



## What's Up With All These Humboldt Squid in Tofino?

Tofino, BC – October 28, 2009 -



Humboldt squid in Monterey Bay, CA. Photo: NOAA

Humboldt squid (*Dosidicus gigas*) are large, carnivorous cephalopods (a class of mollusks including octopus, squid and cuttlefish that are characterized by bilateral symmetry, a head, and modification of the mollusk foot into arms and tentacles) that used to be found only off the coast of South and Central America. One of the largest of the approximately 300 species of squid in the world, it can grow to 2 m (6-7 ft) in length, and is known to be an aggressive feeder, spending the day at great depths and coming up to the ocean surface at night to feed on a wide range of fishes, crustaceans, and squids (including members of its own species!). In turn, Humboldt squid are preyed on by tuna, marlin, billfish, swordfish, sharks and toothed whales such as the sperm whale. Yet very little is known about the biology and ecology of these squid. How can they so easily move between cold, oxygen-poor deep water and warmer, oxygen rich surface water? How do they reproduce and spend the early weeks and months of their lives? We're not even sure how long this squid lives – most scientists think they survive one or two years (like many other squid species) but some believe they may survive to four years.

One thing we do know about these squid is that they are more and more likely to be found in BC waters in recent years. Although Humboldt squid have occasionally been seen in waters off North America during the 20<sup>th</sup> century,

they were not seen in large numbers until 1997-1998, when a strong El Niño event (resulting in oceanic current shifts and warmer waters) likely helped bring them northward to Central California. Interestingly – and alarmingly – the number of hake, a commercially important fish, dropped dramatically in the areas where the squid were found. The squid disappeared for a few years, perhaps because of their short lifecycle and inability to reproduce in this new habitat, but during the milder El Niño event of 2002, large numbers of Humboldt squid appeared again in Central California and have remained there ever since. And, in 2002 the hake populations also dropped again.

While many scientists suspect that El Niño events and general ocean warming associated with long term climate change are partially responsible for bringing the Humboldt squid farther north, they suspect that it's not the full story. Long-term overfishing of the Humboldt squid's predators, such as tuna and billfish, may also be contributing to the squid's range expansion not only because there are less predators to eat the squid (hence increased populations of squid), but also because top predators like tuna and Humboldt squid compete for the same prey. Less competition from tuna means more food for squid, lowering mortality rates.



Humboldt squid stranded on Chesterman Beach, Tofino.  
Photo: Josie Osborne

Moving farther north, Humboldt squid have been sighted regularly off Washington, BC, and Alaska since 2003 – but not in any numbers until this past summer (2009). At first, recreational fishers off Tofino began reporting the odd catch and landing of Humboldt squid – as they and commercial fishermen had occasionally reported in recent years. Others pulled up mangled lures – likely attacked by an aggressively curious squid and its strong parrot-like beak. A search on Flickr.com even reveals a sunset photo of a Humboldt squid stranded on Chesterman Beach, Tofino in September 2008 (and an email conversation with the photographer confirmed that it was there one evening and gone the next morning). But on the evening of August 2<sup>nd</sup>, 2009 several hundred Humboldt squid washed ashore at Chesterman Beach and over the next few days several hundred more were found on Tofino beaches. In late September 2009, yet another stranding event occurred, this time over a much larger geographic range – from Pachena Bay (near Bamfield) through the Long Beach Unit of Pacific Rim National Park Reserve, the northwest coast of Vancouver Island to the BC Central Coast (Rivers Inlet and Hakai Pass). In October, several dozen were stranded in Port Hardy – the first evidence that the squid had entered the inland side of Vancouver Island. In late October 2009, a squid was found on Quadra Island, off Campbell River. Before you ask – no one knows exactly why apparently healthy Humboldt squid would strand, but they do regularly strand in their ‘original’ range of Mexico southward to Chile.

While significant changes in marine food webs, combined with changing ocean temperatures and currents, may explain why Humboldt squid are now more common in BC waters, we don’t know whether they are here to stay, nor whether they will, in turn, have a profound effect on our own marine food webs. California biologists are clear that “a significant change has taken place in the composition and structure of the pelagic community off central California<sup>1</sup>.” Canadian biologists are now examining what Humboldt squid caught in BC are preying on. Squid stranded in Tofino appeared to be eating sardines, herring and mackerel, and Fisheries and Oceans biologists are looking at the prey of Humboldt squid caught just offshore – and whether their prey is similar to prey in Central California (hake, krill, lanternfish, anchovy and rockfish). It seems likely that Humboldt squid would prey on hake, even if hake has not yet been found in squid stomachs. It’s

<sup>1</sup> Zeidberg, LD and BH Robison. 2008. Reply to Watters et al.: Range expansion of the Humboldt squid. PNAS Jan 22, 2008. Vol. 105 no. 3. E6 <http://www.pnas.org/content/105/3/E6.full.pdf> [Accessed October 28, 2009]

unknown whether they prey on salmon. But don’t forget that squid too are preyed upon – will orcas eat them? Sharks? A Tofino photographer even found a black bear scavenging on Humboldt squid carcasses that had washed ashore in Ucluelet Harbour and perhaps unknowingly documented the very first encounter between these two species.

We are not certain what will happen if the Humboldt squid are here to stay, but we do know that with their arrival in BC waters, and the stranding of hundreds of squid on our beaches during the summer of 2009, we can no longer deny that the oceans are changing.

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Black bear scavenges a Humboldt squid near Thornton Creek, Ucluelet Harbour. Photo: Tofino Photography.



Powerful squid beak, and the radula (tooth covered tongue) used by the Humboldt squid to attack prey. Photo: Josie Osborne.

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