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that they may be susceptible to mortality during these movements, including predation.

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Giant Pacific Octopus, *Enteroctopus dofleini*, Attacks on Divers

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Documentation is given of four instances of attacks on scuba divers by the giant Pacific octopus.

Key Words: Giant Pacific Octopus, *Enteroctopus dofleini*, Mollusca, Cephalopoda, attacks, Washington, British Columbia.

In the cold waters around the North Pacific live some truly giant animals. Among them, individuals of one octopus species, *Enteroctopus dofleini* (Wülker, 1910) have been documented to weigh over 68 kilograms (150 pounds) (Cosgrove 1987), making it the world's largest octopus (Norman 2002). Although octopuses (the now preferred plural) have been portrayed as monsters in fiction, folklore, and movies such as *It Came from Beneath the Sea*, octopuses are, as a whole, not monsters, but interesting and intelligent creatures (Mather and Anderson 1993, 1998*). Although predatory, they are generally shy and retiring animals that would rather retreat to a den than have any contact with humans (Hartwick 1983; Hanlon and Messenger 1996). We have emphasized "as a whole" and "generally" because octopuses, particularly the larger, more experienced ones, are individuals (Anderson and Wood 2001). As should be expected with individuals, they

may show decided differences in how they react to any given situation. Sometimes divers will encounter a large octopus that is bold and aggressive rather than shy. The motivations for aggression in normally docile animals are unknown. It is possible that these animals may want to see if a diver has food or frankly, they may well be considering that the diver is food. Whatever the cause, we here relate four instances of octopus attacks on divers.

Fishy Business

A diving crew from the Seattle Aquarium was collecting animals near Slant Rock on the outer coast of Washington State. With rocky cliffs plunging dramatically into the cold Pacific, this is one of the more picturesque areas in a beautiful state. Upwelling at the entrance to the Strait of Juan de Fuca keeps water clear and as cold as 4.4°C (40°F) in the summer! Six meter



(twenty foot) swells are common and the vigorous wave action on the rocks keeps the water well-oxygenated making it prime octopus habitat. While common, mature male octopuses in this area are generally small, weighing 14 kg (30 pounds) or less; in nearby Puget Sound mature male octopuses are commonly 27 kg (60 pounds) or heavier.

The team was collecting adult rockfish with a barrier net. Two divers direct the fish into the net, where they are captured. A third diver bags the fish caught in the net. On this occasion the bagger noticed that a small octopus, having an arm span of about 2.4 meters (8 feet) and an estimated weight of about 6.8 kg (15 pounds), had crawled onto the net and had "flared" across it. When the two other divers returned, the octopus reached out to each and held onto them, one at a time. It actually pulled off one diver's dry suit glove, causing him great aggravation as the cold water leaked up his sleeve. The divers gently pushed the octopus away knowing, from past experience, that this should be enough to scare it off. They then picked up their gear and moved to a different nearby area. While floating in the water 1.5 or 1.8 meters (5 or 6 feet) off the bottom, they were surprised to see the octopus crawling across the bottom toward them. It attacked them again, doing a flaring webover pounce on each of them. When one diver had wrestled it off, it moved to another diver and repeated the behavior. The divers could not get rid of the animal. This so broke up their concentration they decided to surface to the support boat overhead, laughing about the horrible octopus attack!

Now, a 6.8 kg (15 pound) octopus is by no means a monster. The attack these veteran divers experienced was no worse than a puppy worrying a shoelace. But as a puppy might chew through an electrical cord, so might a small octopus do damage in an encounter with a diver. A giant Pacific octopus has a formidable beak that could tear a diver's suit or flesh (Snow 1970; Anderson 1999). The octopus can also inject a venomous saliva into a bite (all octopuses are venomous) (Hanlon and Messenger 1996). However, if a big octopus were to attack a novice diver, the outcome could be different. Instead of surfacing laughing, the diver might not surface at all. The following anecdotes of octopus attacks are more serious and the outcome could have easily been tragedy but for the experience and professionalism of the divers plus some good luck.

Kick Me, Will You?

The second incident happened at Small Pox Bay on the San Juan Island in Northern Puget Sound. Two divers were swimming out into the bay from the shore. One diver was about 3 meters (10 feet) ahead of and above his partner. He looked back at his buddy and saw him kick a big rock. Immediately the "rock" changed color to white then dark red! It was a large octopus, at

least 3 meters (10 feet) across its arms. The animal extended one arm over the unaware diver's fins and ankle, immobilizing him. His forward velocity ceased and, severely startled, he attempted to rise up in the water. He was securely held by the octopus clinging to him and onto the rocks beneath it. The diver grabbed his dive knife and slapped at the octopus' arm. The mollusk responded by wrapping another arm around the diver's legs. He again attempted to ascend and did rise a bit, but the octopus was now moving up toward him by shortening the arms holding the diver and lengthening the arms anchored to the rock beneath it. The diver was working hard enough that a steady stream of air came out his regulator; no discrete breaths were noticeable. The diver approached a nearby cliff and picked up a boulder. The diver attempted to drop it on the large mollusk but just as he did so, the octopus let go, jetted to the bottom and swam off rapidly. During the approximately two minutes of the encounter, the victim had exerted enough effort in trying to break free of the octopus that he had just 20% of his breathing gas (600 psi) left in his tank. His buddy's tank had 67% (2000 psi) remaining. This attack appeared to be the result of simple aggravation at being kicked.

I Don't Like Your Looks

At the Keystone Jetty on Whidbey Island, Washington, a diver was signaled by his buddies to come see a large octopus sitting in front of its den. As he swam over, the octopus turned and faced this diver for a moment then it rapidly swam toward him. The diver used his camera to fend it off. This worked for a while. The animal then pulled on his camera, tugging on the strobes, strobe arms and whole assembly before moving to the diver himself. At first the diver thought: "This is cool, it's going to check me out," then he felt it pulling his mask off. Suddenly it was decidedly "uncool." He grabbed what he could on the bottom and pushed the animal off, holding tight to his mask and biting tightly to hold on to his regulator. The octopus finally let go and retreated back to its den after the diver's buddies shone an ultra-bright canister light at it.

"Come Into My Parlor," Said the Spider to the Fly...

The next attack occurred in Saanich Inlet on Vancouver Island, British Columbia. The diver was a scientist working for a crew filming octopuses. The scientist was very experienced at handling and being around octopuses. He had enticed an octopus to leave its den and the film crew went off with it. As the diver, now alone, gathered his equipment, a second octopus came out of an unseen den. After looking at the diver for a moment, the octopus crawled quickly to the diver's chest and, while remaining firmly anchored to the rocks below with several arms, it seized his upper arms, chest and head. The octopus got three suckers onto the

diver's bare forehead from the suckers c a week. During the diver fought to keep down hard on the to cover it. The diver but in the struggle partially off and he expected, he also breathing gas. The of strength and left his regulator or had undoubtedly died for him to do and brace himself

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Most large octopuses are larger they are, the But as these experience. At certain stages mean, eating man body weight per 1987) so they areing out a diver" will be seeing if he can the octopuses will subdue a diver, which needs to remain near her regulator. So Giant Pacific Octopus diver fatality, but no cause is found. Octopuses were not it is very the potential dan

diver's bare forehead and wouldn't let go. The pressure from the suckers created bruises that lasted for about a week. During the roughly three-minute struggle the diver fought to keep his regulator in his mouth by biting down hard on the mouthpiece and using both hands to cover it. The diver eventually outlasted the octopus but in the struggle lost his mask, had his hood pulled partially off and had his dry suit flooded. As might be expected, he also used up a significant amount of breathing gas. The octopus finally gave up on this test of strength and let go. The diver felt that, had he lost his regulator or had he been low on air, he would have undoubtedly died. The octopus was just too strong for him to do anything but hang onto his regulator and brace himself from being pulled into the den.

Some Thoughts

Most large octopuses are "pussycats." Usually, the larger they are, the more placid and relaxed they are. But as these experiences indicate, there are exceptions. At certain stages in their lives, octopuses are lean, mean, eating machines. They can put on 2% of their body weight per day (Hartwick et al. 1981; Cosgrove 1987) so they are constantly looking for food. "Checking out a diver" with chemotactic suckers may simply be seeing if he or she is edible. As far as we know, the octopuses will let go when they find they cannot subdue a diver, or the diver is not edible, but the diver needs to remain calm and keep a tight grip on his or her regulator. So far, we can document no case of a Giant Pacific Octopus attack that has resulted in a diver fatality, but there have been diver deaths where no cause is found to explain the tragedy. Perhaps octopuses were involved in these deaths but even if they were not it is wise for all divers to be respectful of the potential danger of these powerful animals.

and, Washington to come see him. As he swam back to his den. The diver worked for a while, tugging weakly before the diver thought: "then he felt he was decidedly weak in the bottom back to his mask and regulator. The rock to its den in the bright canis-

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Inlet on Vancouver Island was a scientist. The scientist being around to leave its den the diver, now the octopus came to the diver for a while to the diver's rock to the rocks in its upper arms, suckers onto the

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