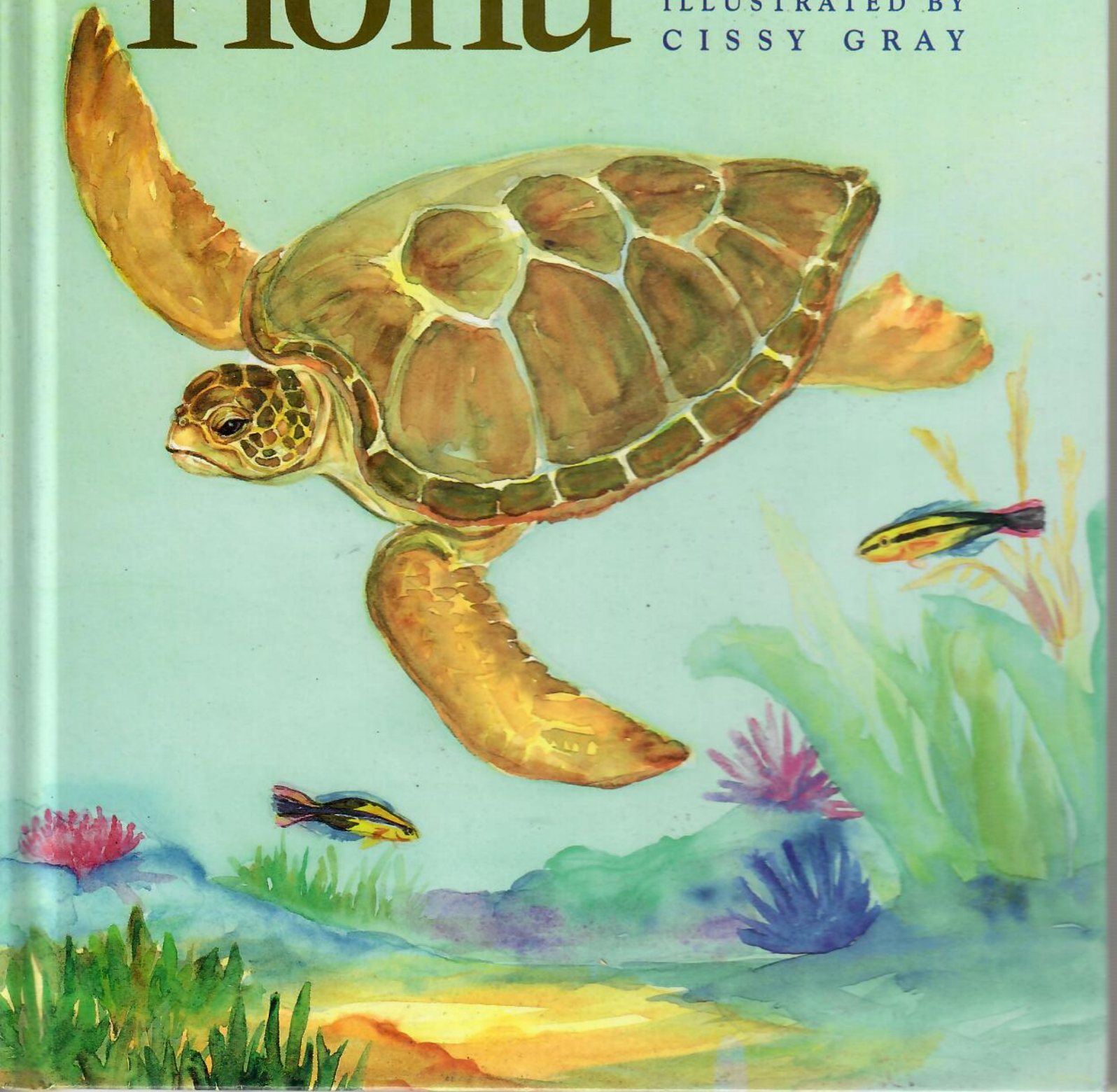


Honu

MARION COSTE

ILLUSTRATED BY
CISSY GRAY



HONU

Marion Coste

Illustrated by Cissy Gray



A KOLOWALU BOOK
University of Hawaii Press
Honolulu



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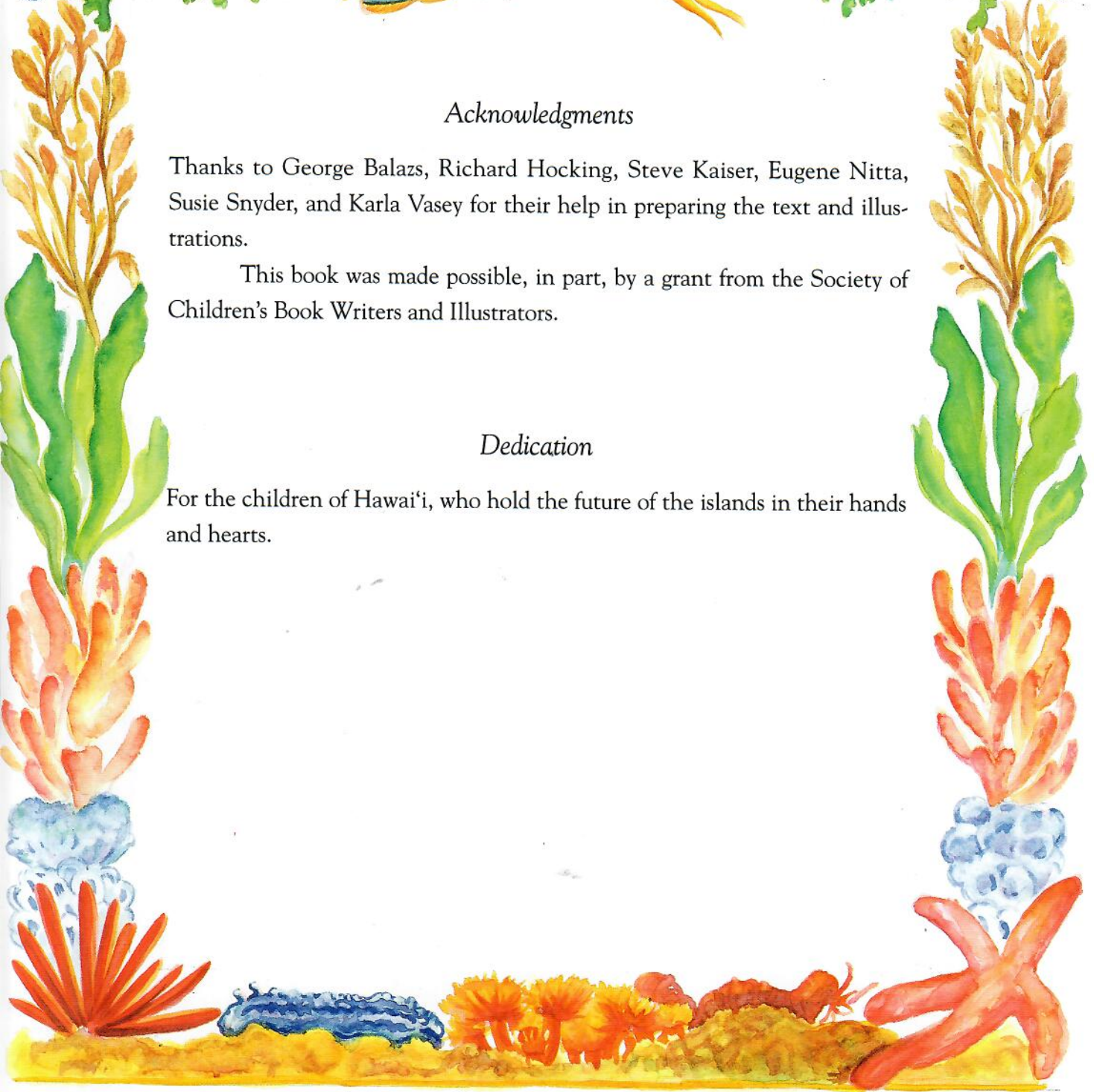
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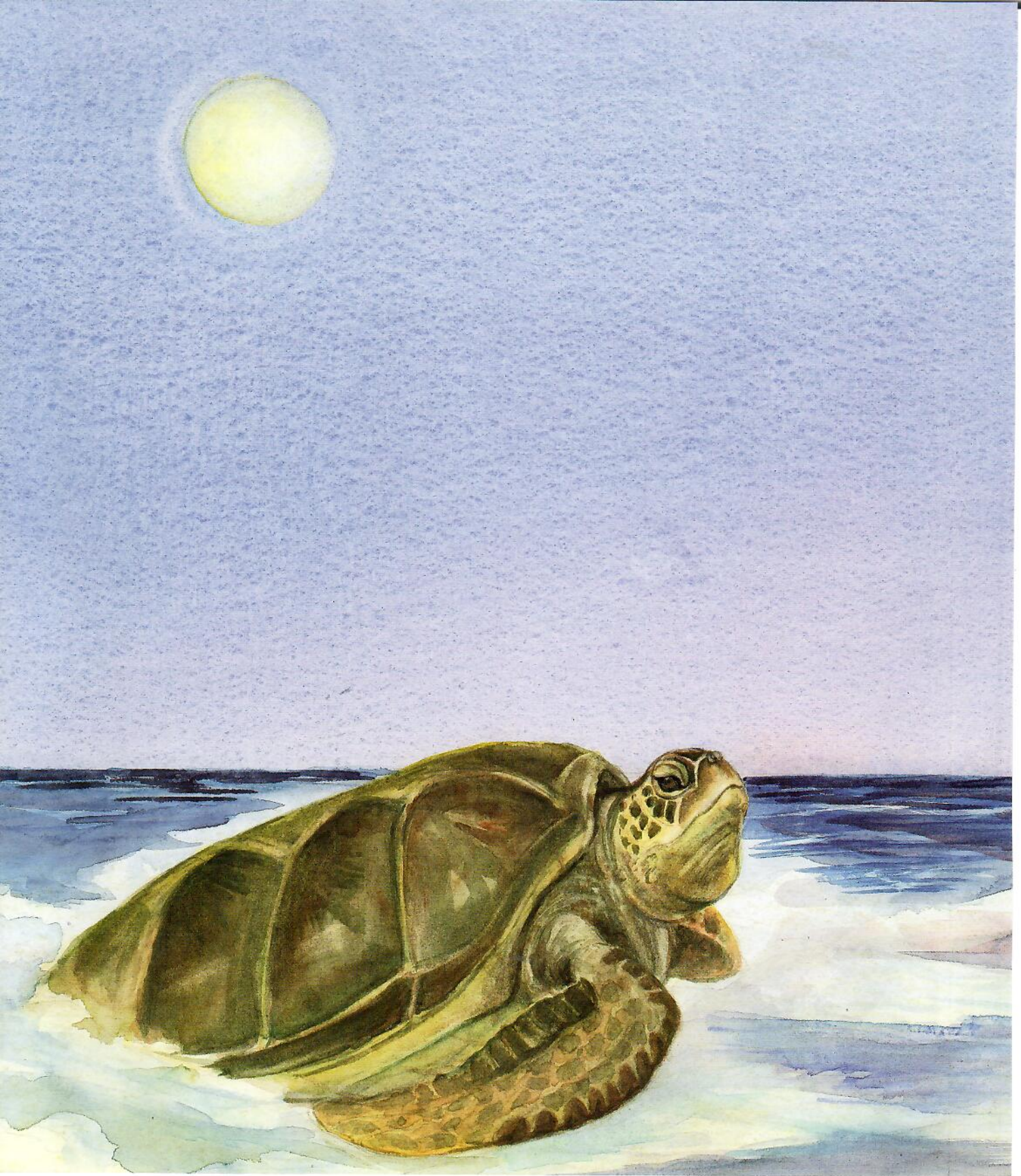
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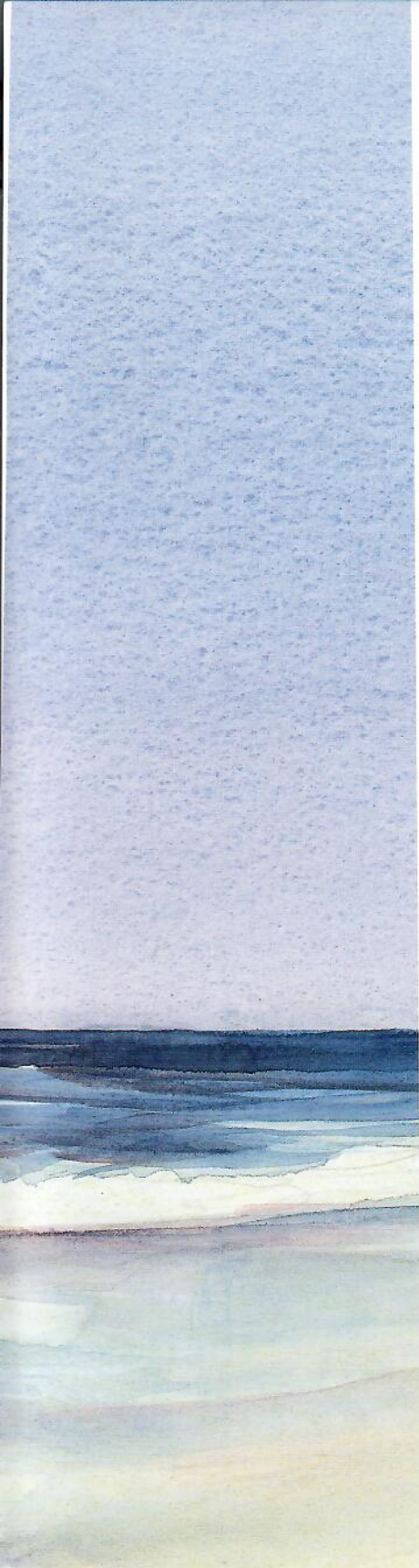
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Dedication

For the children of Hawai'i, who hold the future of the islands in their hands and hearts.







Waves break softly on the moonlit island beach. The only sounds in the night are the small scufflings of the ghost crabs and the swishing of the waves as they spread on the sand and slide back into the ocean.

A new sound begins, a dragging, scraping sound. A dark form has pulled out of the breaking waves. Slowly, heavily, the form moves up the sand, away from the water. The moon shows the glistening back and long front flippers of honu, the green sea turtle. She has come to make her nest.

Up she moves, flippers swinging to lift and push her heavy body along. The sand scratches against her hard shell as she carves a trail across the beach. She pauses, pushes her face into the sand, then pulls it out. Not yet, not right.

Other dark shapes come out of the water. More females struggle across the sand. What pulls them out of their cool water world? Their bodies, perfectly shaped for life in the sea, are too heavy on the land. Their flippers, graceful wings in water, strain against the sand.

The first turtle stops again and pushes her face into the sand. Once more, she pulls it out and goes farther from the water. Thick, salty tears wash the sand from her eyes and run down the sides of her leathery face.

Now the female stops. She has climbed all the way across the beach into the plants that grow above the sand. It has taken her a long time. The moon stands high in the night sky.

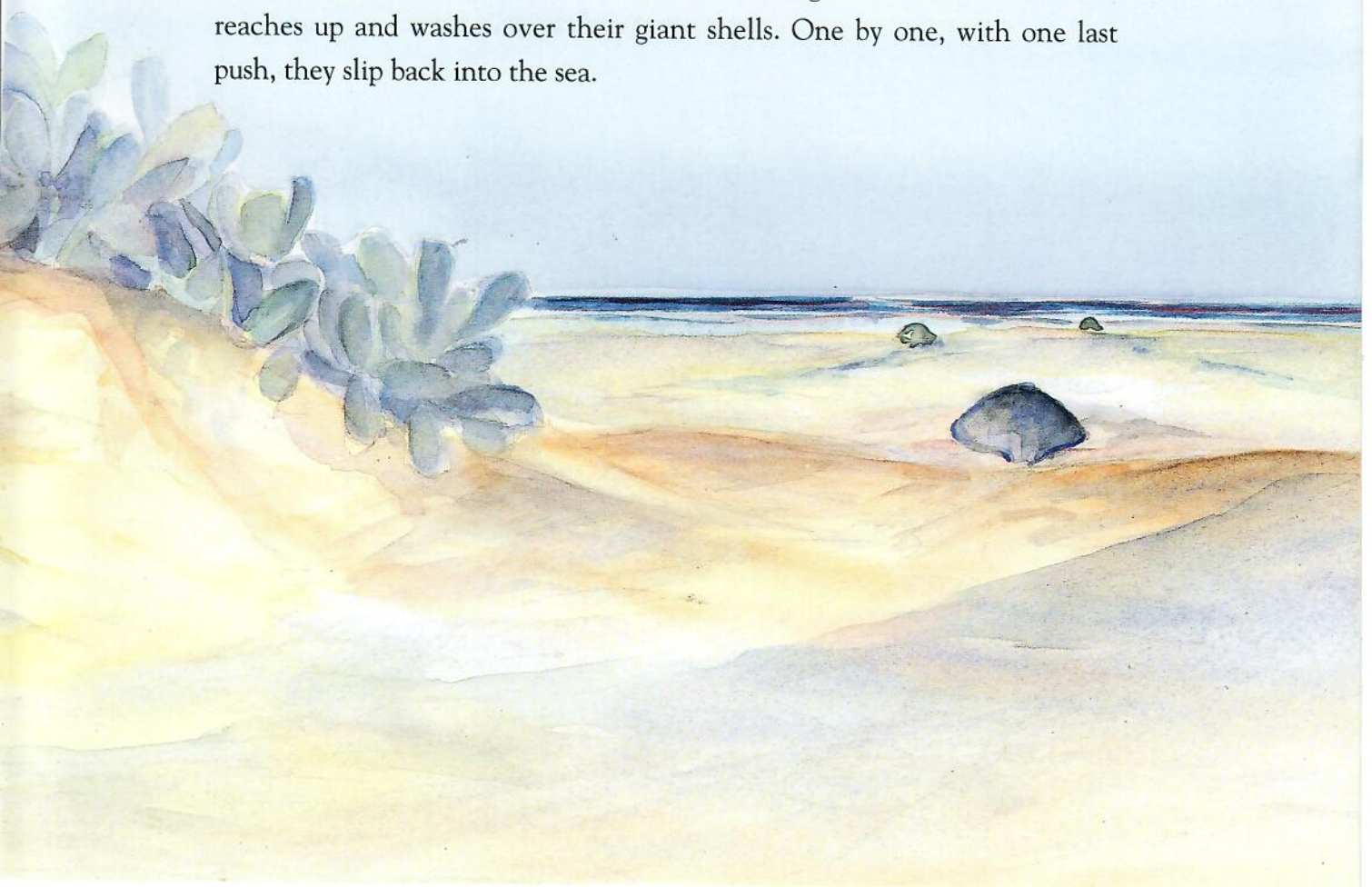


She turns slowly to face the ocean. With her long front flippers, she scoops away the sand to make a pit big enough to hold her body. Her back flippers dig a narrow hole as deep as they can reach.

At last, she is ready. One at a time, she begins to lay her eggs. The eggs drop down into the narrow hole, but they do not break. Their white shells are tough and leathery. Down they fall, now two or three at once, filling up the nest, one hundred all together.

When she is through, she uses her flippers to push sand back over the nest to cover it. The nest is finished now, and the female starts her slow, hard journey back into the sea. The night is almost over; the moon has gone from sight. Soon it will be morning.

Other females finish their nesting and move across the sand. Dark forms push, rest, and push again toward the waiting waves. At last the ocean reaches up and washes over their giant shells. One by one, with one last push, they slip back into the sea.



The morning sun rises on an empty beach. Only the ghost crabs scurry about as usual, running in and over the turtle trails.

The honu glides silently through the ocean, moving swiftly and gracefully in the shallow reef waters. The sand slowly washes off her body and finally, she is free of the land.

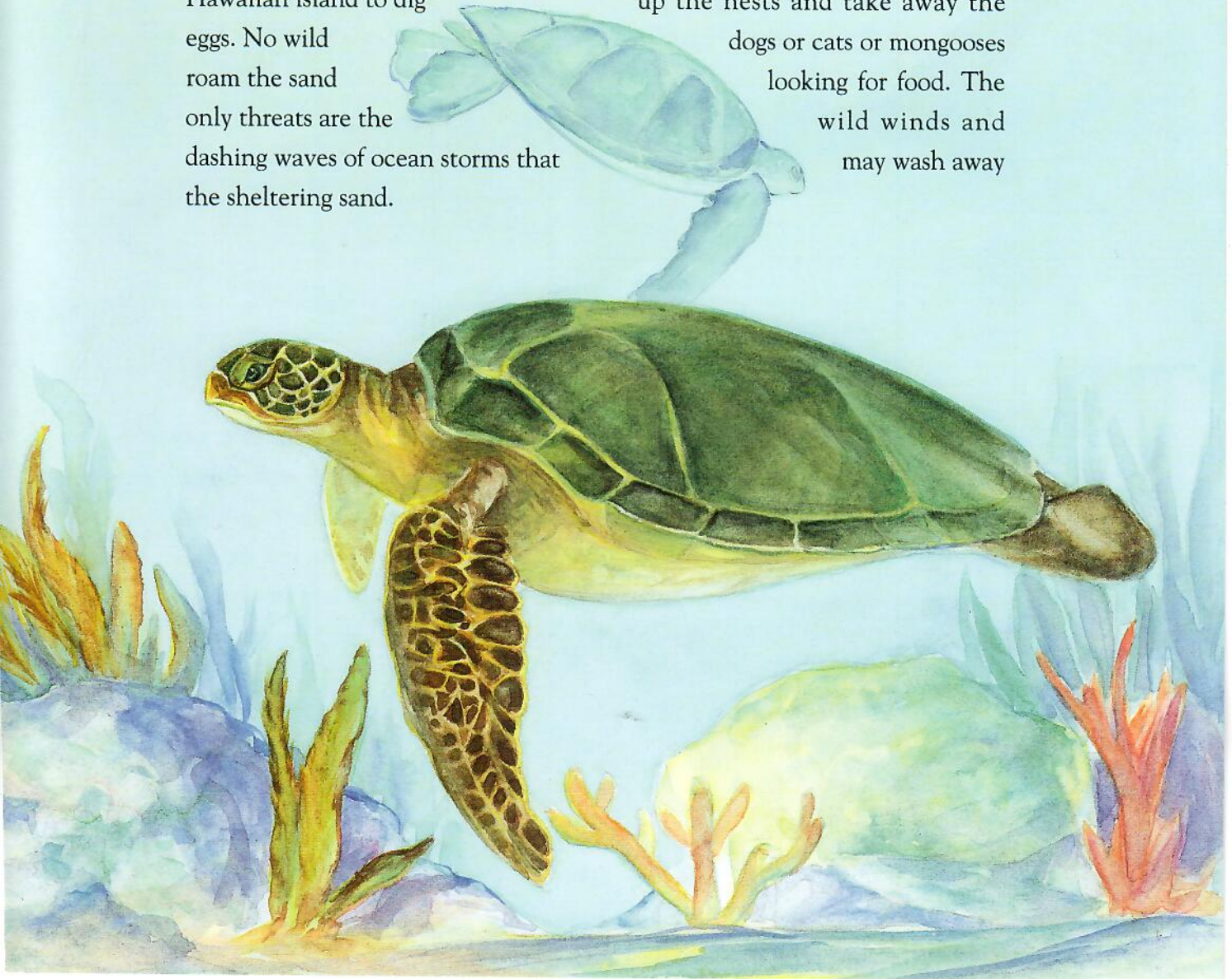
Out on the reef there is seaweed to eat and coral caves where she can rest. For almost two weeks, the female swims and grazes. Sometimes she climbs a short way onto the beach to bask in the warm sun.

Again one night, the honu pulls herself across the beach to dig a nest. She lays another hundred eggs, then carefully covers them with sand. This time, when she returns to the sea, her work is done. She will nest no more this year.

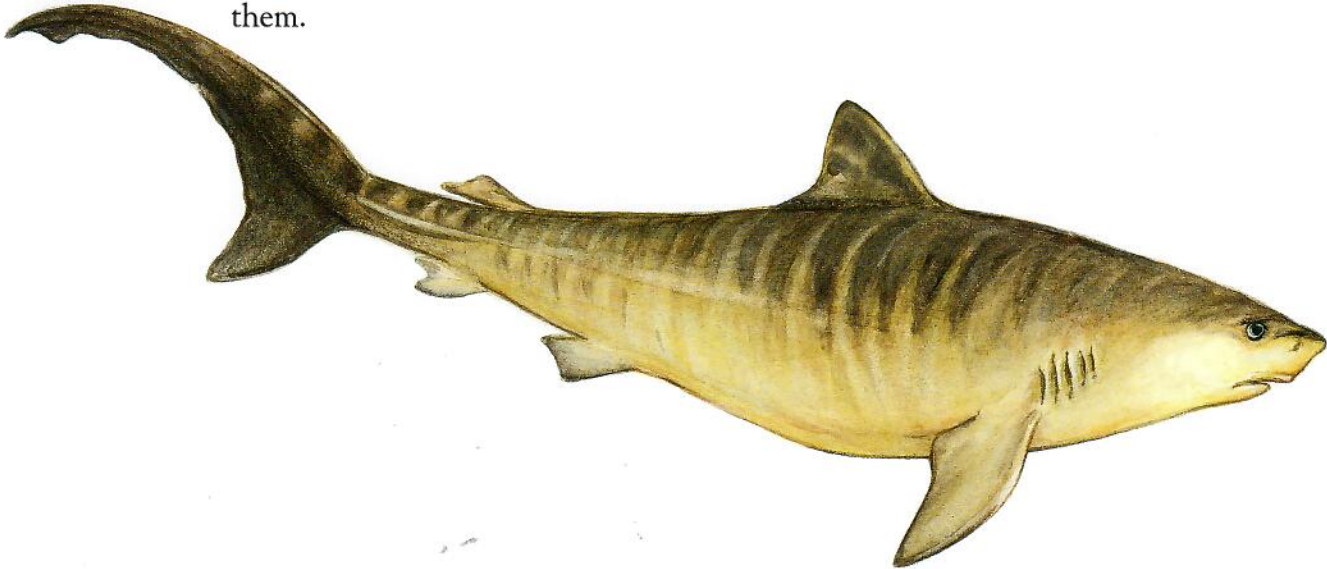


The male honu does not climb out of the sea to help the female with the nest. Once he has clasped the female's shell and mated with her in the shallow offshore water, he has nothing more to do with the eggs or babies. He swims along the reef, grazing on limu, or lies basking on the beach. When the nesting season is over, he will join the other turtles for the long swim back to the distant feeding grounds.

The turtles do not go back to their nests to see if they are all right. Hidden under the sand, the eggs are safe. No people come to this remote Hawaiian island to dig up the nests and take away the eggs. No wild dogs or cats or mongooses roam the sand looking for food. The only threats are the wild winds and dashing waves of ocean storms that may wash away the sheltering sand.



All summer, the turtles stay near the nesting island, alert to the dangers of their ocean home. Sharks, big enough to catch and eat the turtles, sometimes come into the shallow water to find food. Drifting fishing lines and nets can tangle around heads and flippers and hold the turtles under the sea to drown. Poisonous tar balls and fuel spills from passing ships may float on the water's surface, and plastic trash tossed into the ocean looks like something good to eat. If the turtles feed on it by mistake, it could choke them.



Sea turtles have wandered the oceans of the earth since the days of the dinosaurs. Once they swam in great numbers, grazing on the grasses and seaweeds of coastal waters and swimming long distances to their nesting beaches. The land and ocean shifted and changed, and the sea turtle, ancient survivor, changed with them. The turtle's huge size and hard shell protected it from all but the biggest predators of the seas, sharks that prowled the deep waters.

Then came people. In old Hawai'i, the islanders used honu for food and made scraping tools from its hard shell. Later, ships from all parts of the world came to Hawai'i, taking the green turtle for its fresh meat and oil. Sometimes hunters prowled the nesting beaches, flipping helpless females onto their backs until they could be hauled aboard the offshore ships.

More people came to live on the bigger Hawaiian islands. They built homes, cities, and hotels on the beaches. They broke up the reefs along the coastline, scattering the grasses and seaweeds; destroying the coral caves. Pollution seeped into the ocean, spoiling some of the feeding grounds.

Hunters stalked the green sea turtle without letup. The calipee and meat were in great demand for their delicious flavor; green turtle soup became a favorite delicacy all over the world. The leathery skin of the honu was made into shoes and handbags, its polished shell used for trophies, jewelry, and small tools. The shells of young turtles were stuffed, painted, and sold for souvenirs.



Fishermen, stretching their nets and long lines across miles of ocean, pulled drowned green turtles up with their catch, plastic and nylon tangled around heavy flippers and heads.

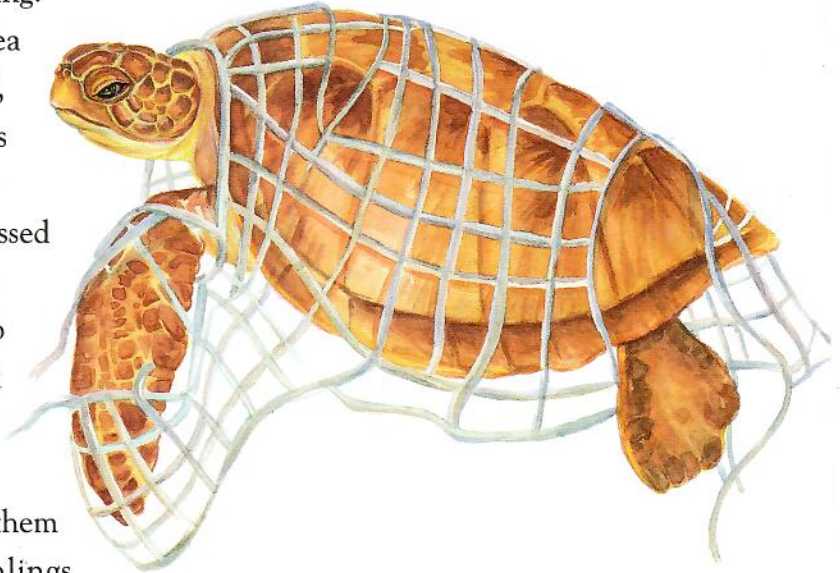
Danger faced the honu on all sides. The hunters and fishermen killed the green sea turtles faster than the breeding females could lay eggs. Fewer turtles swam now between the shallow feeding waters and the nesting beaches. Honu was disappearing.

Only half a million green sea turtles were left in the world, where once tens of millions swam.

Finally, laws were passed to protect the turtles. Countries joined together to try to stop the hunting and careless accidents. Scientists worked to find out more about the turtles, watching them nest and helping the hatchlings

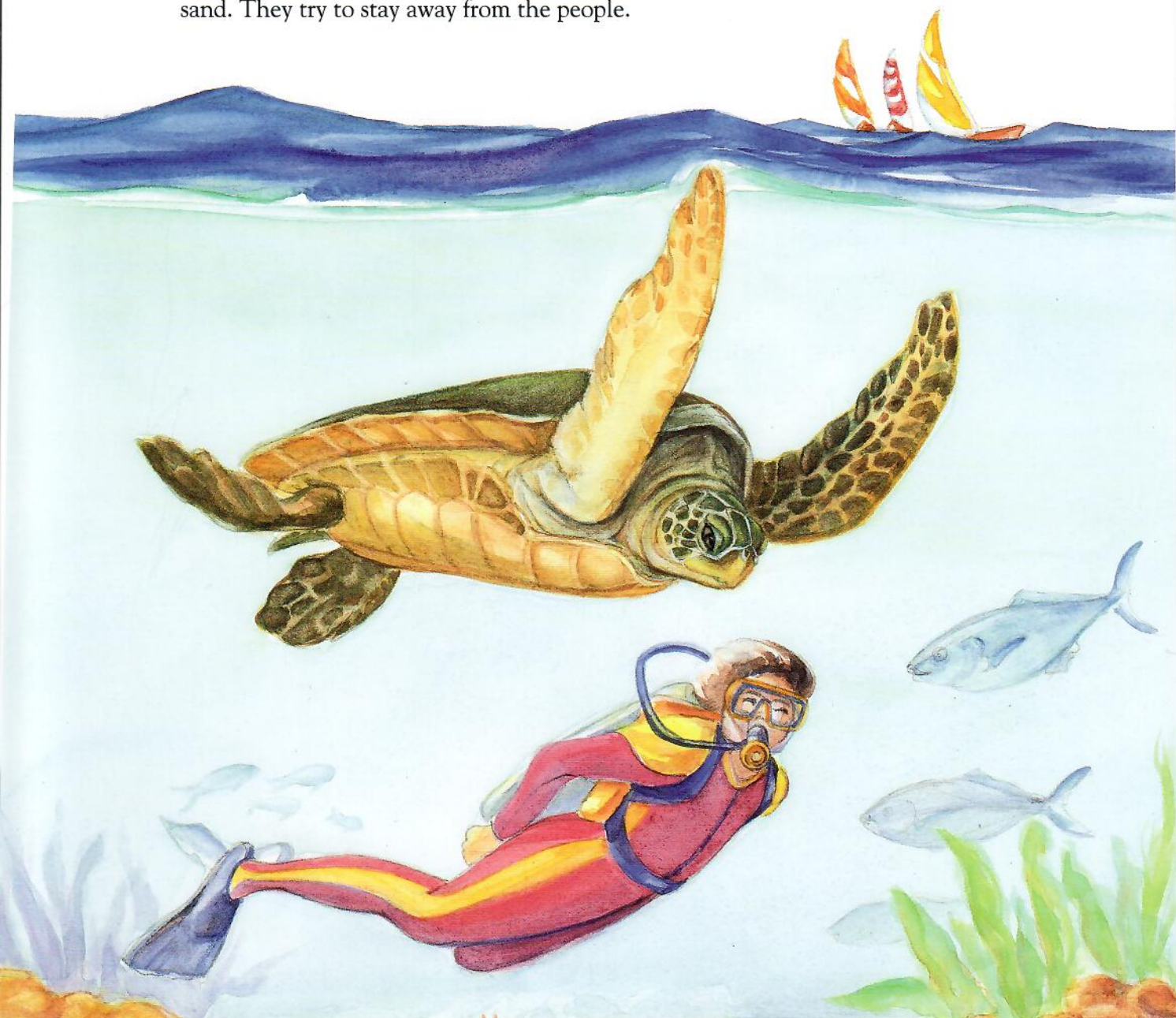
escape to the sea. The nesting beaches were declared a refuge, a place of safety.

As summer comes to an end, the turtles begin their long journey back to the feeding grounds. Now they must watch for the sharp-toothed sharks of the open ocean. Long flippers move like wings, pushing the honu gracefully through the wide waters. The trip takes many days and carries the



turtles far from the nesting beaches. Some turtles head north to small, empty islands, but most swim south to the waters of the main Hawaiian Islands.

Here the turtles must share their feeding grounds with people. Fishermen string their nets across the shallow flats. Boats and swimmers cut through the shallow waters; divers follow the turtles as they graze on the reefs. Hardly ever do the turtles climb out of the sea to bask on the warm sand. They try to stay away from the people.

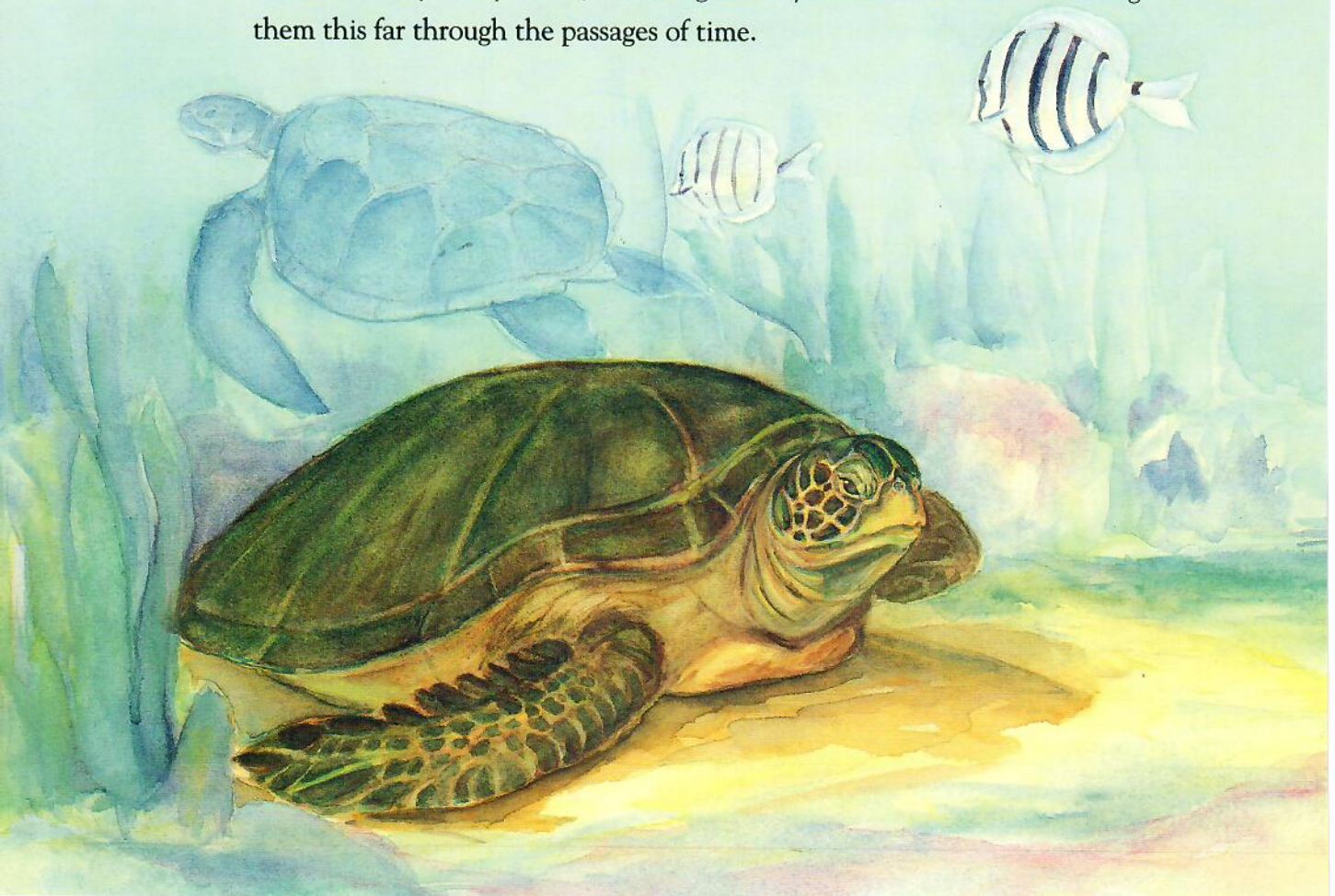




The turtles, old and young, spend the winter and spring months in the shallow waters of the feeding grounds. When the summer sun shines high, some females and many of the males begin their swim to the nesting beaches. Last year's nesting females remain behind, waiting one more year before they make the trip again.

The nesting beaches are not crowded any more. The hunters, the predators, the people, and the pollution have made a sad impact on the numbers of turtles that migrate to the northwestern islands. For millions of years, green sea turtles have lived successfully in the ocean, but now they are fighting for survival. People have entered the watery world of the turtle and changed it forever. What will these changes do to this ancient species?

The green sea turtles cannot know their fate. They move through the sea as they always have, following the rhythms of life that have brought them this far through the passages of time.





Two months after the eggs are laid, there is movement in the nests. The eggs break open and tiny hatchlings, less than two inches long, wait beneath the sand for the “emerging moment.” In the coolness of the night, when the time and temperature are right, the hatchlings scratch through the nest top and stream onto the beach.

Out on the sand, tiny flippers scabble to move the hatchlings toward the water. What a dangerous time! Big ghost crabs lurk on the beach, waiting to grab the tender new turtles. Rocks and driftwood block the way to the ocean. The hatchlings scuttle quickly across the sand, pause a moment, then rush on again.

At last they reach the sea and begin to swim. Fast, even strokes of their flippers carry them quickly through the dangerous shallows, past the crabs and big fish that would snatch them up. On they go, swimming madly for a day and a half out into the open ocean, until they are out of sight.

Where they go exactly, no one knows. Every year for millions of years, baby turtles have sped into the sea and disappeared. They swim straight to an unknown ocean nursery, and there they feed and grow.

When they are about the size of dinner plates, the young turtles come back near land. They appear in the feeding grounds of the adult turtles, where they swim and feed for many seasons until they are old enough to breed. Then they make the long journey to the same beach where they were born to mate and dig their nests.

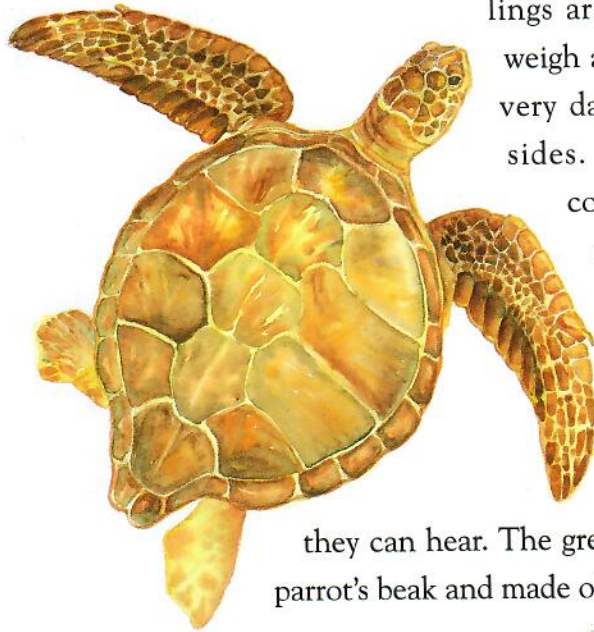
Information about the Hawaiian Green Sea Turtle

Scientific name: *Chelonia mydas*

Hawaiian name: *honu*

Description

The green sea turtle is the biggest sea turtle with a hard shell. Its oval upper shell, the carapace, is dark brown and black with flecks of olive and gold; its underside is yellow-orange. The green sea turtle is not green on the outside; it gets its name from the color of its body fat. Males and females look very much alike except that the male has a longer tail. A full-grown green turtle may be 40 inches long and can weigh as much as 400 pounds. The hatch-



lings are about 1 1/2 inches long and weigh around 1 ounce. Hatchlings have very dark carapaces and white undersides. This kind of coloring, called countershading, is common in sea animals and makes them hard to see in the water.

Green sea turtles have long flippers and tough, scaly skin. Their eyes are black, and they have no outside ears, but they can hear. The green turtle's mouth is shaped like a parrot's beak and made of horn-like material.

Habitat

Green sea turtles are found in warm ocean waters all over the world. The Hawaiian green sea turtle, called honu in Hawaiian, swims and feeds in the shallow waters just off the shores of the Hawaiian Islands, where there is plenty of seaweed and sea grass. Honu may travel over 800 miles from their feeding grounds to breed and nest on one of the small islands in the northwestern Hawaiian chain. Most of the females dig their nests on the tiny islands at French Frigate Shoals.

Long ago, turtles nested on Lānaʻi, Kauaʻi and Oʻahu, but today the beaches on these islands have too many people, animals, and buildings for turtle nests. People disturb the nests and destroy the eggs, and cats, dogs, and mongooses dig up the eggs or catch and eat the hatchlings.

Nesting

Female green sea turtles go ashore to nest mainly during the months of May, June, July, and August. They lift their heavy bodies across the sandy beaches, sometimes going hundreds of feet away from the ocean. Lights or movement around the females while they are on the sand may disturb them and cause them to go back into the water without digging a nest.

When they have found a good nesting spot, the females dig a pit just a little bigger than their bodies. Then, using their hind flippers, they dig a hole for the eggs. The hole is wider at the bottom than the top—something like a bottle—and about 2 feet deep. They lay between 50 and 145 eggs in the nest, then cover it up with sand and leave it. The eggs have white leath-

ery shells and look like large, dimpled Ping-Pong balls. A female may make anywhere from one to eight nests in one season, then she will wait two or three years before she nests again. The male travels to the nesting areas each year to mate with the females there, but he does not help with the nest.

The nest is left alone for two months while the eggs incubate. Sometimes people or animals disturb the nest, or waves wash away the sand that covers it. If the nest is opened, the eggs grow cold and do not hatch.

Hatching

At hatching time, the baby turtles work together to leave the nest. After they break out of their shells, they thrash around under the sand, scraping the sides and top of the nest with their flippers and packing sand down at



the bottom. As they stamp more sand under them, the whole group of babies slowly rises until it lies just under the surface of the sand. There the babies wait until the

temperature is just right—usually during the night. Then, with one more burst of effort, the hatchlings break through the top of the nest and scatter on the beach.



The hatchlings move quickly across the beach toward the ocean. They must go over or around



anything in their path and stay away from the big ghost crabs that like to eat them. Some hatchlings do not make it to the waves. Once in the water, they swim

fast out to sea, but some tender hatchlings are caught by the sea predators who lie waiting: big reef fish like *ulua* and wrasses, sharks, and barracuda.

The hatchlings who get past all these dangers swim as fast as they can for hours—maybe as long as two days! They swim straight out into the open ocean where they live for the next few years in a place unknown to us. When they return to shallow waters, they are 15-to-18-inches long, too big for predators to bother, except for large sharks and people.

Food

In the wild, the adult green sea turtle does not eat other animals. It feeds on the seaweed and sea grasses of the shallow waters near the Hawaiian Islands. The turtle has no teeth, but ridges inside its mouth enable it to grip and tear food.

Unlike the adults, the hatchlings are meat-eaters. Scientists have looked at stomach contents and think the hatchlings eat jellyfish and other small spineless animals during the time they spend in their unknown nursery in the sea.

Defense

The green sea turtle depends on its large size and hard shell for protection. It can swim fast—up to 20 miles per hour—for short distances. Even though it has a beak, the green sea turtle is very gentle and almost never bites, even when it is attacked. Its countershaded coloration, dark on the top and light on the bottom, gives it some camouflage in the water. Looking down from

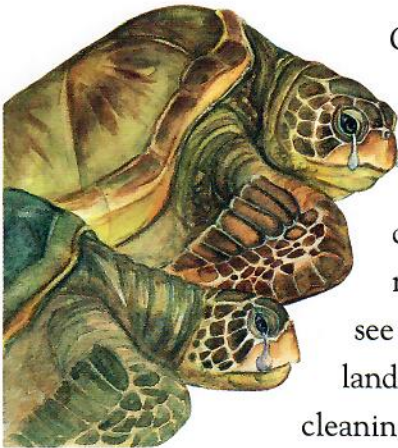
above, the turtle's dark back is hard to see against the darkness of the deep water or ocean bottom, and looking upward, it's hard to spot the turtle's light underside against the bright surface.

Population

Fossils reveal that sea turtles lived 180 million years ago, when dinosaurs were still on the earth. Once, tens of millions of green sea turtles lived in the oceans of the world. Today, scientists guess that there are fewer than half a million left. Only two hundred to six hundred females come ashore each year in Hawai'i to nest.

The Hawaiian green sea turtle is listed as a threatened species in the United States. Worldwide, the green sea turtles are considered endangered animals.

Adaptations



Green sea turtles are saltwater reptiles. Like other reptiles, they have backbones, breathe air, have a tough, scaly body covering, and are cold-blooded. Sea turtles are different from other turtles because they cannot pull their heads into their shells. They can see very well in the water but not so clearly on land. Thick tears constantly wash across their eyes, cleaning the eyes and getting rid of the body's extra

salt. The turtles can hear and they have an excellent sense of smell. They do not have any kind of a voice.

Green sea turtles can sleep underwater or afloat on the surface of a calm sea. Underwater, they may wedge themselves under a rock while they sleep. When they are asleep, their body systems slow down and they do not have to breathe as often as they do when they are awake. They can stay underwater for more than two hours without coming up to breathe.

Green sea turtles can find their way across large areas of open ocean to locate the right nesting beaches. No one knows how they do this. They may smell their way back, or somehow use the stars or the sun or the magnetic pull of the earth. Scientists think the turtles return to nest on the beach where they hatched.

Hawaiian green sea turtles often come out of the water to bask, lying on the beach in the warm sunlight. They may bask to escape from sharks prowling in the water, or to let the heat of the sun warm their body temperatures.

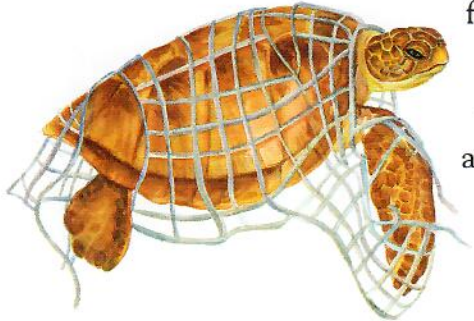


Human Impact

Unfortunately for the green, people have found it the most useful of all the sea turtles. Its meat and eggs are good to eat, its oil can be used in makeup, the shell can be cut into jewelry or small tools, handbags, shoes, and belts can be made from the leathery skin, and calipee, the substance that makes up the bottom shell, is used to make turtle soup. The bodies of young turtles have been stuffed and shined for decorations, the hatchlings dried and put into paperweights. Old books tell how turtle hunters one hundred years ago caught thousands of green sea turtles in a single night, simply turning them on their backs while they were helpless on the beaches.

Besides being hunted for all these different uses, the green sea turtle faces other problems in its struggle to survive. Many of its nesting beaches have been taken over by people for swimming, sunbathing, and boating. Other beaches have disappeared as cities and towns are built. Feeding grounds have been invaded by boats, divers, and swimmers. In some areas, pollution has killed the grasses and seaweed the turtle depends on for food.

Sometimes turtles try to eat plastic they find in the water. The plastic gets stuck in their gut and the turtles starve because they can't digest any food. Many turtles are caught by accident in the drift nets and long lines put into the ocean by fishermen. The turtles get tangled and cannot rise to the top of the water to breathe.



In the past few years, a new threat has come to the green turtles. Fishermen and

scientists have found honu with tumors growing on their bodies. These tumors, called fibropapillomas, appear on the turtles' faces, flippers, and tail areas and cause the turtles to become very thin, or blind, or unable to swim. Scientists are trying to find out what causes the tumors and how to get rid of them.

Recovery

It is very hard to help the green sea turtles because we still don't know important things about how they live. Scientists study the turtles all the time, trying to find out more about them. They put tags on the turtles who come ashore to find out where they go when they are in the ocean and how often they come back to the same beach. Sometimes, scientists use small radios linked to space satellites to help track the turtles. They are trying to learn how the turtles find their way through the ocean.

Some people have tried to raise green sea turtles in captivity. They thought that if they could supply enough turtles and turtle eggs, people would stop hunting them in the wild. Most scientists don't think the turtle farms are a good idea. They are afraid people will get used to eating the turtle meat and eggs and want more than the farms can provide. The scientists think that if there is a big demand for turtles, hunters may kill even more than they do now.

Some hatchlings are being raised in captivity for two or three years then released into the ocean to grow and breed in the wild. Scientists are watching to see if this plan works.

Protection

Since 1940, all but two of the Northwestern Hawaiian Islands, where the green sea turtle nests, have been part of a National Wildlife Refuge. It is against the law to disturb any of the animals and birds that live in a refuge. Still, hunters continued killing sea turtles because the law was hard to enforce in those distant islands. Finally, in 1978, the Hawaiian green sea turtle was added to the list of animals protected by the United States Endangered Species Act, which makes it against the law to hurt, bother, chase, hunt, shoot, wound, or kill any endangered or threatened species. Only scientists who are studying the turtles are allowed to catch (but not hurt) them, and they must get a special permit.

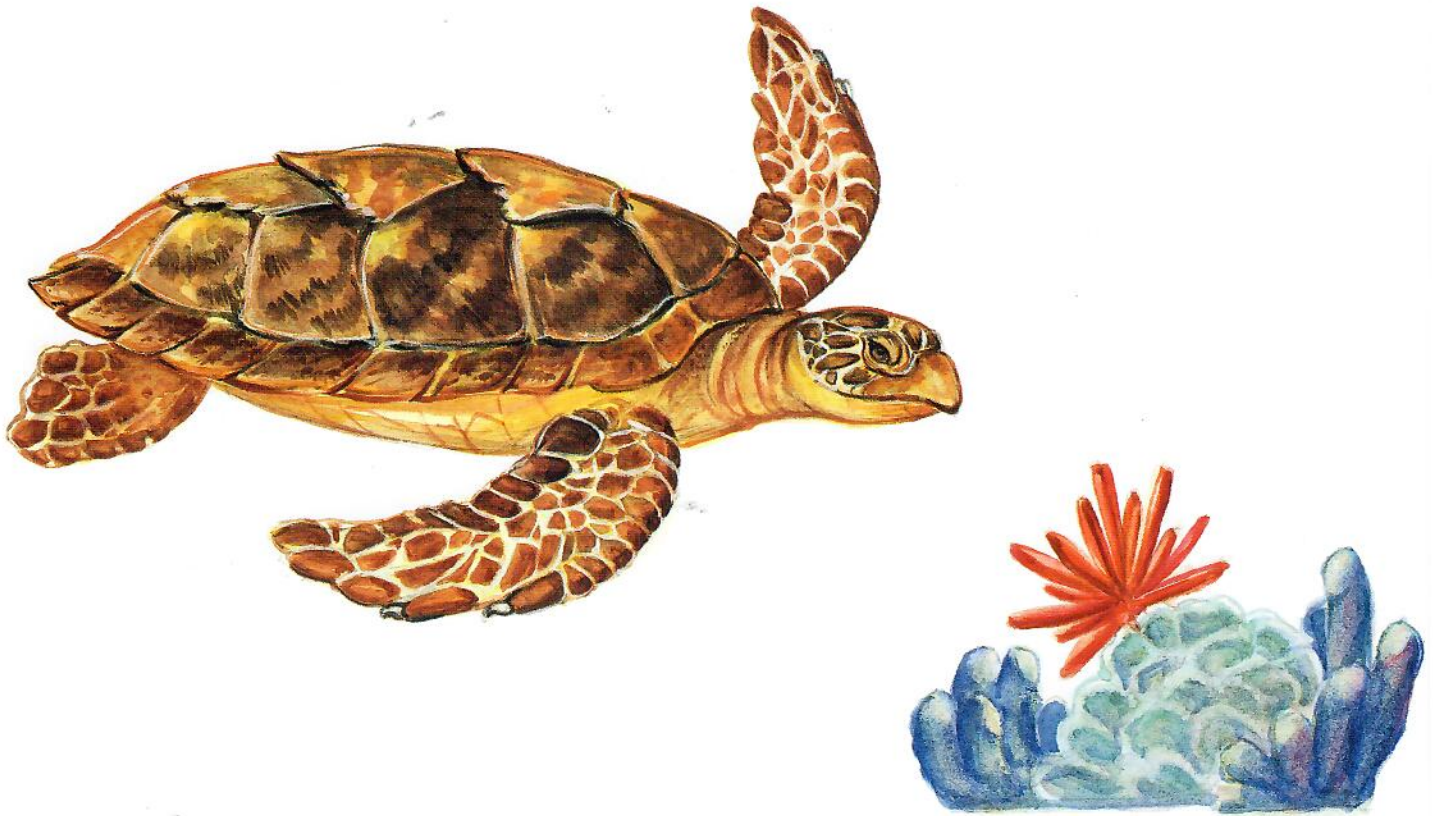
It will be a long time before we know if these laws are working, because green sea turtles grow very slowly. They may take as long as twenty-five years to grow big enough to breed! We do not know how long they live, but scientists think many of them grow very, very old.

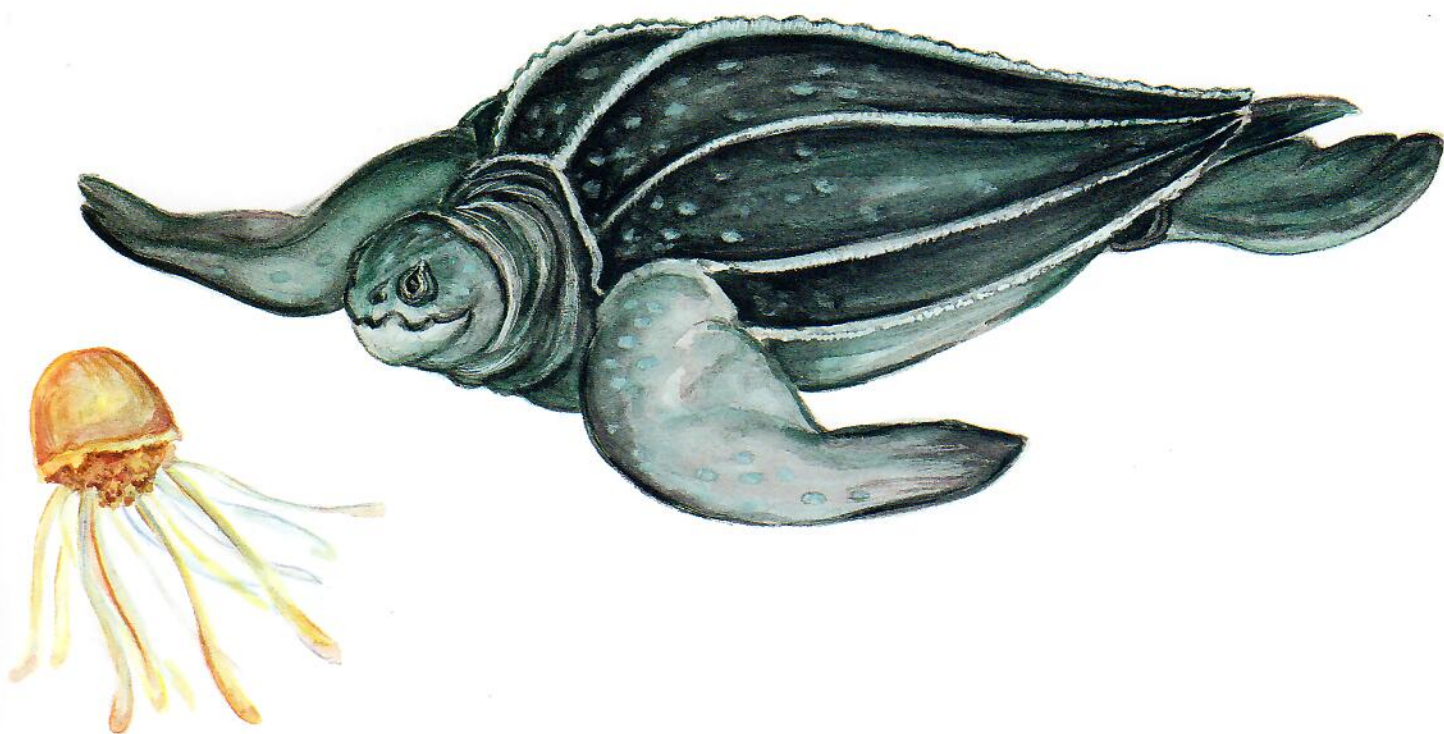
The National Marine Fisheries Service, the U.S. Fish and Wildlife Service, the National Park Service, and the Hawaii State Department of Land and Natural Resources protect sea turtles in Hawai'i. Some private groups, such as the Nature Conservancy, The Honu Project, Sea Life Park, and the Sierra Club are helping the government agencies.

Other Sea Turtles of Hawai'i

Besides the green, two other kinds of sea turtle live in the ocean waters of Hawai'i: the hawksbill and the leatherback. Sometimes loggerheads and olive ridleys visit island waters, but they are not considered native species of Hawai'i.

The hawksbill, called *honu'ea* in Hawaiian, is smaller than the honu, its head is more narrow, and it has a sharp beak. Its main food is sponges. The hawksbill's upper shell is dark brown with yellow and reddish streaks and is prized as a material for jewelry, combs, glasses frames, and other small ornaments. The meat of the hawksbill may be poisonous, depending on what it has eaten. Very small numbers of this turtle nest on Hawai'i and Moloka'i, where the eggs and hatchlings are at the mercy of people, dogs, cats, and mongooses. The hawksbill is an endangered species and scientists fear it will soon be extinct in Hawai'i.





The leatherback is the only sea turtle whose shell is leathery rather than hard. Its shell is black-brown, and the leatherback grows to be very big—up to 2,000 pounds! This turtle often swims in Hawaiian waters, but never comes ashore in Hawai'i. It eats jellyfish and swims to beaches near Central America to dig its nests. The leatherback is the only sea turtle known to make noise: it gurgles and rumbles as it nests. The leatherback's eggs are widely hunted in its nesting areas. It, too, is an endangered species.

Glossary

bask - to lie in the sun and warm up

calipec - yellow cartilage found inside the lower shell of the green sea turtle

camouflage - the color (and sometimes behavior) of an animal that enables it to blend into its surroundings and become hard to see

captivity - kept in a limited area; not allowed to roam freely

carapace - the upper shell of a turtle. It is made up of plates that fit together.

cold-blooded - having a body that does not make its own heat: a cold-blooded animal's body temperature rises or falls as the air or water surrounding the body becomes warmer or cooler. Reptiles and fish are cold-blooded.

coral - a small, soft-bodied ocean animal that makes a hard, stony outer skeleton. Many skeletons together form large ridges, or reefs, in areas where the ocean water is shallow and warm.

countershading - animal coloring that is darker on one side and lighter on the other. A countershaded turtle is hard to see because if you look down at it from above, its dark back will blend into the color of the ocean floor beneath, and if you look up at it from below, its light belly blends into the color of the sky above. Many sea creatures, birds, and reptiles are countershaded.

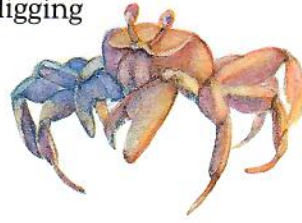
endangered species - animals or plants that may become extinct and no longer exist on earth.

extinct - having died out. Dinosaurs are extinct.



fossils - hard remains of plants or animals that died in earlier ages. Fossils are usually dug from the earth

ghost crab - a crab that lives along the ocean shoreline, digging burrows in the soft sand. It is called "ghost crab" because its coloring looks like sand and it is very hard to see when it is standing still.



gut - the organs that help a turtle digest its food

hatchlings - young turtles that have just come out of their eggs

incubate - to keep eggs warm and safe until they hatch

limu - a Hawaiian word for seaweed

mongoose - a small, furry, meat-eating animal that looks like a weasel

poisonous - something that will make you sick or kill you if you eat it

pollution - something that makes air or water unclean

predators - animals that hunt and eat other animals

reef - a ridge of coral lying in shallow ocean water

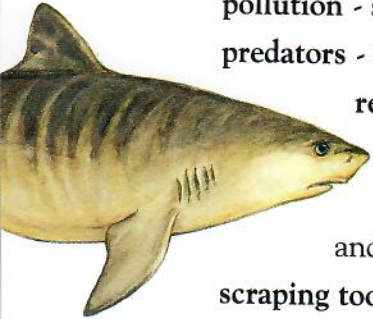
reptiles - cold-blooded animals with lungs, backbones, and bodies covered with plates or scales. Lizards, snakes, turtles, and crocodiles are examples of reptiles.

scraping tools - hand tools used by Hawaiians in ancient times for such things as scraping the bark off branches to make *kapa* (a kind of cloth)

species - one kind of animal

tumors - growths or swellings on the body

ulua - a large species of reef fish, also called jack



About the Author

Marion Coste graduated from Connecticut College and has been an elementary school teacher and an educator/administrator at Mystic Marinelife Aquarium, Bishop Museum, Honolulu Academy of Arts, and the Hawaii Children's Museum. She has worked as a trainer/consultant for The Kamehameha Schools and is a lecturer in the College of Education, University of Hawaii. She was awarded a 1991 nonfiction grant from the Society of Children's Book Writers and is the author of *Nēnē*, a book about the Hawaiian goose.

About the Illustrator

Cissy Gray, award-winning artist and portrait painter, resides in Seattle. She was educated at Connecticut College and the Seattle Art Institute and has taught marketing design. She is a former partner in two art galleries in Honolulu and a member of many art guilds across the United States. She has illustrated children's books—among them *To Find the Way* and *Nēnē*—as well as magazines.

To Learn More

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SEA turtles have wandered the oceans of the earth since the days of the dinosaurs. Once they swam in great numbers, grazing on the grasses and seaweeds of coastal waters and traveling long distances to their nesting beaches. Marion Coste describes the life cycle of the green sea turtle, *honu*, in story form, from the emergence of the female from the water to scoop a nest in the sand, to the migration of the hatchlings to the sea, to the perils of the feeding grounds and return to the nesting beaches. The second part of the book provides further scientific information about the habitat, feeding habits, adaptations, and breeding cycle of Hawaiian green sea turtles and about human impact on them. *Honu* is threatened, and anyone who reads this book will care about the environmental dangers to these wonderful, ancient creatures.

Carefully researched, accurate illustrations by Cissy Gray complement the story and enable the reader to see many details mentioned in the text.

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