

Sharks and Divers

Not too long ago, a man snorkeling off the beach in Fort Lauderdale, Florida, was bitten by a small, 3-foot nurse shark. What followed was a brief but intense flurry of publicity and media attention concerning the safety of swimmers and the perceived dangers of sharks.

The fact that the bite was probably a case of mistaken identity -- the man was spearfishing and visibility was extremely poor -- was overlooked by the media, who instead concentrated on the fact that the snorkeler had to swim back to shore with the small shark still attached to his arm, where two police officers then killed the fish.

The sensationalization of the event once again reinforces the public's belief that all sharks are savage attackers, viciously biting anything in their paths.

Since man first entered the sea, the shark has occupied a prominent place in our minds and has served as a source of both reverence and fear. Among some traditional Pacific cultures, the shark is even worshiped as a god.

Around the world, the shark has been depicted as both an emissary of death and a symbol of power. From pictorial representations left on cave walls by early man to the hand-written journals of prominent historians and scholars, the shark has been a source of fascination throughout history. This fascination continues today, evidenced by the popularity of books and films such as *Jaws*.

But unfortunately this fascination doesn't always produce a complete and rational understanding of the shark. For most people, including a surprising number of divers, the shark still suffers from a largely unjustified bad reputation.

SURVIVORS:

Compared to our own relatively short existence on earth, sharks have been around since the Devonian period, some 350 million years ago. Of the more than 21,000 species of identified fish in the world's oceans, only several hundred are sharks.

For such a small group they occupy a surprisingly wide range of habitats, including all the oceans, though mostly in the temperate and tropical regions. Their range includes depths of over 3,000 feet and, on occasion, bodies of fresh water.

From the impressive to the bizarre, they come in a wide variety of sizes. At one end of the spectrum is that massive whale shark which can obtain a length of up to 60 feet and is the largest fish in the sea. At the other end of the scale is the

tiny male cigar shark, which attains a maximum length at full maturity of about 6 to 7 inches.

Of the approximately 250 known species of shark, fewer than 10 percent are considered truly dangerous. The rest, if left alone, have absolutely no interest in man. And even those in the 10 per-cent category seldom pay any attention to us. Customarily, people are not a normal food source for sharks, but attacks do happen.

On average about 100 person per year -- worldwide -- are attacked by sharks, according to the International Shark Attack File (ISAF), first brought to the public's attention by H. David Baldrige, Ph.D., in his 1971 book Shark Attack. Fewer than 50 percent of these incidents end in fatality. To place this number in perspective, relative to the millions of people who enter the oceans each day, approximately 300 people per year in the U.S. die from such seemingly unlikely causes such as being struck by lightning or stung by a bee. Surprisingly, most shark attacks (around 95 percent) are not a case of man being preyed upon as a food source. Instead most involve a single bite with the shark letting go and with no further assault attempted by the same animal.

Based on the ISAF and studies conducted by behavioral researchers like Dr. Eugene Clark, John McCosker and Richard Johnson, every shark attack has a reason behind it. Most often, sharks aren't biting because of a hunger for human flesh. Most attacks are thought to be either cases of mistaken identity where the shark mistook the information received (sound, smell or vibrations) as coming from a normal source of prey, or a defensive reaction when the shark was disturbed in some fashion.

Our ability to understand the motive of a given attack is hindered by the abundance of popularly held misconceptions about these predators. The most classic is that sharks are insatiable eating machines and relentless killers. If this were the case, few people entering the sea would return unharmed. William Beebe, a famed ichthyologist of the 1930s and '40s, referred to sharks as nothing more than "chinless cowards." Actually, sharks are less barbarous in dealing death than many other ocean hunters such as billfish, tuna and killer whales. In addition, sharks don't need to eat all the time. Compared to most other types of predators in the world, sharks are actually light eaters, feeding on the average of two to three times a week and needing to take in only five to 14 percent of their body weight at a time.

MASTER HUNTERS:

Sharks are master hunters, equipped with a battery of finely integrated senses for finding food. They are among the most efficient predators in the marine realm, a status which is seldom challenged. For long-range detection and location of potential prey, sharks depend mostly on vibrational stimuli (sound). In numerous studies, the first conducted by field researchers Dr. Donald R. Nelson and Dr. Richard H. Johnson, sharks have demonstrated they're capable of hearing low-

frequency vibrations in the 10 to 800 hertz (cycles per second) range, such as those emitted by a struggling, wounded or actively feeding fish.

During controlled tests, sharks repeatedly were drawn from as far away as a thousand feet when recorded sounds similar to those of a wounded fish were played. Once in closer range, the shark's olfactory (smell) and ocular (vision) senses kick in, and it can pinpoint the source of the disturbance. For some time, we have known that sharks can perceive body fluids (blood, urine and so forth) diluted to as much as one part per million. More recently, the popularly conceived notion that a shark has extremely poor eyesight has been rebutted with evidence that it can see basic shapes and patterns quite well. Some species may even distinguish colors. The shark's greatest failing, however, still appears to be its acuity, or the inability to discriminate fine detail, shape or form. In cases of attacks caused by mistaken identity, the victims probably acted in some way that caused them to either appear and/or sound like the shark's normal prey. The result of this misinformation is often a predatory attack. For example, the silhouette of a surfer on a board seen from below may resemble a seal or turtle floating on the surface. Because the shark is unable to discriminate fine details, it may strike. By the time the shark realizes it has made an error, the victim is injured.

While mistaken identity is considered the most common cause of shark attack, there is sufficient evidence that many of the remaining reported incidents are the result of a shark being provoked. Most animals, when threatened or feeling threatened, instinctively will either flee or fight. The two most common ways to elicit this response from a shark is to attack, molest or corner it, or to infringe on its territory. This is much the same as venturing into someone's backyard where there is a dog. The more you advance, the more the dog becomes agitated to the point of either backing away or biting you.

PERCEPTIONS AND REALITY:

Hollywood and, at times, the media sensationalize and capitalize on the shock value of the shark's "beastly" image. This coverage encourages the public to regard these magnificent creatures in an unfavorable light. Granted, like any large animal with teeth, sharks can be dangerous. If one were to review all the facts, however, they would indicate that it is only under rare or extenuating circumstances that the shark has been known to attack man. What most people are not aware of, or perhaps don't even care to know, is that when we enter the sea, whether swimming, surfing or diving, at one time or another we probably have encountered a shark. The shark usually sees and/or hears our presence and inadvertently is frightened away or departs due to lack of interest. With such acute senses they know we are there long before we think they do.

As man learns more about sharks, he discovers a little more about himself, most notably his fears. Hopefully, with our new understanding, we can gain a better perspective on sharks and the hazards they can impose, and permit them to be

seen as the majestic predators they are. Simultaneously, we might allow the shark to fulfill the role which nature ordained. After all, there are no villains in the sea.

SHARKS COMMONLY SEEN WHILE DIVING:

While a growing number of the sport diving community consider it a rare and rewarding thrill to see a shark during a dive, there's still a majority who consider such an encounter, whether intentional or not, as the least comforting type of confrontation they could experience. The likelihood of seeing sharks under normal diving practices is not all that great; encountering sharks is usually a rare occurrence. Of the variety of sharks in the world, only a moderate number are likely to be seen, whether planned or unplanned. These species are prevalent in reef-type communities at 10 to 150 foot depths. Although other species occasionally will frequent these areas, they are less commonly seen by divers.

Nurse Shark Reported to reach a maximum length of 14 feet, the nurse shark is seldom larger than 5 to 9 feet. It's perhaps one of the most commonly observed sharks by divers and snorkelers in the tropical and subtropical oceans. With a body coloration varying from light gray to yellow-brown, it's most easily identified by its resemblance to an oversized catfish (broad-shaped head with two barbels hanging from the underside of the snout). Most abundant on sand and mud flats and in shallow reef areas (2 to 60 feet), nurse sharks are typically seen lying under ledges and overhangs. Normally shy around divers and snorkelers, the nurse shark sometimes will lie motionless when approached. Although considered non-threatening, they do have a good reputation for biting when provoked and sometimes hang on with a bulldog-like tenacity. This usually occurs when they've been molested to the point of retaliation. Best advice when you find this shark: Look but don't touch.

California Horn Shark Of the eight species of bullhead sharks in the Pacific and Indian oceans, the one most familiar to California divers is the horn shark. Like all bullheads, the horn shark is identified by its broad, blunt-shaped head with pig-like snout and pronounced crest over each eye. Unlike most sharks, bullheads have an armament of two sharp spines, one in front of each dorsal fin. Seldom exceeding 3 feet, it is a predator of small invertebrates such as crab and shrimp. Sluggish and reclusive, bullheads are a denizen of the shallows, preferring habitats with rocky bottoms for hunting and taking refuge. Because of their size and nature, horn sharks shouldn't cause any concern unless they're seriously provoked. Some people aren't even aware that it's a real shark.

Pacific Angel Shark Common from southern Alaska to Southern California, angel sharks are identified by their flattened, ray-like appearance and mottled coloration on their back. Often seen lying partially buried on the sea floor, it hunts by means of ambushing small fish that pass close to it. Shy and secretive, it poses little to no threat to people. The largest angel shark recorded measured close to 7 feet, but its usual maximum length is 5 feet.

White Tip Reef Shark Abundant throughout the Pacific and Indian oceans, particularly in the eastern Pacific from Mexico to Colombia, the reef whitetip is one of the most common sharks encountered on all types of reefs. Known to reach a maximum of about 6 feet, they're long, slender sharks with light to dark gray body coloration with conspicuous white tips on the upper tail, dorsal and pectoral fins. Predominantly bottom-oriented, it normally stays close to rock and coral outcroppings. The reef white-tip often can be seen resting under ledges or caves, Unless stimulated with food or aggressive behavior, whitetips tend to treat divers with almost complete indifference.

Gray Reef Shark Found widely in tropical and subtropical waters of both the Pacific and Indian oceans, it is one of the most abundant sharks in the central and western Pacific. Seldom exceeding 6 feet, the gray reef prefers to inhabit outer reef edges and drop-offs, where they commonly congregate in packs. As the name implies, they're identified by their basic gray coloration, some dark markings on the fins, a broad black band on the tail and white belly. In disposition, grays are innately curious and bold, sometimes making a pass as close as 3 feet to a diver. Under stimulated conditions such as spearfishing or chumming, grays become highly active and aggressive, making them potentially dangerous. Also territorial, this variety is most known for its defensive and antagonistic posture displays.

Atlantic Or Caribbean Reef Shark Very similar in build and coloration to the gray reef shark, with the exception of lighter markings on fins and tail, these are fairly common sharks on shallow and deep reef in the tropical Atlantic and Caribbean, particularly the Bahamas. Although considered dangerous when in the presence of spearfishing or baiting activities, the Atlantic reef shark is customarily a wary creature. It has been known to move away when approached by divers.

Blacktip Shark Bearing a similar color pattern as those on grays and Atlantic reefs, the blacktip is most easily identified by a more sharply pointed snout and black tips on the fins. With the Pacific variety, the black tips on the dorsal and pectoral fins are sometimes reduced. A regular inhabitant of shallows and nearshore reefs, they're also frequent visitors to outer lying reefs where they could be mistaken for reef sharks. Found in all tropical and subtropical oceans, blacktips seldom exceed 7 feet. The temperament of this species is more shy and less aggressive, even when stimulated by the presence of food. Yet, because it has been implicated in some attacks on humans, it is considered potentially dangerous.

Bull Shark When it comes to having a reputation, this fellow is widely known as one of the top three "bad actors." Although it isn't seen so commonly as the blacktip, the bull shark is most often found in the warm water regions of all three major oceans, While their range extends mostly to coastal areas, bays and estuaries, especially in shallow turbid waters including various rivers and lakes, they may frequent inner and outer reef areas. Bulls are most easily identified by their robust, stocky build, relatively blunt snout, medium to dark gray coloration on the back (sometimes with a touch of bronze), and pale underside with no

markings on the fins. Reported to have taken a large number of attacks on swimmers, they're generally considered dangerous.

Blacktip Reef Shark Of all the inshore reef shark belonging the genus *Carcharhinus*, the blacktip is the most handsome of the lot. The basic coloration of this species is light gray with beige or brownish overtones, and prominent black markings on the tips of their fins; the one on the dorsal is accentuated by a white band underneath. Sometimes seen over outer reef drop-offs, they prefer the clean shallow waters afforded by inner reef structures. Seldom reaching more than 5 feet, blacktips are regarded by many divers as timid and easily frightened, even though some authorities consider them an aggressive and potentially dangerous species.

Lemon Shark The lemon shark was named, not so much for a sour disposition, but for its yellowish gray/brown color. They are predominantly inshore inhabitants and often take refuge in lagoons, bays and estuaries. Like most inshore sharks, the lemon is capable of resting motionless on the bottom. Found widely throughout the tropical Atlantic and Caribbean, it's believed that the tropical Pacific species may be one in the same. While it's reported to have attacked man, most often in the shallows right off beach areas, the species seems to show a reluctance to approach divers even when baited.

Great Hammerhead Shark Of the eight or nine species of hammerhead sharks, none save the scalloped hammerhead is as heart-stopping in appearance and size as the great hammerhead. Able to attain a length of more than 20 feet, this open-water shark is widespread throughout the tropical and subtropical oceans of the world. Easily identified by its distinctively hammer-shaped head, the shark's two lateral projections are presumed to serve as a forward plane for greater maneuverability. With eyes located at the ends of these projections, there's no mistaking what it is when seen from above or below. Commonly feeding on rays and tarpon, the hammerhead is a frequent visitor to inshore waters and reefs. Although considered highly dangerous, they are generally wary of diver activity and may move away when approached.

Galapagos Shark Although found throughout the tropical and subtropical oceans of the world, the species tends to be insular and coastal in distribution. In the eastern Pacific region from Mexico to Colombia, they're one of the most abundant sharks belonging to the genus *Carcharhinus*. There's no distinctive coloration on this species, it has a medium to dark gray body with white underparts. Generally an inshore shark, it's also commonly seen near island drop-offs and banks, sometimes traversing large stretches of open water. Like the gray reef shark, the Galapagos shark is often curious and at times brazen. Even without feeding stimuli, they've been known to act aggressively.

Zebra Shark Of all the reef-dwelling sharks in the world, few have as fanciful a physique as that of the zebra shark. The shark's appearance is unmistakable. With the ability to grow up to 9 feet, it has an unusually long tail (almost as long as its body). The frame of the zebra shark is moderately stout with a broad,

bluntly rounded head and several dorsal ridges running the length of its back. Although its coloration may vary from light gray to yellowish gray, as an adult, its body is heavily marked with small brown or black dots. Found mainly in depths of 20 to 150 feet in the tropical regions of the western Pacific and Indian oceans, they preferred habitat is around reef areas with large coral heads or gullies and wise sand bottoms. Primarily a bottom predator of small fish, crabs, mollusks, shrimp and other invertebrates, the zebra is shy, retreating from divers if spooked.

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