 2006 **Count:** 55 nests **Beach Length:** 6 km

**Nesting Beach:** Isla Arena, Campeche  
**Year:** 2006 **Count:** 35 nests **Beach Length:** 8 km

**Nesting Beach:** San Lorenzo, Campeche  
**Year:** 2006 **Count:** 23 nests **Beach Length:** 1.8 km

**Nesting Beach:** Victoria, Campeche  
**Year:** 2006 **Count:** 40 nests **Beach Length:** 22.73 km  
**Monitoring Effort:** Daily patrols were conducted from April 1 to September 30, 2006 at each of the five beaches above. Nesting season is April to September, with its peak in June.

**Nesting Beach:** Chenkan, Campeche  
**Year:** 2006 **Count:** 279 nests **Beach Length:** 20 km

**Nesting Beach:** Isla Aguada, Campeche  
**Year:** 2006 **Count:** 236 nests **Beach Length:** 27.75 km

**Nesting Beach:** Isla del Carmen, Campeche  
**Year:** 2006 **Count:** 245 nests **Beach Length:** 35 km

**Nesting Beach:** Punta Xen, Campeche  
**Year:** 2006 **Count:** 520 nests **Beach Length:** 30 km

**Nesting Beach:** Sabancuy, Campeche  
**Year:** 2006 **Count:** 227 nests **Beach Length:** 24.5 km  
**Monitoring Effort:** Daily patrols were conducted from April 1 to October 30, 2006 at each of the five beaches above. Nesting season is April to October, with its peak in June.  
**SWOT Contact:** Vicente Guzman H.

### MOZAMBIQUE

**Data Record 61**  
**Data Source:** Costa, A. 2007. *Report of Marine Turtle Conservation in Quirimbas National Park, Cabo Delgado*. Maputo, Mozambique: Marine Programme, WWF Mozambique.  
**Nesting Beaches:** Lemani Beach and Paquissico Tchawane Beach, Quirimbas National Park, Cabo Delgado  
**Beach Length:** 5 km  
**Comments:** Nesting data from the 2005–06 season were not available. In 2006–07, 104 hawksbill hatchlings were observed during early morning and nightly patrols from October 1, 2006, to June 6, 2007.  
**SWOT Contact:** Alice Costa

### Data Record 62

**Data Source:** Garnier, J., and I. Silva. 2008. Hawksbill nesting in Mozambique. In *SWOT Report—The State of the World's Sea Turtles*, vol. 3 (2008).  
**Nesting Beach:** Rongui Island and Vamizi Island  
**Year:** 2006 **Count:** 3 nests **Beach Length:** 12 km  
**Monitoring Effort:** Daily patrols were conducted on both islands year-round, including additional nightly patrols during the nesting season from November to March.  
**SWOT Contacts:** Julie Garnier and Isabel Silva

### NETHERLANDS ANTILLES, BONAIRE

**Data Record 63**  
**Data Source:** Nava, M. 2006. *Sea Turtle Conservation Bonaire: Progress Report 2006*. Unpublished report.  
**Nesting Beach:** No Name Beach, Bonaire  
**Year:** 2006 **Count:** 42 nests **Beach Length:** 2 km

**Nesting Beach:** Playa Pali Mangel  
**Year:** 2006 **Count:** 7 nests **Beach Length:** 0.7 km  
**Monitoring Effort:** At each of the above beaches, the entire beach was patrolled every other morning from May 15 through December, 2006. Peak nesting is in August and September.

**Nesting Beach:** Playa Washikemba  
**Year:** 2006 **Count:** 3 nests **Beach Length:** 400 m  
**Monitoring Effort:** The entire beach was patrolled every other morning from May 15 through December, 2006. Peak nesting is in October.  
**SWOT Contact:** Mabel Nava

### ST. EUSTATIUS

**Data Record 64**  
**Data Source:** Harrison, E., and A. Herrera. 2006. *St. Eustatius Sea Turtle Conservation Programme Annual Report 2006*. Unpublished report.  
**Nesting Beach:** Kay Bay, Oranje Bay, and Zeelandia Beach, St. Eustatius  
**Year:** 2006 **Count:** 6 nests, 2 false crawls, 1 nesting female  
**Beach Length:** 1.2 km  
**Monitoring Effort:** Daily and nightly patrols of the entire beach were conducted from March 17 to October 6, 2006. Peak nesting is in July.  
**SWOT Contact:** Arturo Herrera

### ST. MAARTEN

**Data Record 65**  
**Data Source:** Nisbeth, B. M., Nature Foundation. 2008. Hawksbill nesting in Gibbs Bay, St. Maarten. In *SWOT Report—The State of the World's Sea Turtles*, vol. 3 (2008).  
**Nesting Beach:** Gibbs Bay  
**Year:** 2006 **Count:** 1 crawl **Beach Length:** 0.5 km  
**Monitoring Effort:** The beach was patrolled twice per week from April 1 to November 1, 2006. Nesting season is April to November, with its peak from July to October.  
**SWOT Contact:** Beverly Mae Nisbeth

### Data Record 66

**Data Source:** Vissenberg, D., Nature Foundation. 2008. Hawksbill nesting in Guana Bay, St. Maarten. In *SWOT Report—The State of the World's Sea Turtles*, vol. 3 (2008).  
**Nesting Beach:** Guana Bay  
**Year:** 2006 **Count:** 4 nests **Beach Length:** 1 km  
**Monitoring Effort:** This beach was patrolled three to four nights per week from April to October, 2006. Nesting season is April to late-October, with its peak from May to October.  
**SWOT Contact:** Dominique Vissenberg

### NICARAGUA

**Data Record 67**  
**Data Source:** Urteaga, J. 2008. Hawksbill nesting in Nicaragua: Personal communication. In *SWOT Report—The State of the World's Sea Turtles*, vol. 3 (2008).  
**Nesting Beach:** La Flor  
**Year:** 2006 **Count:** 10–20 estimated nests  
**Comments:** Hawksbill nesting is sporadic along the Pacific coast of Nicaragua, with 10–20 nests recorded per year around La Flor.  
**SWOT Contact:** José Urteaga



*SWOT Report, Vol. II* was selected from more than 10,000 entries to be featured in the December 2007 issue of *Graphic Design USA*, an annual magazine highlighting the year's best graphic design publications.

### Data Record 68

**Data Source:** Campbell, C. L., Lagueux, C. J., and V. Huertas. 2007. *2006 Pearl Cays Hawksbill Conservation Project, Nicaragua*. Wildlife Conservation Society Final Report.  
**Nesting Beach:** Pearl Cays  
**Year:** 2006 **Count:** 200 nests (minimum) **Beach Length:** 3.3 km  
**Monitoring Effort:** Daily patrols were conducted from June to October, 2006. During the rest of the nesting season, beaches were patrolled weekly or bi-weekly. Nesting season is May to November, with its peak from July to September.  
**SWOT Contacts:** Cathi Campbell and Cynthia Lagueux

### OMAN

**Data Record 69**  
**Data Source:** Rees, A. 2008. Hawksbill nesting in Oman. In *SWOT Report—The State of the World's Sea Turtles*, vol. 3 (2008).  
**Nesting Beach:** Ros Shiban Beaches 1–3  
**Year:** 2006 **Count:** 14 nests **Beach Length:** 2 km  
**Nesting Beach:** Ros Shiban Beaches 3–5  
**Year:** 2006 **Count:** 27 nests **Beach Length:** 2 km  
**Nesting Beach:** Ros Shiban Beaches 5–7  
**Year:** 2006 **Count:** 50 nests **Beach Length:** 2 km  
**Nesting Beach:** Ros Shiban Beaches 7–9  
**Year:** 2006 **Count:** 70 nests **Beach Length:** 2 km  
**Nesting Beach:** Southeast Beaches  
**Year:** 2006 **Count:** 188 nests **Beach Length:** 2 km  
**Nesting Beach:** Southwest Beaches N  
**Year:** 2006 **Count:** 11 nests **Beach Length:** 1 km  
**Nesting Beach:** Southwest Beaches Omedu  
**Year:** 2006 **Count:** 66 nests **Beach Length:** 1 km

**Nesting Beach:** Southwest Beaches S  
**Year:** 2006 **Count:** 36 nests **Beach Length:** 1 km  
**SWOT Contact:** Alan Rees

### PALAU

**Data Record 70**  
**Data Source:** Klain, S., and J. Eberdong. 2007. *Palau Marine Turtle Conservation and Monitoring Program, 2005–2006: Report to National Oceanic and Atmospheric Administration (NOAA)*. Unpublished report.  
**Nesting Beaches:** Ngerbelas, Ngeruangel, and Orak, Kayangel state  
**Year:** 2006 **Count:** 2, 3, and 5 nests, respectively  
**Beach Length:** 410, 200, and 100 m, respectively  
**Monitoring Effort:** Each of these beaches was monitored once per month during the nesting season.  
**Nesting Beaches:** Breu Rock Island, Kmekumer, Moir, Neco Beach / Ngeanges, Ngeremdiu, Ngerukeidi, Ngerureomel, Omekang, Ongtekatl, Ouiais, Such, and Ulong, Koror state  
**Year:** 2006  
**Count:** 3, 13, 3, 3, 2, 2, 1, 1, 1, 1, 1, and 7 nests, respectively  
**Beach Length:** 70, 60, 150, 400, 650, 750, 300, 150, 175, 125, 25, and 200 m, respectively  
**Monitoring Effort:** Each of these beaches was monitored once per month during the nesting season.

**Nesting Beaches:** East Beach/Lisel a Lekeok, Euidelchol, Loulomekang, Kisaks, and Kitaliis, Koror state  
**Year:** 2006 **Count:** 1, 1, 1, 4, and 2 nests, respectively  
**Beach Length:** 0.1, 1.5, 0.7, 0.3, and 0.02 km, respectively  
**Monitoring Effort:** Each of these records was made during a one-time observation.

**Nesting Beaches:** East Beach, Melekeok state  
**Year:** 2006 **Count:** 1 nest **Beach Length:** 3.5 km

**Nesting Beaches:** Chol, Ngesar/Kwabs, and Nggekklau, Ngaraard state  
**Year:** 2006 **Count:** 5, 1, and 2 nests, respectively  
**Beach Length:** 2.75, 0.4, and 0.3 km, respectively

**Nesting Beaches:** Ngerchur and Ngerkekklau, Ngarchelong state  
**Year:** 2006 **Count:** 5 and 2 nests, respectively  
**Beach Length:** 0.9 and 0.6 km, respectively

**Nesting Beaches:** Honeymoon Beach and Mesubedumal, Peleliu state  
**Year:** 2006 **Count:** 4 and 2 nests, respectively  
**Beach Length:** 1 km each

**Monitoring Effort:** Each of the above beaches in Melekeok, Ngaraard, Ngarchelong, and Peleliu states was monitored once per month during the nesting season, with the exception of Ngerchur, Ngarchelong state, which was visited only once.  
**Comments:** Nesting season at all beaches in Palau is May to August.  
**SWOT Contacts:** Joshua Eberdong and Sarah Klain

### PANAMA

**Data Record 71**  
**Data Source:** Patiño-Martínez, J., and L. Quiñones. 2008. Hawksbill nesting in Panama: Personal communication. In *SWOT Report—The State of the World's Sea Turtles*, vol. 3 (2008).  
**Nesting Beaches:** Anatukuna and Armila, Kuna Yala  
**Beach Length:** 0.88 and 4.5 km, respectively  
**Comments:** Each of these beaches contains unquantified hawksbill nestings beginning in May, with an unspecified end date. This information was gathered by personal observation during track counts and interviews with the local population.  
**SWOT Contact:** Juan Patiño-Martínez



## THE SWOT TEAM

### Data Record 88

**Data Source:** (1) Island Conservation Society of Seychelles. 2008. Hawksbill nesting in Aride Island Nature Reserve, Seychelles. In *SWOT Report—The State of the World's Sea Turtles*, vol. 3 (2008). (2) Mortimer, J. A. 2004. *Seychelles Marine Ecosystem Management Project (SEYMEMP): Turtle Component. Final report*, vol. 1 and vol. 2. **Nesting Beach:** Aride Island Nature Reserve **Year:** 2006 **Count:** 50–60 estimated nests **Comments:** Nesting estimates are based on daily track counts conducted by personnel of the Island Conservation Society of Seychelles. **SWOT Contact:** Jeanne A. Mortimer

### Data Record 89

**Data Source:** Mortimer, J., and Bird Island Lodge. 2008. Hawksbill nesting on Bird Island, Seychelles: Personal communication. In *SWOT Report—The State of the World's Sea Turtles*, vol. 3 (2008). **Nesting Beach:** Bird Island **Year:** 2006 **Count:** 125–200 estimated nests **Comments:** Nesting estimates are based on track counts and tagging data collected by personnel of the Bird Island Lodge. **SWOT Contact:** Jeanne A. Mortimer

### Data Record 90

**Data Source:** Nature Seychelles. 2008. Hawksbill nesting on Cousin Island, Seychelles. In *SWOT Report—The State of the World's Sea Turtles*, vol. 3 (2008). **Nesting Beach:** Cousin Island Special Reserve **Year:** 2006 **Count:** 331 nests, 91 tagged females, 419 nesting events **Beach Length:** 1.73 km **Monitoring Effort:** This beach was patrolled at least once per day from August, 2005, to March 15, 2006. Nesting season is September to mid-March, with its peak from November to January. **SWOT Contact:** Naomi Doak

### Data Record 91

**Data Source:** Jolliffe, K., and S.-M. Jolliffe. 2008. Hawksbill nesting on Cousine Island, Seychelles: Personal communication. In *SWOT Report—The State of the World's Sea Turtles*, vol. 3 (2008). **Nesting Beach:** Cousine Island, Granitic Islands **Year:** 2006 **Count:** 66 nests, 47 false crawls, 36 nesting females **Beach Length:** 0.9 km **Monitoring Effort:** Daytime hourly patrols were conducted from August 20, 2005 to March 5, 2006. Nesting season is September to March, with its peak from November to January. **SWOT Contacts:** Kevin and San-Marie Jolliffe

### Data Record 92

**Data Source:** (1) Marine Parks Authority of Seychelles. 2008. Hawksbill nesting in Curieuse Island Marine Park, Seychelles. In *SWOT Report—The State of the World's Sea Turtles*, vol. 3 (2008). (2) Mortimer, J. A. 2004. *Seychelles Marine Ecosystem Management Project (SEYMEMP): Turtle Component. Final report*, vol. 1 and vol. 2. (3) Rulie, A. C. 2002. Reflexion sur la conservation de la tortue imbricque (*Eretmochelys imbricata*): Application aux Seychelles. *Ecole Nationale Veterinaire Toulouse. Annee 2002-These: 2002-TOU3-4166*. **Nesting Beaches:** Eight beaches at Curieuse Island Marine Park **Year:** 2006 **Count:** 200–250 estimated nests **Comments:** Nesting estimates are based on track counts conducted by Anne-Claire Rulie and Park Rangers of the Marine Park Authority of Seychelles. **SWOT Contact:** Jeanne A. Mortimer

### Data Record 93

**Data Source:** Mortimer, J. A. 2005. Sea Turtles of D'Arros Island and St. Joseph Atoll: Status and Recommendations. In U. Engelhardt, ed. 2005. *Proceedings of a Scientific Symposium held at the D'Arros Research Centre 15–17 April 2005*. Seychelles: D'Arros Research Centre. Technical Report No. 1. **Nesting Beaches:** D'Arros Island and St. Joseph Atoll **Year:** 2006 **Count:** 250–300 estimated nesting females **Comments:** Nesting estimates are based on track counts conducted by personnel of D'Arros Development (Pty) Ltd. and the D'Arros Research Centre. It is estimated the more than 1,000 nests are laid here annually. **SWOT Contact:** Jeanne A. Mortimer

### Data Record 94

**Data Source:** Bovenberg, M., and R. Vonk. 2007. *The Hawksbill Turtle (Eretmochelys imbricata) on Fregate Island: The Hawksbill Turtle's Nesting Population and Nesting Habitat on Fregate During the North-West Monsoon in 2006–07*. Unpublished report. **Nesting Beach:** Fregate Island **Comments:** Nesting data from the 2005–06 season were not available. In the 2006–07 nesting season, an estimated 150 nests were laid on Fregate Island, representing approximately 50 individual females. **SWOT Contact:** Jeanne A. Mortimer

### Data Record 95

**Data Source:** Vanherck, L. 2008. Hawksbill nesting on North Island, Seychelles: Personal communication. In *SWOT Report—The State of the World's Sea Turtles*, vol. 3 (2008). **Nesting Beach:** North Island **Year:** 2006 **Count:** 30–50 estimated nests **Comments:** An estimated 30 to 50 nests were laid per year in the 2005–06 and 2006–07 nesting seasons on North Island. Nesting season is September to January. **SWOT Contact:** Linda Vanherck

### Data Record 96

**Data Source:** Mortimer, J. A. 2004. *Seychelles Marine Ecosystem Management Project (SEYMEMP): Turtle Component. Final report*, vol. 1 and vol. 2. **Nesting Beaches:** Five beaches in the Ste. Anne Marine Park **Year:** 2006 **Count:** 200–250 estimated nests

**Comments:** Nesting estimates are based on track counts conducted by Park Rangers of the Marine Park Authority of Seychelles. **SWOT Contact:** Jeanne A. Mortimer

### Data Record 97

**Data Source:** Talma, E. 2006. Interim report on 2005–06 Turtle Nesting Season in the South of Mahe, Seychelles. Marine Conservation Society Seychelles. Technical report. **Nesting Beach:** Beaches of South Mahe Island **Year:** 2006 **Count:** 242 nests **Beach Length:** 1.83 km **Monitoring Effort:** Daily patrols were conducted three times per week between September 2005 and March 2006, and once every one to two weeks throughout the rest of the year. Nesting season is October to February, with its peak in November and December. **Comments:** Data are combined for five adjacent beaches. **SWOT Contact:** Elke Talma

**Data Source:** Mortimer, J. A. 2008. Hawksbill nesting in the Seychelles: Personal communication. In *SWOT Report—The State of the World's Sea Turtles*, vol. 3 (2008). **Comments:** Seychelles comprises more than 120 islands and many hundreds of beaches. Most beaches in the country host some hawksbill nesting each year. The reports above present data that were collected at some of the best protected and best studied sites in the country, but are by no means exhaustive.

## SOLOMON ISLANDS

### Data Record 98

**Data Source:** Siota, C., and P. Ramohia. 2007. *Peak Hawksbill Nesting Activities in the Arnavon Community Marine Conservation Area: A Report for The Nature Conservancy, Solomon Islands Field Office, Honiara*. Unpublished manuscript. **Nesting Beach:** Arnavon Community Managed Conservation Area, Santa Isabel **Year:** 2006 **Count:** 286 nests **Beach Length:** Approximately 4.5 km **Monitoring Effort:** These beaches were patrolled daily and nightly from June 1 to August 31, 2006. **SWOT Contacts:** Peter Ramohia and Catherine Siota

### Data Record 99

**Data Source:** Ramohia, P., Siota, C., Motui, D., Routanis, F., Pema, M., Rini, C., Zama, M., Tetabea, T., Madada, L., and G. Willy. 2007. *Hawksbill and Green Turtle Nesting Activities on Kerehikapa Island in the Arnavon Community Managed Conservation Area: A Report for The Nature Conservancy, Solomon Islands Field Office*. Unpublished manuscript. **Nesting Beach:** Kerehikapa Island, Santa Isabel **Year:** 2006 **Count:** 345 nests **Beach Length:** 1.2 km **Monitoring Effort:** These beaches were patrolled daily and nightly from January 1 to December 31, 2006. **SWOT Contacts:** Peter Ramohia and Catherine Siota

## SRI LANKA

### Data Record 100

**Data Source:** (1) Ekanayake, E. M. L., Ranawana, K. B., Kapurus- inghe, T., Premakumara, M. G. C., and M. M. Saman. 2002. Marine turtle conservation in Rekawa turtle rookery in southern Sri Lanka. *Ceylon Journal of Science (Biological Science)* 30: 79–88. (2) The Turtle Conservation Project. Turtle Nesting Beaches in Sri Lanka. <http://www.tcpsrilanka.org/download/Map.pdf> **Nesting Beaches:** Southern coast of Sri Lanka **Comments:** Nesting data from 2006 were not available. Hawksbills are known to nest along the southern beaches of Sri Lanka.

## SURINAME

### Data Record 101

**Data Source:** (1) Mitro, S. Forthcoming. Country report of Suriname. In *Proceedings of the Seventh Sea Turtle Symposium for the Guianas (October 25–27, 2004)*. Georgetown, Guyana. (2) Hiltermann, M. L., Govere, E., Tordoir, M. T., and H. A. Reichart. Forthcoming. Beaches come and beaches go: Coastal dynamics in Suriname are affecting important sea turtle rookeries. In *Proceedings of the Twenty-Fifth Annual Symposium on Sea Turtle Biology and Conservation: NOAA Technical Memorandum NMFS-SEFC*. (3) De Dijn, B. 2003. Country report of Suriname: Marine turtle season 2002. In *Proceedings of the Sixth Sea Turtle Symposium for the Guianas*, compilers I. Nolibos, L. Kelle, B. De Thoisy, and S. Lochon, 8–10. Remire-Montjoly, French Guiana. **Nesting Beach:** Matapica Beach (formerly Bigisanti) **Comments:** Nesting data from 2006 were not available. Based on three decades of nest monitoring in Suriname, it is known that Matapica Beach (formerly called Bigisanti) receives 99 percent of all hawksbill nests in the country. The last available data are from 2002 and 2003, when 21 and 16 nests were recorded, respectively. **SWOT Contacts:** Edo Govere and Maartje Hiltermann

## TANZANIA

### Data Record 102

**Data Source:** Muir, C. 2008. Hawksbill nesting in Tanzania: Personal communication. In *SWOT Report—The State of the World's Sea Turtles*, vol. 3 (2008). **Nesting Beach:** Kilindoni, Mafia Island **Year:** 2006 **Count:** 1 nest **Beach Length:** 2.5 km **Comments:** Hawksbill nesting in Tanzania is rare. **SWOT Contact:** Catharine Muir

## THAILAND

### Data Record 103

**Data Source:** Charuchinda, M., and S. Monanunsap. 1998. Monitoring survey on sea turtle nesting in the Inner Gulf of Thailand, 1994–1996. *Thailand Marine Fisheries Research Bulletin* 6: 17–25. **Nesting Beach:** Khram Island, Chonburi province **Comments:** Nesting data from 2006 were not available. The last available data are from 1996, when 42 hawksbill nests were recorded during nightly patrols throughout the nesting season (May to August). From 1973 to 1996, an average of 74 hawksbill nests were recorded at this site. Sporadic hawksbill nesting has also been

recorded on other islands in the Gulf of Thailand, including the Man, Lan, Chang, Samet, and Thalu Islands.

## TRINIDAD AND TOBAGO

### Data Record 104

**Data Source:** Livingstone, S. R. 2006. *Sea Turtle Ecology and Conservation on the North Coast of Trinidad*. PhD diss., University of Glasgow, Scotland. **Nesting Beaches:** 5 small sandy bays around Grande Riviere (North coast), Trinidad **Beach Length:** 50 km **Comments:** An estimated 675 hawksbill nests are laid per year on these beaches, combined. Estimate is based on data collected from April to September in 2000 to 2004 during patrols of the entire coast two to three nights every one to two weeks. Nesting season is May to September, with peak nesting in July and August. **SWOT Contact:** Suzanne Livingstone

## UNITED STATES OF AMERICA

### Data Record 105

**Data Source:** (1) Florida Fish and Wildlife Conservation Commission, Fish and Wildlife Research Institute, Statewide Nesting Beach Survey Program. <http://research.myfwc.com>. (2) Brost, B. 2008. Hawksbill nesting in Florida, USA: Personal communication. In *SWOT Report—The State of the World's Sea Turtles*, vol. 3 (2008). **Nesting Beach:** Bahia Honda State Park, Monroe County, Florida **Year:** 2006 **Count:** 3 nests **Beach Length:** 4.7 km **Monitoring Effort:** Daily beach patrols were conducted from April 17 to September 1, 2006. Nesting occurs between early August and mid-October.

**Nesting Beaches:** Boca Raton Beaches, Palm Beach County, Florida **Year:** 2006 **Count:** 1 nest **Beach Length:** 8 km

**Nesting Beach:** Breakers Beach, Palm Beach County, Florida **Year:** 2006 **Count:** 1 nest **Beach Length:** 0.5 km **Monitoring Effort:** The above beaches in Palm Beach County were patrolled each morning from March 1 to October 31, 2006. **SWOT Contact:** Beth Brost

### Data Record 106

**Data Source:** Pacific Whale Foundation. *Sea Turtles: A Hawai'i Wildlife Guide*. <http://www.pacificwhale.org>. **Nesting Beaches:** Beaches on Hawai'i Island (Big Island), Mau'i Island, Molokai Island, and O'ahu Island, Hawaii **Comments:** Approximately 10–15 hawksbill nests are laid per year in the state of Hawaii. Ninety percent of the nesting occurs on the Ka'u coast of Hawai'i Island. Nesting season is from mid-May through November. **SWOT Contact:** George Balazs

## U.S. VIRGIN ISLANDS

### Data Record 107

**Data Source:** NPS Buck Island Reef National Monument Sea Turtle Research Program Seasonal Report 2006. St. Croix, U.S. Virgin Islands: National Park Service, Buck Island Reef National Monument, Division of Resource Management. Unpublished report. **Nesting Beaches:** Buck Island Reef National Monument, St. Croix **Year:** 2006 **Count:** 133 confirmed nests, 101 suspected nests **Beach Length:** 1.5 km **Monitoring Effort:** These beaches were patrolled from July 1 to September 30, 2006. Nesting occurs year-round, with its peak from July to October. **SWOT Contact:** Zandy Hillis-Starr and Ian Lundgren

## VENEZUELA

### Data Record 108

**Data Source:** (1) Guada, H. 2008. Hawksbill nesting in Venezuela: Personal communication. In *SWOT Report—The State of the World's Sea Turtles*, vol. 3 (2008). (2) Guada, H. J., and G. Solé. 2000. *WIDE-CAST Plan de Acción para la Recuperación de las Tortugas Marinas de Venezuela*. Informe Técnico del PAC No. 39. Kingston, Jamaica: United Nations Environment Programme Caribbean Environment Programme. **Nesting Beaches:** Beaches along the Caribbean coast **Comments:** Nesting data from 2006 were not available. Extensive surveys in the late 1980s found that hawksbills nested in unknown numbers on many beaches along the coast. Further studies in the late 1990s and in recent years have found scattered nesting throughout other areas of the coast. Hawksbill nesting sites have been recorded in the following Venezuelan states and federal dependencies: Estado Anzoátegui, Estado Aragua, Estado Falcón, Estado Miranda, Estado Sucre, Estado Vargas, Isla de Aves, and Isla La Blanquilla. **SWOT Contact:** Hedely Guada

## VIETNAM

### Data Record 109

**Data Source:** Hamann, M., The Cuong, C., Duy Hong, N., Thuoc, P., and B. Thi Thuhen. 2006. Distribution and abundance of marine turtles in the Socialist Republic of Viet Nam. *Biodiversity and Conservation* 15: 3703–20. **Nesting Beaches:** Gulf of Thailand, Gulf of Tonkin, and Spratly Archipelago **Comments:** Data from 2006 were not available. Recent surveys indicate that less than 10 nests per year are laid in Vietnam.

## YAP, FEDERATED STATES OF MICRONESIA

### Data Record 110

**Data Source:** Cruce-Johnson, J. 2006. *Yap State Sea Turtle Conservation Program, Ulithi Tagging Project, Gielop and Iar Islands, Summer 2005*. Yap State, Federated States of Micronesia: Marine Resources Management Division Report. Unpublished report. **Nesting Beach:** Gielop Island **Year:** 2006 **Count:** 0 nests **Comments:** No hawksbill nesting was observed in 2006. In 2005, one nesting hawksbill was observed and tagged while nesting on Gielop Island. Nightly patrols were conducted on most nights from June 9 to August 24, 2005, and from June 2 to August 20, 2006. **SWOT Contacts:** Jennifer Cruce and Wayne Sentman

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Sincerely,  
Rod, Lisa, and Brian—*SWOT Report* Editors



## In Memoriam

**Lance Ferris (1946–2007).** Lance Ferris, known by many in Australia as their “Pelican Man,” was also a dedicated sea turtle conservationist. Many years into his career of rescuing and rehabilitating seabirds, in 1992 Lance founded the Australian Seabird Rescue (ASR) in New South Wales, Australia, an excellent center for seabird conservation and for education about marine and coastal conservation issues. Five years later, Lance helped to develop a marine turtle division at the ASR. One of the center’s most important achievements was New South Wales’ ban on mass release of helium balloons, passed in 2002—legislation that certainly saved the lives of many seabirds, sea turtles, and other marine wildlife. Lance passed away in October 2007, but his legacy lives on at the ASR.

### Bringing Conservation into Focus



INTERNATIONAL LEAGUE OF  
CONSERVATION  
PHOTOGRAPHERS

The International League of Conservation Photographers (ILCP), a consortium of professional photographers working to raise conservation awareness through photography, has provided several photos to this issue of *SWOT Report*. The SWOT Team thanks ILCP for those important contributions, which are indicated throughout the magazine with the ILCP logo.

# The State of the World's Sea Turtles *at a Glance*

## Major Headlines of 2007

### Sea Turtle Conservationist Named Animal Planet's 2007 Hero of the Year

Source: Animal Planet (Nov. 1, 2007)

### Baja Fishermen Make a Change to Aid Sea Turtles

Source: *New Scientist* (Oct. 19, 2007)

### U.S. Report Shows Decline in Loggerhead Sea Turtles

Source: New York Times / Associated Press (Sept. 22, 2007)

### World's Largest Green Turtle Rookery at Raine Island, Australia, Given Highest Protection Status

Source: Queensland Government (Aug. 22, 2007)



At the Karen Beasley Sea Turtle Rescue and Rehabilitation Center on Topsail Island in North Carolina, U.S.A., Jean Beasley (second from left), engages volunteers of all ages in sea turtle conservation. In Nov. 2007, Jean was voted Animal Planet's Hero of the Year. © NEIL OSBORNE / WWW.VISIONSBYNEILOSBORNE.COM



Biologists have found a major clue in the age-old mystery of green turtles' "lost years"—the period of time between crawling out of their sandy nests into the surf and reappearing several years later in coastal foraging grounds as juveniles. New research shows that these young turtles hide themselves in the open ocean, feeding on jellyfish and other small animals. © RODERIC B. MAST / CONSERVATION INTERNATIONAL

### IUCN *Red List* Shows Olive Ridleys' Status Improved

Source: IUCN—The World Conservation Union (Sept. 10, 2007)

### Costa Rica Expropriates Land at Las Baulas to Protect Leatherbacks

Source: Reuters (Oct. 11, 2007)

### Poachers with Nearly 300 Endangered Sea Turtles Caught Near Malaysia

Source: MSNBC News Service (March 30, 2007)

### Biologists Begin to Understand Mystery of Sea Turtles' "Lost Years"

Source: *ScienceDaily* (Oct. 3, 2007)

### Scientists Warn of Climate Change Risk to Marine Turtles

Source: *ScienceDaily* (Feb. 22, 2007)

To read these stories, visit the SWOT website at [www.SeaTurtleStatus.org](http://www.SeaTurtleStatus.org).

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