

Entangled whales:

not your typical gentle giants

Staff with the Department of Parks and Wildlife have become known worldwide as one of the most experienced teams in the field of disentangling whales that have become entrapped in fishing gear.



by Douglas Coughran

Since 1990, 128 large whales have been recorded as becoming entangled in fishing gear or other marine debris while migrating along the Western Australian coast. In such cases, staff from the Department of Parks and Wildlife (DPaW), often supported by the Department of Fisheries, are quickly on the scene in an attempt to free the entangled animal. But dealing with animals weighing up to 45 tonnes, who are often tightly entangled in gear, while being tossed by the wind and waves in a small rescue vessel, is a risky business for disentanglement teams. Whale disentanglement experts need solid knowledge, management planning and infrastructure in place if they are to successfully disentangle the whale, while also ensuring their safety.

The key is to maintain a healthy respect for working around wild, large and powerful animals, while having a fundamental understanding of their survival strategies and survival behaviour to perceived threats. We need to understand the chance of a whale selecting a flight or fight



response, to read its body language, to be aware of its likelihood to travel in a certain direction, to understand the threat of any nearby whales and to know which position to be in to avoid a potentially lethal tail slap.

After about 20 years of working to disentangle whales off the WA coast we have built such a repository of knowledge that so far all of the department's attempted whale disentanglements have been successful. The department is now regarded as a world leader in whale disentanglements, its staff sometimes travelling to far-

flung corners of the globe to share knowledge with others. But every case is different, every case poses its own risks. So just how does whale disentanglement work?

Not for the faint hearted

Disentangling whales is a very dangerous task that should not be undertaken without appropriate training, equipment, incident management structures and resources. Even with appropriate precautions, dealing with large dangerous animals is never easy, especially when you consider variables such as how tightly they're entangled, the sea, tides and weather.

Whales are large and capable of inflicting injury or death, particularly if harassed or distressed. All precautions must be taken to protect the public and staff when responding to large whale entanglement incidents. And, contrary to popular belief, whales do not understand that we're trying to help them and behave accordingly. Rather, they will do whatever they can to minimise their exposure to a perceived danger—the disentanglement team.

Fight or flight

One of the strongest driving forces in animal evolution is adaptation to reducing the probability of detection and capture by a predator. This dynamic—called predator-prey interaction—determines much about



Above A humpback whale displays an extremely aggressive behaviour as its tail slaps the surface of the water. Photo – Oceanwide Images

how animals react under threat or pressure. Regardless of the physical size of whales—one of the most charismatic megafauna admired by humans—the forces of survival drive how they will react to any perceived or real threat.

Even the largest animal to have ever lived on Earth, the blue whale (*Balaenoptera musculus*), is subject to predation by killer whales (*Orcinus orca*) and sharks. As such, they have developed responses to such threats. These responses are very much in a mix of complex driving forces that need to be well understood when determining what can or cannot be done safely in close proximity to a compromised whale. Scientific literature describes two distinct categories of survival strategy that animals make in response to predatory advances—fight or flight.

As the word suggests, the fight strategy is an active physical response to a survival threat. This may be attack, the best form of defence by an individual, or defence. It may include an all-out attack by a mother in an effort to protect her calf, or could also be a 'group stand and defend' as has been well documented in herd animals, including cetacean species such as humpback (*Megaptera novaeangliae*) and sperm whales (*Physeter macrocephalus*).

Unless desperate, most predators will avoid being injured by a species that is inclined to attack for fear of their own chances of survival diminishing through injury.

The second strategy is flight—to out-run or, in the case of whales, out-swim a predator. And, as noted in countless observations and detailed study, once a flight animal is caught, it offers little or no fight. On the other hand, an animal that prefers the fight strategy will attempt to out-run a predator, but when pressed, they will stand and put up a fight. The energy budget is equally demanding but, depending on the morphology of specific species, one strategy will benefit over the other.

There are two main whale species likely to have contact with human-related obstacles causing entanglement, such as fishing line, as they migrate along the WA coast. These are the humpback whale and southern right whale (*Eubalaena australis*). Of the 128 large whale entanglements recorded in WA waters from 1990 to 2012, about 91 per cent were humpback and about seven per cent southern right whales—both of which are fight-strategy species. The balance is made up by Bryde's whale (*Balaenoptera edeni*)

and Minke whale (*B. acutorostrata*), at about one per cent each—both flight-strategy species.

Obviously, understanding that some 98 per cent of entangled whales are going to 'stand' and fight a response team demands strict risk management techniques. But the complexity of the challenges doesn't only involve considering whether a whale is going to fight or flee—a complex mix of other factors also needs consideration.

Assessing the risk

Each year, between May and December, humpback whales make a 13,000-kilometre round trip from Antarctica to the breeding grounds in warmer waters in WA's north and back again to the feeding grounds in Antarctica. This is one of the longest migrations of any mammal on the globe. Like many other global populations of great whales, the population of humpback whales that aggregate to



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Main A humpback whale clears the water in just three tail beats.

Photo – Oceanwide Images

Inset A humpback struggles to breathe with multiple rope wraps around its body.

Photo – Douglas Coughran/Sea Dog Films

Above An aggressive humpback makes a huge surface splash as it re-enters the water after breaching in front of the rescue team.

Photo – DPaW

Left The disentanglement team makes the final cut to free a humpback off the Abrolhos Islands.

Photo – Sea Dog Films



breed along the coast of WA was severely depleted through commercial whaling.

The west coast humpback whale population is now estimated to be more than 30,000. This is a significant recovery; when commercial humpback whaling ended in 1963 the population was less than 500. The population that migrates along our coast is now the largest humpback whale stock in the southern hemisphere, and it is predicted that by 2020 the population will be fully recovered to pre-whaling levels.

Most whale entanglements are experienced on the northbound migration. This means a breeding-status humpback will be in peak condition and average between 40 and 45 tonnes. An animal in peak condition compromised by a rope entanglement will often be dragging the entanglement gear, which may include floats and possibly pot-traps, and will be driven by an overwhelming urge to reach the breeding grounds. If the entangled whale is pregnant, the stakes will be even higher as the animal rushes to the warmer waters to give birth. This urgency increases the likelihood of a fight response. If the entangled animal is a male, the motivation to breed will heighten its urge to fight. If either are entangled but anchored by the entangling lines, they will be compromised even further by the probability of sharks taking advantage of a trapped animal, and attempting to feed on it.



Top left A humpback mother and calf. Whalers used to call humpback mothers 'devil fish' due to their tenacious defence of their calves.
Photo – Oceanwide Images

Centre left A humpback whale comes eye to eye with the disentanglement team.
Photo – Geoff Taylor/Lochman Transparencies

Left A male suitor tail-sails alongside the rescue team, displaying its displeasure as they work to free a female, heavily entangled in ropes.
Photo – DPaW

Right A male suitor launches itself into the air, engorging its mouth with water and air to appear more menacing to the rescue team.

Photo – DPaW

Reading whale warnings

Every response effort must consider all aspects of risk and determine whether the incident can be managed to achieve a positive safe outcome. The response team may decide not to attempt the disentanglement if they determine that the whale will free itself, or if an attempted disentanglement is too dangerous. They follow a 'decision tree' in the risk management process, and then put in place procedures and techniques that have been developed over time, locally, nationally and internationally.

All animals give warnings to a potential threat. This may be in the form of posturing, vocalisation, subtle body language and breathing rates. It is through understanding these warnings and signs that a disentanglement response team makes critical decisions on when to continue and when to back away.

The tail of any cetacean is its primary weapon to deter or repel a threat, but the head and pectoral fins are also used. The potential reach of the tail, head and pectoral fins is used to identify a hypothetical line; outside this line is deemed the 'safe zone' but inside is the 'kill zone'—a zone in which time spent is crucially limited, or totally avoided. All techniques deployed by the response team are based around this knowledge.

Extended pectoral fins are a sure sign of the whale stabilising to throw a tail slap in the direction of the perceived threat which, in the case of a whale disentanglement, is the response crew in a small boat. Conversely, finding a humpback arching over with head, tail and pectoral fins hanging vertical in the water column is a sign of fatigue and means the whale is less likely to react as aggressively, at least initially. Elevating the peduncle and



tail flukes into the air will be followed by tail slapping onto the water surface or more directly at and on the threat. Both humpback and southern right whales take up an aggressive 'S' posture, somewhat like a wound-up spring ready to release, meaning they are ready to strike. A highly distressed whale will head charge at a boat or predator. Over many years of studying whale behaviour, it has been noted that many whales, particularly humpback whales, will move into shallow water when their survival is compromised, to gain a defensive advantage. Shallow water enables a whale to protect itself from a ventral attack from deep water so the whale needs only to defend laterally, forward or from the rear. They are extremely sensitive to any approach but a rear approach is likely to afford better control for a response team. Additionally, a high percentage of entangled whales will turn back southward if entangled on the northbound migration and towards shallow water.

Though quite dramatic, any tail slapping can be avoided by staying out of the reach of the tail. Positions forward of the tail are extremely dangerous as the whale can adjust its strike distance and they are very accurate with attempts to hit a target. They will quite often attempt to get below a boat to lift it on its back and up-turn the vessel. Right whales will lift the head high, roll over then tail slash, a predictable sequence once it commences but one that can occur lightning fast.

Much can be achieved in disentanglement attempts in the initial stages of contact. The objective is to assess the situation correctly and act in a way that will not pressure the animal into taking flight or fight. However, this is stated with caution, as each case is unique and should never be underestimated. But if a response team fusses around the entangled whale for too long without taking action, the whale may quickly decide that it can attack the response team without risking itself, and launch an attack.



Above A southern right whale approaches. Note the white callosities on its head, thought to be an adaptation for fighting.
Photo – Oceanwide Images

Working around whales with vessel motors causing any level of noise quickly agitates the whales and may inadvertently simulate predatory behaviour. The presence of a second nearby vessel can also cause whales to panic as they may mistake the vessel for another predator, such as a killer whale. Killer whales hunt cooperatively and one routine strategy deployed is the flanking of the victim with pressure applied from both sides and simultaneously from behind the whale. The killer whale's strategy to work its whale prey is aimed at fatiguing the victim so a 'rider' can swim up onto the blowhole to accelerate exhaustion, depleting the whale of energy and rendering the victim incapable of fight. Therefore, for an entangled humpback, any second vessel in close proximity can cause alarm as it fears a group attack, and may cause the whale to panic, therefore heightening the risk to disentanglement response teams.

Attending whales pose threats

The entangled whale is not always the most dangerous whale on site. The most dangerous of all entanglement incidents is when a calf is entangled with its mother, and sometimes an escort, in attendance. These situations are of very high risk and only an extremely experienced crew should attempt an assessment and action

plan. The behaviour of the mother will be the focus of very high-risk management.

Second only to a mother-calf pair in terms of risk is the involvement of a breeding-status female entangled with male suitors in attendance. In all of the years of experience undertaking disentanglement response operations in both the southern and northern hemispheres, a case in late 2012 was one of the most difficult and challenging. A breeding-status female humpback whale was badly entangled around her tail and peduncle, and was anchored. Normally an anchored whale is under relative control, but she had three male suitors in close attendance. The male behaviour observed was truly frightening. There was always a large male in close proximity, often crisscrossing each side of the rescue vessel, tail sailing and breaching in aggressive posturing. These males, mostly the dominant escort, rewrote the book of experience for the crew.

The case was further complicated by the female whale's efforts to remain deep underwater, out of reach of the cutting pole which is used to sever entangled ropes. However, the female was buoyed to near the surface and eventually cut free. All our cases have been different and challenging—none could be described as easy operations. But they have all been learning experiences to pass onto colleagues here in WA, across the country and overseas. Such culminated experience helps us to manage the risks of very challenging incidents so a positive outcome can be achieved for the compromised whale, and so all crew make it safely back home.

Douglas Coughran AM is a senior wildlife officer with the Department of Parks and Wildlife's Marine Wildlife section. He has led the whale disentanglement response team since its inception in 1995. His work becomes busier each whale migration as whale numbers continue to increase. Douglas is a member of the International Whaling Commission's Large Whale Disentanglement Response Committee and advises internationally. He can be contacted on (08) 9219 9849 or by email (douglas.coughran@dpaw.wa.gov.au).