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## Blue Waters of the Bahamas

Sharks are in decline worldwide, yet they abound in the Bahamas. What makes this blue-water archipelago a sanctuary?

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There's no denying that sharks have an image problem. The serial-killer stare, the obscene grimace of warped teeth, the bloody feeding frenzies—it's no wonder they've been difficult to love as long as we've known them. And writers haven't always helped their cause.

"Pale ravener of horrible meat," Herman Melville wrote of the shark, with its "saw-pit of mouth," its "ghastly flank," its "Gorgonian head." On years-long voyages aboard whaling ships, the famous 19th-century teller of sea tales witnessed sharks devour the offal of butchered whales—"horrible meat"—which goes a long way toward explaining his uncharitable view.

The Bahamas might have changed his mind. Ernest Hemingway, who in the mid-1930s hid out in the islands with his typewriter and rods, was stirred to write of fish and fly lines and the steady pull of the sail. True, he railed against sharks that ravaged his catches faster than he could crank the reel. (He killed scores of them in reprisal, shooting them and burning their bodies on the beach.) But though he often vilified sharks, sometimes he wrote of them with reverence. Says Santiago in *The Old Man and the Sea*, of a mako shark breaking the surface, "Everything about him was beautiful except his jaws. . . . He is not a scavenger nor just a moving appetite. . . . He is beautiful and noble and knows no fear of anything."

The Bahamas is still much as Hemingway experienced it, its waters clean and teeming and blue. Most of the archipelago—some 700 islands and cays scattered for 500 miles (800 kilometers) southeast of Florida—remains free of industrial development. Locals still make a living off Bahamian lobster, snapper, and conch; sportsmen still take bonefish from the sand flats and marlin and sailfish from the cold 6,000-foot-deep (1,800 meters) chasm called the Tongue of the Ocean.

The sharks, too, are still here. At a single dive spot called Tiger Beach, a dozen or so tiger sharks circle, not in the manner of vultures, but more like a mobile above a child's bed. Their dark, watchful eyes are the size of fists, and subtle spots and bands stain their skin like batik. After the great white, this species is said to be the world's most dangerous shark. It will eat anything—other sharks, license plates, tires. The big female that breaks formation and heads my way passes so close I can make out the pores that pepper her snout and enable her to sense the electromagnetic energy of living flesh. As she slides by, huge and silent, I reach out and run a hand over her side. It's like fine-grain sandpaper. Her movements stay steady and calm as she rejoins the circling sharks. For a fish with a vicious reputation, this one makes a disarming first impression.

Big tigers aren't the only sharks that flourish here. More than 40 other species cruise Bahamian waters, including lemons, great hammerheads, bulls, blacktips, makos, silkies, nurses; even migrating blues and massive whale sharks pass through. Others live here year-round, giving birth in the same quiet lagoons where they were born. And fishermen continue to curse the marauders that gut their quarry, leaving nothing to reel in but lips and gills.

The name Bahamas comes from the Spanish, *Baja Mar*, for "shallow seas." The archipelago rests atop a pair of limestone platforms, the Great and Little Bahama Banks, divided by channels that plunge as deep as 13,000 feet (4,000 meters). It's this combination of sheer drops and shallows, of rocky ledges

and sandy shores, of coral reefs, grass flats, mangroves, and quiet lagoons, that nurtures life of all sizes. Clean Atlantic waters and a warm current from the Gulf blend to create a seafood feast that draws sharks from near and far. For now, this clean blue place is their Eden.

In a secluded pool hemmed by mangroves, baby lemon sharks roll in the shallows and nip at the surface of the windowpane water. "This place is extraordinary," says Samuel "Doc" Gruber, a biologist who runs a shark research station nearby. This tiny lagoon in the strand of Bahamian islands called Bimini is a natural shark nursery, a birthing and feeding area where young lemon sharks can eat and grow without being eaten themselves. Gruber was led here a couple of years ago by a shark stoolie of sorts, an adult female fitted with a tracking device.

As we wade through the lucid pool, small fish dart among mangrove roots that spider in all directions, and crabs skitter into hiding. The tidal forest is dense and deep green, sheltering birds that break the quiet now and then, one coughing up song like a truck engine that won't start. But mostly there's just breeze in our ears as the young sharks, hardly bigger than wine bottles, graze our ankles, sending chills up our spines.

With sunglasses, beard, and red bandanna around his face to block sun and mosquitoes, Gruber looks more outlaw biker than marine biologist. Kneeling in a swirl of sandy water, he tries to lure sharks into reach by flicking bits of bait at them and crooning "Ma Chérie Amour." He swears loudly when they ignore his overtures, but then, with a pup finally in hand, he coos like an adoring mother. He shows how the young shark, when flipped on its back, slips off to a sleeplike state called tonic immobility.

Sharks bite fewer people each year than New Yorkers do, according to health department records. And you are far likelier to drown in your bathtub or be murdered by your spouse than you are to die in the jaws of a shark. Yet it's still difficult to win public support and dollars for shark research and conservation. Gruber's lab on South Bimini is clearly a duct-tape-and-string operation. Torn fishnets festoon the yard. The lab's donated truck, when it runs, fills quickly with noxious exhaust (a passenger needing air has to ride holding the door ajar). Volunteers who do most of the grunt work share a double-wide mobile home painted in loud colors. The food is off-brand, the bread soft and white, the bunking arrangements chummy. The mostly twentysomethings look sleep-deprived and hungry, but they still eagerly line up to do hands-on research in a place where sharks still thrive.

The self-described "shark geeks" spend long nights working by moon and flashlight in open stretches of Bimini's North Sound, wading along a lattice of nets, carefully untangling captured lemon sharks and rushing them to a pen to be studied and later released. Nearly every pup that moves through the sound is caught this way. Each is weighed, measured, tagged, and its dorsal fin snipped for DNA studies to help the researchers build a lemon shark family tree. More than 90 percent of the tagged sharks that survive their first year are caught again in subsequent years, their health and growth recorded for comparison. Gruber boasts about this recapture rate the way brokers brag about their rate of return. But the real credit goes to the mangrove forests, whose isolation and bounty keep generations of lemons close to home.

Gruber has been studying Bimini's lemon sharks for some 25 years, amassing a detailed database that's the largest for any shark population anywhere on Earth. His findings on how sharks affect their environment and what they need from it confirm, along with numerous other studies, the life-giving nature of mangroves—which is one reason the biologist is fighting mad about a contentious and outsize resort elbowing its way onto tiny North Bimini Island. Condos, a marina, and a casino are already under way, and plans call for a waterside golf course. Local Bahamians are worried about their shrinking access to fishing grounds as the seafloor is dredged and the land locked up in gated communities. Gruber has his own concern: the mangroves. "They'll all be wiped out if the developers have their way," he says. "The North Sound will be the 18th hole. You can have your mai tai there."

But Gruber admits that Bimini and some of the other smaller islands need better amenities for visitors, whose spending is crucial to the local economy. It's a difficult balancing act: Development done right, gentle on the environment and drawing tourists in manageable numbers, can help protect sharks and their ecosystem, Gruber says. But too much development or environmentally unsound practices can destroy them.

As recently as 2002, plans were in motion to set aside five marine areas to preserve the economic and ecological lifeblood of the Bahamas, with Bimini rated as the highest priority. But a change in government put off the project, and there's been no movement toward protection, despite angry prodding and accusations of corruption. Instead, giant resorts such as the one being built on Bimini have grown up on several outer islands. "The government is selling off this environment, cheap," Gruber says. A staffer at the Bahamas tourism office didn't exactly disagree. "We are a young country," said Leonard Stuart,

referring to the Bahamas' 1973 independence from Britain. "We have to learn our own lessons about our environment, and we'll probably make mistakes."

The ramifications could be costly. Tourism accounts for nearly half the gross national product of the Bahamas. Diving is a multimillion-dollar industry here, and sharks are an ever increasing draw. By Gruber's back-of-the-envelope estimate, a single live shark in healthy habitat is worth as much as \$200,000 in tourism revenue over its lifetime. And sharks' ecological value is inestimable. Not only do they weed out sick and weak fish, leaving the fittest to breed, but as top predators they also keep other carnivores in check, preventing them from depleting the algae-eating fish that keep coral reefs healthy. Studies in the Caribbean have shown that where sharks are keystone species, their depletion could topple ancient food hierarchies and ultimately destroy the reefs.

It is a great and sad irony that over much of the world sharks are prized foremost for the nearly tasteless cartilage ribbons, or "noodles," that make up their fins and are the costly key ingredient in shark-fin soup. As many as 73 million sharks die annually for their fins, which command more than \$300 a pound in Asian markets. The trade is illegal and cruelly wasteful—finners often slice off the fins and throw the sharks back to starve, drown, or be eaten alive—but it continues to grow.

Add to the finners' toll the targeted as well as unintended take of millions of sharks by commercial fishermen, plus the slow reproductive rate of sharks, and grim outcomes loom. The oceanic whitetip, one of the most abundant sharks just three decades ago, is critically endangered in parts of its range because of relentless demand for its fins. The great white shark of Hollywood notoriety is believed to be in jeopardy worldwide. Even seemingly plentiful species such as lemons, bulls, and Caribbean reef sharks are threatened by fishing pressure and habitat loss. Scientists warn that many shark populations could be dangerously depleted within a decade, barring bold action. Large-scale bans on finning, more accurate reporting of sharks caught unintentionally, and establishment of marine sanctuaries could all help ease sharks' plight—as would a boost in research dollars. But without strict enforcement around the world, their numbers will continue to nose-dive.

In the Bahamas, commercial long-line fishing has been illegal since 1993, and shark parts cannot be exported from the country. Sportfishermen take some sharks, but demand for the meat is low. All this helps keep the blue waters a sanctuary for the blacktip, reef, and nurse sharks that vie for nibbles from nooks in the coral, for the oceanic whitetip on its global wanderings, for the great hammerhead rocking its bizarre snout side to side in search of prey.

But as developers make their way around the archipelago, shark habitat will continue to be whittled away. These big fish are magnificent in their own right and vital to the natural workings of this place. If the sharks go, so too goes a bountiful ecosystem that feeds local people and keeps outsiders coming back to the islands to fish, to dive, to write, to dream.

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