# Cetaceans

# ‘Out of Habitat’

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## Introduction

There are increasing reports, from all around the world, of dolphins (including orcas) and other small cetaceans coming into close contact with human activities that put the animals at risk of harm and even death. Sometimes these animals are 'solitary-sociable' dolphins which have become habituated to human contact and even, eventually, actively seek it out.

On other occasions it may be wild schools of dolphins which, for unknown reasons, have entered ports or harbours or other busy waters putting themselves at risk of ship or propeller strike or entanglement in fishing gear or marine debris. Even if the animals are not involved in such an accident, these busy, industrialized, and often polluted waters may be stressful and otherwise unhealthy for them. There are also cases of both small and large cetaceans turning up in locations where they would not normally be present and some of these cases are also included here.

What all of these events have in common is a need (or at least a perceived need) for people to intervene to move the animals to what is considered a safer situation. Typically, the majority of the animals where intervention seems necessary may be regarded, rightly or wrongly, to be outside of their 'normal habitat' and hence the title of this project.

There is no well-accepted and expert-endorsed approach to moving dolphins or whales out of harm's way and a review is provided here of some of the methods and approaches that have been used.

## Background - extralimital sightings

On occasion, cetaceans are sighted in areas away from their natural habitat. Such sightings do not necessarily mean the animals are in danger and need help, but they may need to be monitored.

### Great whales

Bowhead whales (*Balaena mysticetus*) are resident in the Arctic throughout the year and are rarely sighted outside of the Arctic Circle. However, there have been unusual cases in the last decade where individuals have been spotted in European waters (off the southwest of the United Kingdom, France and Ireland/Northern Ireland) and the Gulf of Maine (in both US and Canadian waters) (Accardo *et al*., 2018; de Boer *et al.,* 2017).

Sperm whales (*Physeter macrocephalus*) are rare in the North Sea, especially the southern end. Their arrival in this area often seems to be a prelude to a stranding event. For example, between 8th January and 25th February 2016, a large sperm whale mortality event occurred in Europe with 30 immature male sperm whales stranding in five countries (IJsseldijk *et al.,* 2018). At this time, the stranding of

such a large animal usually means no rescue is practical and how to respond to these animals has been the focus of much discussion over recent years within the UK's Marine Animal Rescue Coalition (Simmonds, pers. comm.) Smeenk and Addink (1993) reported a sighting of six sperm whales in Dutch waters in April 1993 which did not subsequently strand and which seemed to leave the area. It was speculated that these animals may have been the same six whales which were herded out of Scapa Flow in the Orkneys in March of that year (see case study 17).

## Beaked whales

Perhaps the most famous of all the 'out of habitat' cetaceans was the young female northern bottlenose whale (*Hyperoodon ampullatus*) that entered the river Thames in London in midwinter 2006. Thousands of people lined the river's banks and bridges to try to see the six-metre long animal and millions more watched the rescue efforts unfold on TV. Indeed, live-feed of the attempted rescue dominated the Sky and BBC digital news channels for most of January 21st, when the main rescue effort was made (Simmonds, 2011).

The pressure on the UK's rescue community was enormous and yet it was apparent that her prospects were very poor. This realization came with recognition that she was hundreds of miles from her normal deep sea habitat where her kind specializes in feeding at great depths. Any hope that she might make her own way out into the estuary, and thence into the North Sea, was lost when she moved further up the busy, tidal river. Eventually, under the coordination of British Divers Marine Life Rescue (BDMLR), rescuers corralled and caught her in the shallows and she was lifted by crane, held in two sets of rescue stretchers, onto a barge near to Albert Bridge, with millions watching live on TV. There, the vet in charge of her care, Paul Jepson, started to assess her as the barge travelled east towards the estuary[1]. Earlier there had been much discussion behind the scenes about how she might be best moved back to the wider Atlantic (Simmonds, 2011). At this time, no one had ever attempted to move such a large whale alive and calls were made to the military and others to see if boats or even aircraft could be called into use. Eventually, it was decided to move her as carefully as possible back into the North Sea by boat. Despite these rescue efforts, she died a little while into her journey. The post mortem results, announced on 25th January 2006, detailed various problems including dehydration (which would probably be linked to lack of prey, given that this is how such animals gain their water), muscle damage and kidney failure (Hopkin, 2006).

In the months and weeks that followed, the British rescue community discussed at length how similar animals might best be responded to. It became clearer that large whales that strand (and there was evidence that the 'Thames whale' had stranded and then refloated before the rescue attempt) rapidly become compromised; the abnormal pressure on their bodies causing organ damage and failure.

[1] https://www.zsl.org/blogs/wild-science/the-thames-whale-remembering-the-events-ten-years-on

## Monodontids

A number of different cases of extralimital beluga (*Delphinapterus leucas*) sightings have been recorded in recent years. In summer 2015, a beluga was photographed near Dunseverick, Co. Antrim in Northern Ireland and a month later two individuals were seen off the Northumberland coast in England[2]. 'Benny' the beluga stayed in the Thames estuary for a few weeks in 2018[3], causing considerable concern and re-routing of boat traffic before he disappeared and, in 2020, a beluga was filmed off San Diego, California in the USA (the most southerly record ever for this species)[4].

In 2016, a narwhal (*Monodon monoceros*) was found dead, stranded in Belgium after being sighted in the area, alive, in the previous month though it was not identified as a narwhal until the carcass was examined (Haelters *et al.,* 2018). This is the most southerly case of a live narwhal recorded in Europe and the first sighting for nearly 70 years of this species in Western Europe. The cause of death of this individual was probably starvation though the state of decomposition at necropsy meant that disease or other physical impairment could not be ruled out as contributing factors. Its state of starvation was probably compounded by the fact that it had been out of its normal home range for some time and that in the southern North Sea and the River Scheldt (where it ultimately died), narwhals' preferred prey are not available.

Another incident involved a narwhal being sighted further south than is usual in Canadian waters[5]. This individual was first spotted in 2016 in the St Lawrence River in the company of a group of belugas. Narwhals do not usually range further south than the northern part of Quebec's Ungava Bay (just to the south of Baffin Island). It is also unusual for them to interact with belugas, but this individual has been spotted with the belugas every year since then[6],[7].

## Delphinids

A sighting of common bottlenose dolphins (*Tursiops truncatus*) in Canadian Pacific waters in 2017 was the most northerly record for this species in the eastern North Pacific (Halpin *et al*., 2018). The dolphins were seen alongside false killer whales (*Pseudorca crassidens*) and it was the first time they had been recorded in non-coastal waters in British Columbia, Canada.

There is a small discrete and endangered population of orcas (*Orcinus orca*) in the Strait of Gibraltar (Esteban and Foote, 2019) but usually they are not seen further into the Mediterranean. However, in December 2019, a small pod of orca were sighted off Genoa in Italy and these were identified as being individuals that are regularly sighted in Iceland during the summer months[8]. They were last seen in

[2] https://www.seawatchfoundation.org.uk/more-rare-beluga-whales-spotted-around-the-uk/
[3] https://www.bbc.com/news/uk-england-kent-49199220
[4] https://www.nationalgeographic.com/animals/2020/07/lone-beluga-appears-off-san-diego-in-unprecedented-sighting/
[5] https://www.cbc.ca/news/technology/belugas-narwhal-stlawrence-1.4820602
[6] https://baleinesendirect.org/en/with-the-belugas-and-a-narwhal/
[7] https://baleinesendirect.org/en/narwhal-still-present-in-the-st-lawrence/
[8] https://orcaguardians.org/documentaries/

Iceland in June 2018. The group comprised an adult male (SN113 known as Riptide), a breeding female (SN114), a juvenile (SN115) and SN116 which could be an adult female or a sub-adult male. SN114 was accompanied by a calf which died whilst they were near Genoa. Other sightings in the following months in the Strait of Messina, Italy were not confirmed as being the same group although it does seem likely[9]. Riptide (SN113) was later identified off the coast of Lebanon meaning that in total he had travelled over 8000km (from Iceland to Lebanon) which is the longest migration ever recorded for an orca.[10] The group has not been reported since.

In the summer of 2020 a number of 'attacks' by orcas on sailing vessels off the coasts of Spain and Portugal made the international news[11]. This behaviour, which included the orcas ramming the vessels and manipulating and damaging the rudders, seems to be limited to a small number of young individuals, and whilst this may be play for them, it is clearly distressing to the people on-board the vessels. The Spanish and Portuguese authorities responded by banning vessels from the area and local researchers are studying the situation. Whilst these animals were not outside of their normal habitat, their behaviour meant that a response was necessary and, if such behaviour continues in the future, further responses may be necessary to ensure both the safety of the orcas and the humans travelling in the boats which are attacked.

## Reasons for cetaceans being 'out of habitat'

It is not always clear why an individual cetacean or group of cetaceans are sighted 'out of habitat'. Possible reasons could include because they were following prey or because they made a mistake whilst navigating perhaps due to illness.

The sighting of 'out of habitat' common bottlenose dolphins alongside false killer whales in Canadian Pacific waters (see above) was considered to be related to a prolonged period of warming in offshore regions (Halpin *et al.*, 2018). Such changes in water temperatures are predicted to be more common in the coming decades and this may prompt more cases of species being sighted out of their usual habitat, perhaps because they are following prey into new areas or possibly as a direct response to changing physical conditions (Alter *et al.*, 2010). Indeed, climate change may be a driver for cetaceans being increasingly sighted 'out of habitat'. Loss of sea ice, increased exploitation of Arctic areas by humans, warming of high latitude waters, changes in weather patterns, increased storm intensity and increased construction of renewable energy generators in cetacean habitat, could all lead to individuals or groups of cetaceans being forced out of habitat. Haelters *et al.* (2018) speculate that recent extralimital records of arctic marine mammals which usually associate closely with sea ice, might be indicative of disruptions in the Arctic ecosystem due to recent changes in the climate there.

[9] https://www.reuters.com/article/us-italy-whales/killer-whales-migrate-from-iceland-to-italy-delighting-locals-idUSKBN1YY17Q

[10]https://www.youtube.com/watch?v=KK8l8SY6hhM&feature=youtu.be&fbclid=IwAR2LHHtFCvIGRrmF20GFXgCqjvrcbDYC1csv4ZHF5pKqBD9B55SVXTmEGNo

[11] https://www.bbc.co.uk/news/extra/buqvasp1rr/orcas-spain-portugal

Other environmental factors can cause animals to become trapped for example, changes in tides (see case studies 8, 10 and 13). River dolphins may become trapped in sections of river due to changes in water levels and the formation of separate pools that do not connect to the main river (see case studies 1, 2 and 3).

Human activity can also disrupt cetacean behaviour including migration and this can have fatal consequences. In both 2008 and 2009 the deaths of large numbers of narwhals in northern Baffin Bay following ice-entrapments were associated with seismic surveys which had taken place in the area (Heide-Jørgensen *et al*., 2013). Normally, narwhals depart their summering grounds well before fast-ice forms, therefore avoiding the risk of entrapment. The airgun pulses emitted during the seismic surveys appear to have interrupted the narwhals' migration, causing them to return to their summering grounds where they eventually became trapped. The entrapment in November 2008, which happened near Pond Inlet, Canada, involved several hundred narwhals, 629 of which were subsequently harvested by local hunters (Laidre *et al.*, 2011). The entrapment in November 2009, involved between 50 and 100 narwhals and took place in Inglefield Bredning, West Greenland. Approximately 38 of the trapped animals were taken by hunters.

In river habitats, it is also possible that animals become trapped because of human activities. For example, the extraction of sand and gravel, dam and bridge construction and placements of electricity pylons can lead to river basins becoming uneven and pools forming when tides are low (Solanki *et al.*, 2018). See case study 9.

## The special case of the solitary-sociable dolphins

The phenomenon of why some small cetaceans end up living solitary lives in close contact with humans is not fully understood (Nunny and Simmonds, 2019). These animals have been referred to as 'solitary-sociable', meaning they live solitarily (i.e. away from conspecifics) whilst being, to a greater or lesser degree, sociable with humans. The vast majority of these solitary-sociable animals are bottlenose dolphins (mainly *Tursiops truncatus* but also *T. aduncus*) although such behaviour has also been reported in belugas, narwhals, orcas, tucuxis (*Sotalia fluviatilis*), rough-toothed dolphins (*Steno bredanensis*) and other dolphin species. These animals are not necessarily 'out of habitat' but they may spend more time, or even all of their time, in areas which are dangerous and polluted such as harbours, ports and busy boating areas.

Factors that could influence why bottlenose dolphins may exhibit solitary behaviour for a period include:

- Loss of habitat,
- Food availability,
- Predator pressure,
- Reproductive opportunities,

- Individual differences (some dolphins prefer to be alone),
- Loss of group, mother or coalition partner (due to illness, bycatch, hunting),
- Response to trauma,
- Poor health due to illness or injury,
- Distance between dolphin groups meaning individuals have to travel further to find a new group, (Müller and Bossley, 2002, Simmonds and Stansfield, 2007).

It should be noted that solitary behaviour does not necessarily convert into solitary-sociable behaviour. A solitary dolphin may not come to interact with humans and it may return to live in a group of conspecifics either temporarily or permanently. For more information on the challenges facing solitary dolphins please see Nunny and Simmonds (2019).

## When is action required?

How do we decide when action should be taken? As mentioned above, sometimes extralimital sightings are made and yet we do not take action, because it is assumed that the animals will move on, returning to more suitable habitat.

Sometimes cetaceans may not be entirely 'out of habitat' but they may enter a port or harbour within their natural range. Recent examples include the bottlenose dolphins that entered Barcelona port, Catalonia, Spain in 2012,[12] the group of common dolphins which entered Kingswear harbour in Devon, UK in early 2020, seemingly looking for a pod member who had died,[13] and the humpback whale spotted in New York City's harbour in December 2020[14] . If the animals do not stay for an extended period and do not have a negative interaction with a vessel then there may be no need for action to be taken, though a warning to the port users to take care whilst manoeuvring boats might be necessary.

In summer 2020, in Tenerife, Canary Islands, Spain a bottlenose dolphin spent a week or so in the port at Puerto Colón and swimming close to beaches along the Costa Adeje[15]. The animal was closely monitored in case it showed any signs of stranding and the public were told to keep away from it and beaches were closed when the dolphin was nearby. Plans to play recordings of orca vocalizations were considered as a means of encouraging the dolphin to leave the area though apparently this was not carried out in the end and the dolphin left of its own volition without incident.

[12] https://www.elperiodico.com/es/sociedad/20120321/localizados-cuatro-delfines-en-el-interior-del-puerto-de-bcn-1571581
[13] https://www.metro.news/dolphins-in-harbour-look-for-dead-friend/1891042/
[14] https://www.bbc.com/news/world-us-canada-55250143
[15] https://www.eldia.es/tenerife/2020/07/11/delfin-veranea-adeje-22378539.html

If there is a change in the animals' environment, then action may be required. Such changes include the formation of ice which subsequently traps animals [16], a decrease in water levels which could leave river dolphins trapped in a section of river (Solanki *et al*., 2018), or low tides leaving animals trapped in tidal pools e.g. case studies 8, 9 and 10. Extreme weather can cause animals to be stuck out of habitat for example after a hurricane or tsunami (see case studies 4 and 15).

There may be an imminent risk of injury if the 'out of habitat' animals are in an area with significant boating traffic or if military or industrial activity is planned nearby which could have direct negative impacts on the animals or could prevent them from leaving the area (see case study 18).

For solitary-sociable dolphins, it may be necessary to implement some protocols to protect the animals as they are at risk of being injured by boats, e.g. through propeller strike, or at receiving other negative attention from humans which can lead to injury and even death. Nunny and Simmonds (2019) report a number of cases where solitary-sociable dolphins were killed or injured by humans.

An animal that has stranded will need to be attended to in some way. It is essential to be able to identify the species as this will be key to knowing whether the animal is likely to be healthy or not. For example, in the UK, pelagic species may strand in a healthy condition whereas when a coastal species strands it is usually associated with serious illness, malnutrition or trauma (Barnett *et al.,* 2017).

Assessing the animal for signs of malnutrition can be done by examining the profile of the muscle masses below the dorsal fin (Barnett *et al*., 2017).. If the animal is in poor condition then its mouth should be checked as missing, broken or worn teeth may explain the animal's poor condition. Further details about assessing muscle mass are given in the BDMLR's Marine Mammal Medic Handbook including complicating factors which mean that this should not be the only diagnosing factor.

A stranded animal also needs to be assessed for signs of trauma. Heavy bleeding is not necessarily a sign of significant injury as an abrasion on the beak, melon, flippers and tail fluke may be superficial. Wounds which penetrate deep into the muscle layer, or which expose bone are more serious and will affect the prognosis. Persistent flexion of the trunk may mean there is a spinal injury or muscle damage. Injuries such as fractures or dislocations of the pectoral flippers may be harder to detect, as will any muscle damage or trauma caused by exertion or stress associated with the stranding itself.

It is important to monitor the animal's breathing rate during a stranding event. Rates can be determined by watching the opening and closing of the blowhole (Barnett *et al.,* 2017). A healthy cetacean maintains its blowhole in a closed position and, upon opening it, rapidly breathes out before breathing in again immediately. See Table 1 for breathing rates. During a rescue attempt, breathing rates will often decrease. However, increases may occur with stress from

[16] http://newfoundlandlabradorwhales.net/ice-entrapments

handling, moving and treatment. Once the stressor is removed, breathing rates should return to the previous level after a few minutes. If this does not happen it may indicate that the animal is extremely stressed or shocked. Significant gaps (more than 4 seconds in small cetaceans) between breathing out and in may also indicate shock. These abnormalities in breathing rates can also be indicative of respiratory disease. Other signs of this could be shallow breathing, strong smelling breaths and a sticky discharge from the blowhole.

Table 1: Breathing rates in cetaceans. From The Marine Mammal Medic Handbook (Barnett *et al.,* 2017)

| **Small cetaceans e.g. Common dolphin** | |
|---|---|
| 2-5 breaths per minute | Normal |
| 6+ breaths per minute | Mild stress or respiratory compromise |
| 10+ breaths per minute | Severe stress or respiratory compromise |
| **Medium – large cetaceans** | |
| 1 breath per minute | Pilot whale - normal |
| As low as 1 breath per 20 minutes | Sperm whale - normal |

Other health parameters that should be taken into consideration during a stranding event include skin condition, body temperature (cetaceans quickly overheat and suffer from hyperthermia when out of water although hypothermia can also be an issue for some species and if the animal is weak and malnourished). The animal should be monitored for signs of dehydration and by checking reflexes and muscle tone, the level of consciousness can be assessed. Excessive bleeding from the mouth, blowhole or anus are poor prognostic signs. The age of the animal is also important as young animals that are still dependent on maternal care should not be refloated unless it is clear that members of the same species are in the near vicinity.

## What action to take?

Depending on the circumstances, it might be necessary to capture, handle and translocate the animals. In some situations, it might be more appropriate to drive or corral the animals so that they leave a dangerous area. This can be done using vessels and noise. Brownell *et al.* (2008) provide a review of how these are used to drive animals in hunts which aim to ultimately kill the cetaceans, but some of these techniques may also be appropriate for herding animals out of one location and into another.

For solitary-sociable dolphins, it may not be possible, or even in the animal's best interests, to move it and action may need to be focused more on restricting human behaviour.

For animals that become trapped in rivers or lochs, it may be necessary to put restrictions on boat movements to prevent the animal being injured or forced further upstream.

If the 'out of habitat' animal strands, then a decision needs to be taken about whether to attempt to refloat the animal. Refloatation may be the appropriate response for stranded pelagic dolphins which do not exhibit signs of disease or emaciation and have seemingly stranded following an error in navigation (Barnett *et al.,* 2006). However, for them to be successfully refloated action needs to be taken quickly following accurate assessment and triage on the beach. The Marine Mammal Medic Training Handbook provides a clear triage to guide vets called upon to assess and treat stranded cetaceans (Barnett *et al*., 2017).

For large whales, given the speed with which they are irreversibly harmed once they have stranded, there is a strong argument than any humane response needs to include euthanasia, even though killing such a large whale itself poses major challenges. A workshop, held under the auspices of the International Whaling Commission (IWC), was devoted to this topic in 2013 (IWC, 2013). At the time of writing, euthanasia is the response that the UK rescue community would generally choose to deploy for large stranded whales far from their habitat (i.e. the southern part of the North Sea), although finding suitable drugs or firearms remains problematic (Barnett *et al.,* 2017). Indeed, the UK's Cetacean Strandings Programme has found that the majority of animals that strand alive are diseased and/or emaciated and euthanasia is an important humane option in such cases (Barnett *et al.*, 2006).

A number of techniques are available for euthanizing marine mammals and they are covered by three categories:

1. physical disruption of brain activity by direct destruction of brain tissue (e.g. via gunshot or explosives),
2. drugs that depress the nervous system and induce death (e.g. barbiturates or other anesthetics),
3. mechanisms that directly (e.g. decapitation) or indirectly(e.g. muscle paralyzing drugs) induce hypoxia (Alonso-Farré *et al.*, 2014).

The Marine Mammal Medic Handbook gives details on drug-induced euthanasia including relevant doses and routes of administration as well as the appropriate techniques for shooting (Barnett *et al.*, 2017).

## Handling and translocation

How cetaceans are captured and handled will vary according to species, individual animals and location (Norman *et al.,* 2004). Handling should always be limited in terms of the amount of handling and the length of time the animal is handled.

A number of different methods have been used for capturing odontocetes including seine, drift or set nets, breakaway hoop nets, encircling and, in some cases, driving animals to shore or into shallow water (Norman *et al.,* 2004).

The Marine Mammal Medic Handbook (Barnett *et al.,* 2017) and the CRC Handbook of Marine Mammal Medicine (Gulland *et al.,* 2018) provide details on how to respond to stranded cetaceans including how to lift and move them.

### Human safety

Handling cetaceans can be dangerous. Humans involved in capturing a cetacean can be struck by the animal's tail or rostrum or be injured by the equipment being used (Norman *et al*., 2004). Careful planning can help to reduce such incidents. The Marine Mammal Medics Handbook gives clear advice on health and safety issues (Barnett *et al.*, 2017). Risks to human health include:

- Hypothermia - it is important that those involved in a rescue effort wear protective clothing and that they are not in the water for long periods,
- Injury from the tail which can thrash violently,
- Bite injury from a toothed cetacean,
- Exposure to zoonotic bacteria – those working near the animal's blowhole should wear protective facemasks, and
- Exposure to *Brucella* species which can cause disease in humans – pregnant women should not handle cetaceans because of the risk of *Brucella* causing miscarriage.

## Case studies

Below are a number of case studies where cetaceans have been found 'out of habitat' and some kind of rescue effort has been made to return them to a suitable area or where they have been encouraged to leave the area.

### Odontocetes

#### River dolphins

*Case study 1 – Two tucuxis trapped in a pool in southern Bahia, Brazil*

In March 2003 two sub-adult male tucuxis were found stuck in a pool of the Cachoeira River, Ilhéus, southern Bahia, Brazil (Batista *et al*., 2005). The pool was 7m deep and had a diameter of 50m. The tucuxis were trapped for nine days where they faced potential starvation, entanglement in fishing nets and boat strikes. During the rescue they were captured using a 120m long, 6m deep nylon net which was used to encircle them and they were then transported by boat, with handling kept to a minimum, and the administration of a glucocorticoid anti-shock treatment (4mg of Dexamethasone).

The first animal captured was released sooner than planned because it became agitated and, upon being released, it returned to the original capture location (seemingly following the whistles of the other trapped dolphin). It was recaptured an hour later and taken to the correct release site in Pontal Bay, Ilhéus. The second dolphin was then captured and transported to the release site where it was subsequently seen swimming with the first dolphin. The handling procedure affected the respiratory rates of both of the dolphins from 0.6 rpm (respirations per minute) in both animals prior to capture, rising to 2 to 3 rpm for the first

captured dolphin and 3 to 6 rpm in the other during capture and handling. Their heart rates also increased but all of these changes were considered normal for small cetaceans being handled. The animals were photographed for id purposes in case of future strandings and were monitored for an hour after release.

*Case study 2 – Amazon river dolphins trapped in segment of river, Bolivia*

In May 2010, at the end of the high-water season and the start of the dry season, a group of Bolivian river dolphins known as bufeo (*Inia geoffrensis boliviensi*) were trapped in a 3km long segment of the Pailas River, a tributary of the Río Grande (Aliaga-Rossel and Escobar-Ww, 2020). Only about 1km of the area was of suitable depth for the animals. Following a number of surveys to determine how many dolphins were trapped, the depth and quality of the water, availability of prey and possible declines in health of the animals, it was decided in July 2010 that the dolphins should be relocated to the Río Grande. Three release sites were chosen with animals captured together to be released together. The dolphins were captured by encircling them with 30m by 6m cotton fishing nets. Once trapped, an animal was brought to the surface, placed on a stretcher for transport and taken to a landing site. It was then transported by truck on a dirt road built by the team. Once at the Río Grande they were transported by inflatable boats to the release areas (a journey of between one and three hours).

After release the dolphins were tracked for two hours and were relocated two days later. Over 13 days, in August 2010, 26 individuals were captured and released. Some animals were difficult to capture and over time, it became harder to capture them as they learnt how to avoid the nets. None of the animals showed major signs of harm (skin lesions or infections) although some of them received scratches during the capture process. Three calves and four juveniles were released close to their mothers. Three of the females were possibly pregnant (based on abdomen size).

*Case study 3 – Bolivian river dolphins trapped in a canal, Bolivia*

Similarly to Case Study 2, a group of 18 bufeos became trapped in a naturally formed canal in early 2019.[17] The animals were released into the Rio Grande at the town of San Julián.[18] Veterinarians from the Maryland Zoo and the Saint Louis Zoo in the USA helped the Bolivian rescue team with the initial rescue of six of the dolphins by catching them in nets and transporting them via pick-up truck to a release site 2 hours away[19]. Three of the released dolphins were fitted with satellite transmitters.

### Oceanic Dolphins

*Case study 4 – Indo-Pacific Humpback Dolphin stranded after tsunami, Kao Lak, Thailand*

The tsunami that took place in December 2004, led to an Indo-Pacific humpback dolphin (*Sousa chinensis*) becoming stranded in a small lagoon near Kao Lak in

[17] https://www.youtube.com/watch?v=j-gQRqqg1kg
[18] http://www.santacruz.gob.bo/sczturistica/asies_contenido/21269/301
[19] https://www.stlzoo.org/about/contact/pressroom/pressreleases/bolivian-river-dolphin-rescue-news-release

Thailand.[20] Efforts to rescue the dolphin were hampered by debris in the lagoon which kept ripping the nets being used to catch her. On 5th January 2005, she was finally caught, placed on a stretcher and taken by pick-up truck to the sea. Her wounds were treated and she was given antibiotics before being released into the Andaman Sea.

*Case study 5 – Striped dolphin trapped in El Musel port, Gijón, Asturias, Spain*

In 2009, during building works to expand the port of El Musel in Asturias, Spain two striped dolphins (*Stenella coeruleoalba*) became trapped within the new dock[21]. One of them died and the other remained there for over 6 months before leaving the port. During those 6 months, environmental groups demanded that the port take action to rescue the dolphin and, seemingly, these pleas were not answered[22]. It is not entirely clear whether the dolphin left of its own accord or whether it was the use of ultrasounds emissions by the organization CEPESMA that led to the animal leaving[23].

*Case study 6 – Dolphins rescued from ice-bound harbour, Seal Cove Harbor, Newfoundland, Canada*

In February 2009, three white-beaked dolphins (*Lagenorhynchus albirostris*) stuck behind drifting pack ice for four days in Seal Cove Harbor, Newfoundland, Canada, were rescued by local fishermen who cut through the ice and cut a route for the dolphins to follow[24]. Two of the dolphins immediately followed the channel to open water. The third animal appeared too weak to follow them and was assisted by a 16-year-old boy wearing a survival suit who entered the water and helped tow the animal to open water. Seal Cove's mayor had requested assistance from the Department of Fisheries and Oceans but when this was not forthcoming, the local people decided to take action. A fourth animal seen with the group was presumed to have died or escaped before the rescue effort.

*Case study 7 – Bottlenose dolphin relocated in New South Wales, Australia*

In 2012 a single female bottlenose dolphin was recorded in St Georges Basin / Sussex Inlet in New South Wales, Australia (Hawkins, 2014). She spent 10 months in that area and became habituated to interactions with humans, regularly seeking contact with swimmers and boats. There was concern that the dolphin could be injured or stressed by these interactions and that the public was also at risk. Therefore, the dolphin was relocated to the open ocean at Bendalong on 2nd May 2013. Within 7 months, she had travelled 240km to Sydney where she continued to interact with swimmers and vessels.

*Case study 8 – Two bottlenose dolphins rescued from Black Lake, Western Australia*

In March 2015, two male bottlenose dolphins got stuck in Black Lake at Mandurah in Western Australia after traveling up the Serpentine River from Peel Inlet

[20] https://www.wfft.org/aquatic-wildlife/tsunami-dolphin-released-back-to-the-seas/
[21] https://www.elcomercio.es/20100307/asturias/gijon/liberado-delfin-estaba-atrapado-201003071148.html
[22] https://www.20minutos.es/noticia/483530/0/delfin/atrapado/musel/
[23] https://www.lne.es/gijon/2010/03/11/ecologistas-tachan-irreal-salvacion-cepesma-21379606.html
[24] https://www.ctvnews.ca/dispute-emerges-over-rescue-of-trapped-dolphins-1.371924

presumably chasing fish.[25] The dolphins could not leave the lake because of a series of low tides and decreasing water levels.[26] Kayakers herded the dolphins into shallower water using nets and then the dolphins were captured by wildlife officers from the Department of Parks and Wildlife who put them into a trailer and took them to the Serpentine River to release them[27].

### *Case study 9 – Indo-Pacific Humpback Dolphin rescued from a pool in the Mahi River, Gujarat, India*

An Indo-Pacific humpback dolphin was found in shallow water in the Mahi River, near Umraya village, Gujarat, India on 28th December 2015, trapped in a pool because of the falling tide and with no possibility to return to the river (Solanki *et al.*, 2018). The dolphin was encircled with a nylon trawl net (mesh size about 40mm) and the dolphin was caught and placed on a thick water-proof tarpaulin (4 x 5m). The dolphin was transported on the tarpaulin on top of a bed of mud in a vehicle to the nearest coast at Kavi-Kamboi, Jambusar, Gujurat and was released into the Mahi river estuary early in the morning of 29th December 2015. The dolphin's health status was monitored throughout and it seemed to be healthy. No evidence of re-stranding was reported.

### *Case study 10 – Bottlenose dolphin rescue from pool, Mandurah, Western Australia*

In January 2017, in an area close to the location of case study 8, a young male bottlenose dolphin known as Kristen to those studying the local population got trapped in a small pool at Herron Point, Mandurah, Western Australia when sandbars formed[28]. After several days trapped, with very low tides and high temperatures, Kristen was captured, placed in a sling and moved to the Harvey Estuary.

### *Case study 11 – White-beaked dolphins rescued from ice-bound harbour, Heart's Delight, Newfoundland*

In March 2018, a pod of eight white-beaked dolphins became stuck in a small area of sea water at Heart's Delight, Newfoundland[29],[30]. They were trapped by pack ice. Fishing boats and other boats belonging to local residents were used to break open the ice to try to give the dolphins more space to swim. Finally an excavator was used to remove ice from the wharf which relieved pressure on the ice in the harbour and then a patrol boat cleared the way for the dolphins to exit the harbour by moving more chunks of ice out of the way. If the dolphins had beached themselves, then the Whale Release and Strandings Group would have transported them to an ice-free area.

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[25] https://www.perthnow.com.au/news/wa/kayakers-come-to-aid-of-dolphins-trapped-in-black-lake-serpentine-ng-14fd57057e96411f5abe77acff77ac7e

[26] https://www.mandurahdolphins.com/rescue-stories--dolphin-issues

[27] https://www.mandurahmail.com.au/story/2971394/barragup-black-lake-dolphin-rescue-a-success/?cs=288#slide=1

[28] https://www.mandurahdolphins.com/rescue-stories--dolphin-issues

[29] https://twitter.com/DFO_NL/status/976897797994754048?ref_src=twsrc%5Etfw%7Ctwcamp%5Etweetembed%7Ctwterm%5E976897797994754048%7Ctwgr%5Eshare_2&ref_url=https%3A%2F%2Fglobalnews.ca%2Fnews%2F4099280%2Ffisheries-ice-newfoundland%2F

[30] https://www.saltwire.com/news/provincial/wind-change-best-chance-for-dolphins-trapped-in-ice-at-hearts-delight-195189/?location=newfoundland-labrador

### *Case study 12 – Dolphins rescued from canal in St Petersburg, Florida, USA*

Four bottlenose dolphins, including two calves, became trapped in a canal in St Petersburg, Florida in September 2019 seemingly because they were nervous about passing under a low and noisy bridge[31]. Florida Fish Wildlife Conservation Commission organized a rescue team involving a human chain of rescuers wading and swimming along the canal using sounds and vibrations to direct the dolphins towards Riviera Bay. Once they had passed under the bridge, the dolphins quickly swam off.

### *Case study 13 – Pacific white-sided dolphins saved from fish trap, Powell River, British Columbia, Canada*

On 16th March 2020, a group of 16 Pacific white-sided dolphins (*Lagenorhynchus obliquidens*) which were being pursued by a group of Transient Bigg's orca were forced close to the shore by the orca and so they took refuge in a centuries-old fish trap north of Powell River, British Columbia, Canada just off Tla'amin Nation lands.[32] The fish trap had been built to trap herring and other fish. The water was shallower in the trap and the orca could not follow the dolphins. As the tide receded, the dolphins became trapped in the fish trap. Local people rescued the dolphins by carrying them in tarps and blankets and releasing them into deeper water.

### *Case study 14 – Common dolphin trapped in Mill River, New York, USA*

In late July 2020, a common dolphin entered the Mill River in New York and was seen in the East Rockaway area over a number of days.[33] It is likely that the dolphin entered the river whilst chasing fish during a high tide. It was hoped that with high tides at the start of August, the dolphin would find its way out to sea. When this did not happen, plans were made to herd the dolphin out of the shallow river on 13th August 2020 but rescuers were unable to locate the animal.[34] Although the use of motorized boats had been banned in the area, the dolphin was found dead, with injuries consistent with vessel strike[35]. According to the New York Marine Rescue Center, the dolphin also had sticks, muddy substrate and a non-embedded fishing hook in its gastrointestinal tract and a possible parasitic infection in the brain.

### *Case study 15 – Six dolphins rescued following Hurricane Laura*

On 9th September, a female bottlenose dolphin was found 9 miles inland in a pond in Cameron Parish, Louisiana, USA following the storm surges associated with Hurricane Laura[36]. Audubon Coastal Wildlife Network (CWN), Texas Marine Mammal Stranding Network (TMMSN) and the NOAA Office of Law Enforcement assessed the dolphin and deemed it releasable and transported it back to the Gulf of Mexico.

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[31] https://www.youtube.com/watch?v=fueJ9yAPQ0s
[32] http://prliving.ca/dolphins-rescued-off-tlaamin-lands/
[33] https://newyork.cbslocal.com/2020/07/30/mill-river-dolphin/
[34] https://www.liherald.com/eastrockaway/stories/early-findings-revealed-in-east-rockaway-dolphin-death,127415
[35] https://www.facebook.com/nymarinerescuecenter/posts/10158436224817597
[36] https://newsroom.audubonnatureinstitute.org/audubon-coastal-wildlife-network-rescues-dolphin-in-wake-of-hurricane-laura/

The storm surge and coastal flooding caused by the hurricane also trapped other dolphins. On 29th and 30th September 2020, two adult dolphins and a calf were rescued by the CWN and their partners in the Southeast Region Marine Mammal Stranding Network from a drainage canal in Grand Chenier, Louisiana.[37] The adult dolphins were satellite-tagged so that they could be monitored post-rescue.

A mother and calf rescued from a bayou in Grand Chenier on 9th November 2020 were also believed to have been 'out of habitat' because of Hurricane Laura.[38] The rescue effort was coordinated by NOAA Fisheries and included Audubon Nature Institute, the National Marine Mammal Foundation, Texas Marine Mammal Stranding Network, SeaWorld Orlando and San Antonio, the Louisiana Coastal Protection and Restoration Authority, US Fish and Wildlife Service's Office of Law Enforcement and NOAA's Office of Law Enforcement. The dolphins were released into the Mermentau River which links up to the Gulf of Mexico. The mother was satellite tagged with tags provided by the Chicago Zoological Society's Sarasota Dolphin Research Program.

## Monodontids

### *Case study 16 - Beluga relocated from Nepisiguit River in New Brunswick*

In June 2017, a lone beluga was sighted swimming in the Nepisiguit River near Bathurst, New Brunswick.[39] Concern for the animal's health and for the conservation status of the St. Lawrence beluga population prompted the decision to capture and relocate the beluga to the St. Lawrence Estuary. The beluga was captured on 15th June 2017, transported to Bathurst airport, flown to Rivière-du-Loup and taken to the port of Gros-Cacouna where it was transported by a small vessel before being released into the water near a group of belugas. Over one year later, on 14th July 2018, the beluga was sighted with another male beluga in Ingonish, off Cape Breton, Nova Scotia.

## Sperm whales

### *Case study 17 - Sperm whales in Scapa Flow, Orkney Islands, Scotland*

Six juvenile male sperm whales entered the enclosed waters of Scapa Flow, Orkney Islands on 22nd February 1993 probably through Hoxa Sound (Goold, 1999). Scapa Flow covers approximately 50 square miles and is enclosed by a number of islands. It is shallow (maximum depth 50-60m) and not considered suitable habitat for sperm whales. When they showed no signs of leaving after a few weeks, concerns for their welfare grew as it was unlikely that they were feeding properly and there was a risk of them stranding. An attempt was made to lure the animals out to open water by playing recordings of social sounds (codas) made by female sperm whales. Although three of the whales did show interest in the sounds, they did not follow and this approach was ultimately unsuccessful. The whales were successfully moved out of the area by herding them with a flotilla of

[37] https://newsroom.audubonnatureinstitute.org/two-adult-dolphins-and-calf-rescued-after-being-trapped-in-drainage-canal-in-louisiana/
[38] https://newsroom.audubonnatureinstitute.org/dolphin-and-calf-rescued-after-being-trapped-in-louisiana-bayou/
[39] https://gremm.org/en/le-beluga-de-la-riviere-nepisiguit-est-revu-bien-vivant/

approximately ten vessels on 25th March 1993. During this procedure, the boats moved in a horseshoe formation and though, initially the whales were disturbed by the vessels and moved towards Hoxa Sound, as was the aim, at one point they submerged and reappeared behind the flotilla. The boats broke formation and reformed behind the whales. This time when they had herded the animals closer to the entrance to Hoxa Sound, they made as much noise as possible with engines, echosounders and fish finders. The next time the animals surfaced they were in the channel heading to open sea. However, one animal turned back towards Scapa Flow and had to be herded back again by 3 fast vessels which blocked it from returning to Scapa Flow. The other five whales waited for the sixth whale to join them outside Hoxa Sound and then they all moved away to the open sea.

### Beaked whales

*Case study 18 - Herding of bottlenose whales in Scotland*

In September 2020 a pod of northern bottlenose whales was sighted at various locations in the river Clyde in Scotland including Loch Goil, Loch Long, Holy Loch and near the Isle of Cumbrae. At first it was not clear how many animals were present, but subsequent evaluation suggests that there were five whales. BDMLR, local volunteers and the Ministry of Defense (MOD) all monitored the animals. Bottlenose whales have visited this area previously and have left of their own accord and, therefore, the initial response was to 'watch and wait'. As the whales spent more time in the area, concern grew that the upcoming Joint Warrior (JW) 202 submarine, mine warfare and live firing activity planned for 4th – 15th October[40] could prevent the animals from leaving the Clyde and returning to the open ocean. JW is a multi-national exercise and many naval vessels were arriving in Gare Loch where the headquarters for the operation were located at Faslane.

As the whales were also observed in Gare Loch, it was decided that action should be taken to herd them out of the Loch, using engine noise as a deterrent to prevent them from returning[41]. The herding action took place on 1st October 2020 and included BDMLR medics, Coastguard, RB Marine, RNLI and the Sea Shepherd Conservation Society. Two animals were successfully herded towards the mouth of Loch Gare by a small group of boats. They were suspected to have left through the Rhu Narrows. Three further animals were still in the Loch, a parent / juvenile pair and a single large adult. Various attempts were made to herd the pair south but they were elusive and kept diving and surfacing behind the boats. Banging poles were also used in the last attempts to put more noise into the water. Their use made little difference. Eventually the operation was called off. A couple of days later, the whales left Gare Loch though there were sightings again in Long Loch and Gare Loch. One of the bottlenose whales was subsequently found dead stranded and the post-mortem showed that it was dehydrated and in poor condition[42].

[40] https://www.royalnavy.mod.uk/qhm/clyde/joint-warrior
[41] https://bdmlr.org.uk/northern-bottlenose-whales-in-river-clyde-final-update
[42] https://www.facebook.com/Strandings/posts/3401763173247779

### Mysticetes

*Case study 19 - Humpback whales in the East Crocodile River, Australia*

In September 2020, three humpback whales (*Megaptera novaeangliae*) entered the East Alligator River in Kakadu National Park in Australia.[43] This is the first time such an event has been recorded. Two of the whales found their way out of the river on their own, but one remained 20km upstream for almost three weeks. An exclusion zone was put in place from the mouth of the river to approximately 30km upstream to prevent boats from accessing the area and potentially injuring the animal or forcing it further upstream and eventually the whale found its way back to the open ocean[44]. Potential ways of encouraging the whale out of the river included the use of noise such as banging a metal rod against a ship's hull or playing orca vocalizations[45]. It appears that none of these actions were carried out in the end.

## Proposal for an 'out of habitat' workshop

There is clearly a need for standardized approaches to be developed so that we can identify when a response is needed to a situation where a cetacean or group of cetaceans is 'out of habitat' or in some way in danger due to their location. How to respond appropriately and quickly needs to be included in any guidelines which should be easily available to wildlife managers, vets and other groups involved in cetacean monitoring and rescue.

A workshop to further explore these matters is recommended and a proposed agenda is attached (see Annex 1). Organisations which could be invited to attend such a workshop include:

British Divers Marine Life Rescue (BDMLR), UK
Dolphin Research Australia
Group for Research and Education on Marine Mammals (GREMM), Canada
International Fund for Animal Welfare (IFAW)
International Animal Rescue
Marine Animal Response Society, Canada
Whale Release and Strandings, Canada

## Conclusion

Incidents involving what might be termed 'out of habitat' cetaceans seem to be becoming more commonplace and there are a number of factors that indicate this is likely to be a growing problem. As illustrated here, these situations offer

[43] https://parksaustralia.gov.au/kakadu/news/exclusion-zone-set-up-for-humpback-whale-at-kakadu/
[44] https://www.abc.net.au/news/2020-09-21/nt-kakadu-whale-swims-way-out-of-croc-infested-river/12683936
[45] https://www.abc.net.au/news/2020-09-21/nt-kakadu-whale-swims-way-out-of-croc-infested-river/12683936

complex challenges, and it is desirable that experts should be convened to review best practice and develop suitable protocols that may be shared around the world to help improve the likelihood of successful outcomes. An indicative agenda for such a workshop is included here as Annex 1.

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## Annex 1

Draft agenda for a workshop about 'out of habitat' cetaceans

**Day 1 (meeting open to the public)**

1. Setting the scene
2. An introduction to the biology of small cetaceans
3. Presentation of Review Report
4. The particular case of solitary sociable dolphins
5. Case study presentations from experts (to be refined based on who attends)

**Day 2 (closed meeting for detailed discussions)**

1. Review of agenda
2. Overview of previous day
3. Other case studies
4. Critical review of responses

**Day 3 (closed)**

1. Presentation of draft conclusions
2. Drafting of agreed recommendations and
3. Identification of dissemination routes