IWDG www.iwdg.ie
Irish Whale and Dolphin Group

IWDG Policy Document

Face to face with a beached whale

Guidelines for the welfare of live stranded cetaceans

Published by The Irish Whale and Dolphin Group, 2017.
Website: www.iwdg.ie Email: enquiries@iwdg.ie

ISBN 978-1-9997135-0-8
Printed by Walsh Colour Print, Castleisland, Co. Kerry.

Cover photograph: Fin whale, Courtmacsherry, Co. Cork (William Helps).
This page: Sperm Whale, Ballisadare, Co. Sligo (Will Woodrow).
Back cover: Fin Whale, Courtmacsherry, Co. Cork (Pádraig Whooley).

Design & layout by Michael O'Clery.
Artwork & illustrations by William Helps.

Citation: IWDG (2017). IWDG Face to face with a beached whale - guidelines for the welfare of live stranded cetaceans. Irish Whale and Dolphin Group, Merchants Quay, Kilrush, Co Clare, Ireland.

Acknowledgement: The IWDG gratefully acknowledge the Minister for Agriculture, Food and the Marine for providing funding towards the publication of these live stranding guidelines under the ex-gratia funding to animal welfare organisations scheme. The IWDG also acknowledge MARC and BDMLR for the use of the MARC data recording sheets, and the International Whaling Commission (IWC) for inviting IWDG to participate and speak at the first IWC workshop on cetacean welfare and live strandings. A special thanks to Mark Simmonds OBE and James Barnett for their advice.

Contents

IWDG Policy Document

Introduction

Ireland has one of the richest and most diverse marine ecosystems in the Northeast Atlantic. Whales, dolphins and porpoises (collectively called cetaceans) that are present in the waters around Ireland are an important part of this unique marine environment. To-date, 25 species of cetacean have been recorded in Irish waters. And though we are only beginning to understand our role in the ecology of these remarkable animals, it is clear that Ireland represents a significant habitat for many cetacean species in the North Atlantic.

What is also clear is that our oceans need cetaceans. The whales, dolphins and porpoises that live in the waters around Ireland play a critical role in the health and viability of our marine ecosystems. And in turn, a healthy marine environment enables these amazing marine mammals to thrive and their populations to grow. Their care, protection and conservation are, therefore, mutually beneficial to our marine environment and to the health and sustainability of our cetacean populations for future generations.

There are, however, many challenges facing Ireland's cetacean populations. Live stranding has been identified by the Irish Whale and Dolphin Group (IWDG) **Cetacean Welfare Policy** as a significant threat to the welfare of cetaceans in Irish waters. High profile strandings such as the Fin Whale stranding in Baltimore Harbour, Co Cork in 2012, and the mass stranding of Long-finned Pilot Whales in Falcarragh, Co Donegal in 2014, received significant local, national and international media attention, and highlighted a critical lack of capacity to respond to cetacean live strandings in Ireland. In the wake of these events, the Irish public has become increasingly aware of the importance of caring for live stranded animals, enabling their rescue, and using science to investigate the causes and reduce the occurrence of strandings into the future.

This latest revision of ***Face to face with a beached whale – guidelines for the welfare of live stranded cetaceans*** builds on the Cetacean Welfare Policy using the most up-to-date scientific information on cetacean stranding. These comprehensive guidelines to live stranding response provide for the welfare of the stranded animal, while minimising the risk to human health and safety and maximising the potential benefits to marine mammal science.

It is hoped that these guidelines can form the basis for developing an improved response to live stranded whales, dolphins and porpoises in Ireland.

Paul Kiernan
IWDG Welfare Officer

Réamhrá

Tá ceann de na héiceachórais mhuirí is saibhre agus is éagsúlaí san Atlantach Thoir-Thuaidh timpeall ar Éirinn. Is cuid thábhachtach den timpeallacht mhuirí uathúil sin iad na míolta móra, na deilfeanna agus na muca mara (a dtugtar céiticigh mar chnuasainm orthu) atá sna farraigí thart timpeall na hÉireann. Go dtí seo, taifeadadh 25 speiceas céiticeach in uiscí na hÉireann. Agus cé nach bhfuilimid ach ag cur tús le tuiscint ar ár ról in éiceolaíocht na n-ainmhithe iontacha seo, tá sé soiléir gur gnáthóg shuntasach atá in Éirinn i gcomhair cuid mhaith speiceas céiticeach san Atlantach Thuaidh.

Tá sé soiléir, freisin, go dteastaíonn céiticigh inár n-aigéin. Tá ról an-tábhachtach ag na míolta móra, na deilfeanna agus na muca mara i sláinte agus in inmharthanacht ár n-éiceachórais mhuirí. Agus, dá réir, cuireann timpeallacht mhuirí fholláin ar chumas na mamach muirí iontach sin rathú agus cuireann ar chumas a bpobal fás. Dá bhrí sin is chun tairbhe ár dtimpeallacht mhuirí agus sláinte agus inmharthanacht ár bpobal céiticeach i gcomhair na nglún atá le teacht iad a gcúram, a gcosaint agus a gcaomhnú.

Mar sin féin, tá an iliomad dúshlán roimh phobail chéiticeacha na hÉireann. Tá a dtriomú agus iad fós beo aitheanta mar bhagairt shuntasach do leas na gcéiticeach i bhfarraigí na hÉireann ag **Beartas Leasa na gCéiticeach** de chuid Lucht Faire na Míolta Móra agus na nDeilfeanna (IWDG). Tarraingíodh aird shuntasach na meán áitiúil agus idirnáisiúnta ar eachtraí triomaithe, amhail an droimeiteach a sáinníodh i gCuan Dhún na Séad, i gContae Chorcaí in 2012 agus an triomú ollmhór de phíolótaigh fhadeiteacha ar an bhFál Carrach, Contae Dhún na nGall in 2014, agus mar thoradh orthu sin díríodh aird ar an easpa cumais chun tabhairt faoi eachtraí triomaithe bheo in Éirinn a réiteach. Tar éis na n-eachtraí sin, tá pobal na hÉireann ag teacht ar an eolas, de réir a chéile, faoin tábhacht a bhaineann le haire a thabhairt d'ainmhithe triomaithe chun cuidiú lena dtarrtháil agus faoi úsáid na heolaíochta chun na cúiseanna le heachtraí triomaithe na gcéiticeach a iniúchadh agus iad a laghdú amach anseo.

Tá an t-athbhreithniú is deireanaí seo de ***Face to face with a beached whale – guidelines for the welfare of live-stranded cetaceans*** ag cur le Beartas Leasa na gCéiticeach agus an fhaisnéis eolaíochta is nua-aoisí maidir le triomú beo na gcéiticeach á húsáid. Cuireann an treoir chuimsitheach seo, le déileáil le triomú beo, faisnéis ar fáil i dtaca le leas an ainmhí thriomaithe, laghdaíonn sé an baol do shláinte agus do shábháilteacht an duine agus téann sé chun sochair eolaíocht na mamach mara an oiread agus is féidir.

Táthar ag súil go gcuirfidh na treoirlínte seo bonn faoi fhorbairt freagra níos fearr ar eachtraí triomaithe i dtaca le míolta móra, deilfeanna agus muca mara in Éirinn.

Paul Kiernan
Oifigeach Leasa IWDG

Whales, dolphins and porpoises of Ireland

Whales, dolphins and porpoises (cetaceans) are mammals which have adapted to life in the ocean. These adaptations have helped cetaceans to survive and thrive in most of the world's marine habitats. Many of these adaptations, however, can present a significant challenge if an individual becomes stranded.

Biology

The evolution of cetaceans to life in the ocean has resulted in a number of anatomical adaptations which are important considerations for the welfare of the stranded animal.

Baleen or teeth

Cetaceans are divided into two groupings; Mysticetes (baleen whales) and Odontocetes (toothed whales, dolphins and porpoises). The presence of baleen or teeth is a key characteristic for identifying the species of the stranded animal. Knowledge of the species, and consequently the ecology, will help in the assessment and decision-making processes (see Chapter 6: Assessing the live stranded animal).

Breathing

All species of cetacean breathe air through their blowhole. The blowhole is situated on top of the head,

Common dolphins, Roaringwater Bay, Co. Cork (Pádraig Whooley)

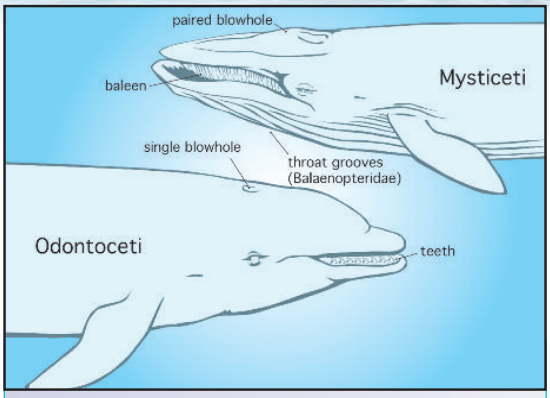


Figure 2.1 Biology of a whale and dolphin (illustration: William Helps)

somewhat to the left of the mid-line in toothed species. The nostrils are paired in baleen whales and single in toothed whales, which can help when identifying the type of stranded animal. It is of particular importance that the blowhole is protected at all times during care and response (see Chapter 5: Caring for the live stranded animal & Chapter 7: Responding to the live stranded animal).

Body size

Cetacean species vary considerable in body size (length & mass), from a 1.5 metre Harbour Porpoise weighing 60 kg to a 24 metre Fin Whale weighing many tonnes. The size of the stranded animal can be the most significant challenge to both care and response (see Chapter 6: Assessing the live stranded animal & Chapter 7: Responding to the live stranded animal). If cetaceans are to be moved, they must be lifted properly and moved with care in order to prevent further injury and suffering. Cetaceans must never be dragged by the tail.

Body shape

The cetacean body has evolved into a streamlined shape, providing for minimal drag and maximal efficiency during swimming. This has resulted in the notable absence of external reproductive organs, which can make the identification of gender challenging. The streamlined shape and lack of external features also makes the lifting and moving of stranded cetaceans particularly difficult, and necessitates the use of appropriate equipment and techniques (see Chapter 7: Responding to the live stranded animal).

Skin

Cetacean skin is smooth, oily and can be quite thin. It is important, then, that precautions are taken during care, assessment and response to avoid damaging the skin of the stranded animal. The skin of cetaceans is not well protected against direct sunlight and can dry-out, burn and blister quite quickly if left exposed. The skin of a stranded animal should be covered for protection, even on cool and over-cast days, and shade should be provided for the whole body where possible (see Chapter 5: Caring for the live stranded animal).

Blubber

Under the skin of each cetacean lies a layer of blubber. The thickness of the blubber layer varies by species depending on their ecology. However, the importance of the blubber layer for thermoregulation is common to

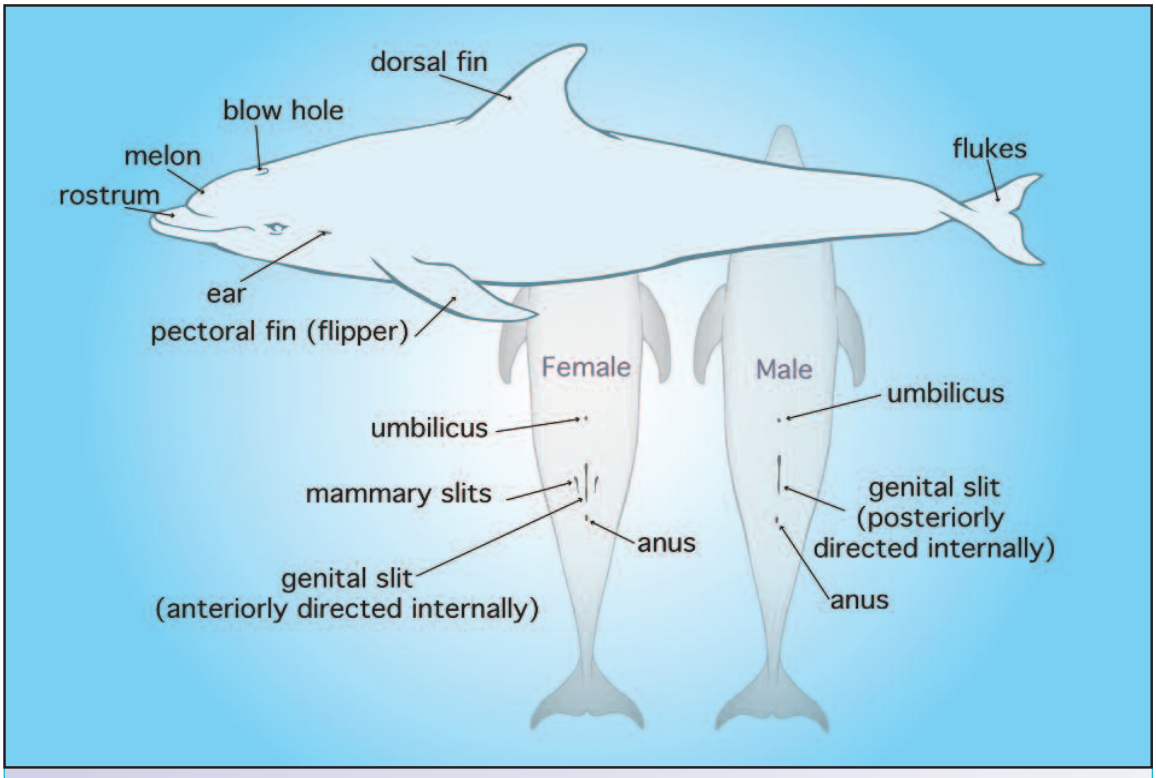


Figure 2.2 Biology of a whale and dolphin (illustration: William Helps)

all species. Water conducts heat away from the body 25 times faster than air. Body heat is conserved in cetaceans by the insulating effect of the blubber layer. When a cetacean strands and is no longer in water, this insulating layer can cause the animal to over-heat rapidly. Therefore, the animal must be kept cool while stranded by draping the entire animal in wetted towels/blankets, and continually re-wetting while protecting the blowhole (see Chapter 5: Caring for the live stranded animal). Certain areas of the body, i.e. flippers, flukes and dorsal fins, do not have a layer of blubber as a thermo-insulator. These areas are used by the animal in its natural environment to shed heat when necessary. It is important to protect these areas of the body during excessively cold or exposed conditions to ensure body heat does not drop below acceptable levels.

Pectoral fins

The pectoral fins (flippers) are flattened, paddle-like appendages located at the front of the body. The pectoral fins contain forearm, finger and knuckle bones which are attached to the skeleton of the animal. It is important, therefore, to protect the pectoral fins during repositioning, lifting or moving to prevent damage or injury (see Chapter 5: Caring for the live stranded animal & Chapter 7: Responding to the live stranded animal).

Ecology

Cetacean ecology is an important consideration in both planning for and responding to live stranding events. Ireland's extensive marine ecosystem contains a variety of habitat types capable of supporting a diverse range of cetacean species. However, different cetacean species use Irish waters in different ways. Knowledge and understanding of species-specific life histories, such as their distribution and abundance, habitat use, community and social structure, is particularly important when developing an effective stranding response.

Many species of cetacean are thought to be resident in Irish waters year-round. However, more species are seasonally present or occur only rarely. Some cetacean species are widespread, having been recorded off all Irish coastlines, while other species, including the large migratory species, are only present off certain coastlines during particular times of the year. Individual species are known to favour specific coastal or offshore habitat types, while others may exist in both. Some species are considered to be abundant in Irish waters numbering tens of thousands of individuals, while other species are vagrant. In addition, certain species in Irish waters exist in highly social family groupings while others are predominantly solitary, forming temporary aggregations to feed and socialise.

Ireland's cetacean stranding protocol must therefore cater for both large and small cetacean strandings. It must effectively address both single and mass-stranding events. And while it is not possible to predict when and how a stranding will occur, it must take account of the existing knowledge of cetaceans in Irish waters.

Welfare

The IWDG Cetacean Welfare Policy identifies live stranding, both single and mass, as a primary welfare consideration for cetaceans in Irish waters. Cetacean stranding can cause severe pain, injury, suffering and distress, significantly and detrimentally impacting the welfare of the stranded animal. The following IWDG live stranding guidelines have been prepared to ensure the highest standards of care and protection for the stranded animal. Where the IWDG live stranding guidelines are promptly implemented the welfare outcome for the stranded animal can be greatly improved. Where the intervention, however well intentioned, is not in accordance with these guidelines the welfare of the stranded animal may be severely and permanently compromised. Therefore, the IWDG recommend that the following guidelines for the welfare of live stranded cetaceans are carefully followed during all live stranding events in Ireland.

Long-finned Pilot Whales at Castlegregory, Co. Kerry (Simon Berrow)

What is a live stranding and why do they occur?

Live stranded Common Dolphins at Crookhaven, Co. Cork (Pádraig Whooley)

A live stranding involves a living animal that comes ashore and is unable to return itself to the sea. Live strandings of cetaceans can occur in two forms; single live strandings involving one individual animal, and mass strandings involving the simultaneous stranding of two or more individuals, other than a mother/calf pair, that come ashore in close proximity.

Live strandings of cetaceans are not a new phenomenon and there are many historic records of cetaceans stranding alive along Ireland's coastline. These records document numerous single and mass stranding events dating back many years, such as the 1767 *Freeman's Journal* account of a whale stranded near Galway that managed to refloat itself on the rising tide, a less fortunate whale that came ashore on rocks near Ardglass, Co. Down around 1830, and the mass stranding of 36 Pilot Whales at Fethard, Co. Wexford in August 1957 [(1)], to mention just a few. These records demonstrate a variety of stranding types and outcomes through the years.

Why cetaceans live strand remains a mystery, and even after a thorough investigation, it is not always possible to definitively determine the reason for a stranding. It is likely that there are many different natural and human-related causes of cetacean live strandings, and that some strandings may even result from a combination of these causes. Some causes of live strandings are beyond our control, while others can be greatly reduced or even eliminated through human actions. Therefore, while it will never be possible to prevent all live strandings from occurring, it may be possible to significantly reduce their frequency.

(1) Fairley, J.S. (1981). *Irish Whales and Whaling*. Blackstaff Press, Belfast.

The following is a list of causes which are likely to contribute to the incidence of live strandings of cetaceans in Ireland.

Navigation error

It has been proposed that cetaceans are capable of sensing the geomagnetic force fields of the earth, and some species may use these force fields to navigate at sea, especially in the deep oceans. Magnetic anomalies occurring in the force fields may lead to disorientation resulting in an increased frequency of live strandings. Live strandings may occur more frequently on shores where lines of equal magnetic force intersect the coastline perpendicularly. Research has also attributed strandings to radical changes in the Earth's magnetic field associated with natural phenomena such as earthquakes. Disruption in magnetic fields may interfere with cetaceans' ability to navigate, which may explain some single and mass stranding events.

Common Dolphin stranded at Rathmullen, Co. Donegal (Gareth Doherty)

Environmental factors

Some live strandings can be attributed to natural and environmental factors such as rough weather and coastal and seabed topography. The later, in particular, appears to have a significant impact on the frequency and type of stranding. Some types of shores and coastlines have been shown to be more prone to strandings than others. Strandings are particularly common on shallow, sloping shores with a soft sediment base, which it is believed can compromise the effectiveness of the echolocation system used by some species of cetacean for navigation. Many of the cetaceans commonly stranded on Irish shores are pelagic (deep water) species which are less familiar with coastal topography.

Group cohesion and family bonds

Mass strandings are rare events which occur due to the strong bonds that exist between individuals in social groups of certain toothed whale and dolphin species. Mass strandings differ from single strandings in that the majority of animals involved in a mass stranding are likely to be healthy. It has been suggested that healthy animals, reluctant to leave a sick or dying member of their social group may follow into shallow water and become stranded. This results in the mass stranding of the sick animal as well as several healthy animals. Healthy individuals of a group can often re-strand after rescue while trying to re-join the sick animal or members of their social group not yet refloated.

Health and old age

Health and age have been identified as the cause of a number of cetacean live strandings. Natural mortality, including death from old age, death of an adult female or calf during birth, or the death of a dependent calf separated from its mother account for at least some live stranding incidents in Ireland. Compromised health and immune function due to disease or infection may also be a contributory factor in many live stranding events. Trauma and physical injury resulting from ship strike and entanglements in fishing gear have also been shown to be a significant cause of live stranding in cetaceans.

Foraging

Some scientists have suggested that cetaceans hunting prey close to shore or in shallow waters may become isolated and stranded in lagoons created by a receding tide, or simply make a mistake and strand. However, this has been countered as a general explanation for live strandings by the number of cetaceans stranding in areas devoid of their natural prey or with no evidence of recent foraging following necropsy examination. Some research has suggested that some strandings can be attributed to animals attempting to avoid predators such as killer whales.

Anthropogenic causes

Human activity in the marine environment is having a profoundly negative impact on all of the oceans inhabitants. Humans, now acting as ecosystem engineers, are placing many of the world's oceans under significant and unsustainable pressure. Activity such as harvesting the ocean's natural resources, international commerce, eco-tourism and military activity are causing increasingly negative impacts on cetacean welfare through net entanglement and by-catch, ship-strike, chemical and noise pollution, habitat degradation, prey depletion and marine litter. Humans are also contributing to a changing marine environment through the effects of climate change. However, there is still hope. There is a growing global move towards sustainable use and mitigating the impact of humans on the natural world. Understanding and addressing the anthropogenic causes of live strandings has the greatest potential for reducing the frequency of cetacean live strandings in Ireland.

Species of cetacean which have stranded in Ireland

The following is a profile of some of the species which have been recorded stranded, alive and dead, along the coastline of Ireland.

Short-beaked Common Dolphin *(Delphinus delphis)*

The Common Dolphin is a pelagic (deep water) species, found mostly in deep offshore waters, but frequently observed in Ireland in shallow inshore waters off the south and southwest coasts and the Aran Islands. There is evidence of a strong inshore winter peak along the south coast, possibly associated with the movements of sprat and herring.

The Common Dolphin ranges in length from 1.7–2.4 m, with adult females capable of reaching 2.3 m and males 2.6 m in length. Calves are 0.8–0.85 m at birth and are weaned between 14–19 months at a length of nearly 1.5 m.

The head is a typical dolphin shape with a long and distinct beak. The dorsal fin is tall, falcate, located mid-back and is often dark with a lighter centre. The beak, back and appendages are dark brown to black, and the ventral surface is white. The front flank patches are yellow and rear flank and the sides of the tail-stock are streaked light grey. These features give a distinctive hourglass pattern on the sides, which is the most characteristic feature of the Common Dolphin. A distinctive black back and cape form a V-shaped saddle that dips below the dorsal fin. The eye is surrounded by black, and a narrow stripe runs forward to the melon. Another dark stripe runs from the chin to the flipper and several face-to-anus stripes may also be present. Common Dolphins are the most frequently recorded stranded species along the Irish coast, including live strandings, and the numbers seem to be increasing.

Harbour Porpoise *(Phocoena phocoena)*

The Harbour Porpoise is the most widespread and frequently sighted species in Ireland, occurring around the entire coast, although they appear to be most abundant off the southwest coast. This is a coastal species, frequently observed in shallow bays, estuaries and tidal channels.

The Harbour Porpoise is the smallest cetacean species in Irish waters, measuring on average 1.5 m and weighing 60 kg. Harbour Porpoises calve between May and August, with a strong peak in June. Calves are 0.7–0.9 m and 6–10 Kg at birth. Calves are weaned at eight months when they are 0.9–0.95 m.

This species has a small, rounded head with no forehead or distinct beak. The dorsal fin is small, triangular, with a slightly curved trailing edge, set halfway along the back. The back, flukes, flippers and tailstock are black/brown, with grey flanks, a white belly and 1–3 dark stripes extending from the jaw line to the flippers. Harbour Porpoise are among the most frequently stranded animals in Ireland. They have stranded on all coasts, but higher concentrations have been documented along the south and east coasts, with peaks from December to March. stranding records show a consistent trend of around 30 recorded strandings per year in Ireland. The majority of these strandings involve dead animals.

Long-finned Pilot Whale *(Globicephala melas)*

Long-finned Pilot Whales are an offshore species most commonly sighted along the shelf edge and in adjacent deep water. This species is highly social, existing in tight family groups comprising adult males and females, related juveniles and calves. Family groups are led by older adults who direct social, breeding and feeding behaviours. Sightings inshore in Ireland are very rare and it is likely that some of these are associated with live-stranding events. Long-finned Pilot Whales are known to live strand, with live stranding events regularly involving the mass stranding of several individuals thought to result from strong family bonds.

Adult Long-finned Pilot Whales grow to an average of 4 m, with larger animals reaching up to 6 m in length. Calves are born 1.8 m in length and are weaned at 22 months at a length of 2.3–2.5 m.

The head is bulbous and may overhang the snout on older animals. The beak is almost absent. The dorsal fin is characteristically backward sweeping, large, long at the base end and rounded at the tip, and is set well forward on the animal's stocky, elongated body. The pectoral fins are long, sickle shaped and pointed at the tip. This species is predominantly black in colour except for a light coloured 'W' shaped patch on the throat.

Striped Dolphin *(Stenella coeruleoalba)*

Confirmed sightings of this warm water, pelagic species are not common in Irish waters, although a number do occur each year, most notably in offshore waters off the southwest coast.

Striped Dolphins grow to an average of 2 m in length, with larger adults reaching up to 2.6 m. Calves are 1 m at birth and are dependent for up to 18 months.

Striped Dolphins have a rounded, tapered head and a prominent, long, slender beak. The dorsal fin is tall and curved. They have a dark blue to grey cape, lighter grey flanks leading to pink-white undersides and black pectoral fins. There are a number of dark stripes running from the eye backwards on the white ventral surface, including one linking with the pectoral fin and one running to the anus. Striped dolphins are one of the most frequently live stranded species in Ireland.

Common Bottlenose Dolphin

(Tursiops truncatus)

There are three distinct populations of Bottlenose Dolphin recognised in Irish waters – the offshore, inshore and Shannon estuary populations. The resident population of c. 130 dolphins in the Shannon estuary are genetically discrete and largely confined to the Shannon and adjacent waters. Bottlenose Dolphins are most commonly seen along the west coast, although the inshore population can be observed off all Irish coasts.

Bottlenose Dolphins in Irish waters grow to 4 m in length and weight up to 650 kg. Calves are 1–1.3 m at birth and weigh 30 kg. Calves are weaned at 12–18 months at a length of 1.75 m.

The head is small, with a short 'stubby', rounded beak which is well marked off from an exaggerated melon. The lower jaw protrudes beyond the upper, and a soft mouth line curves upwards at back to give the familiar 'amused' facial expression. The dorsal fin is tall, prominent, broad at the base and curved backwards. The tailstock is moderately keeled. The back is medium grey, with pale/light grey on the flanks and belly. Calves are slightly bluish in colour. A pale line draws from the flipper to the eye and some spotting occurs on older animals on the belly. Adults may have white calluses on the tip of the lower jaw.

Atlantic White-sided Dolphin *(Lagenorhynchus acutus)*

Atlantic White-sided Dolphins are not regularly observed in Irish waters, but have been recorded in offshore waters along the edge of the continental shelf and in deeper waters. However, they are known to occur inshore off the northwest coast in late summer and autumn. This species is known to strand alive, including a high risk of mass strandings of two or more individuals at the same time.

The Atlantic White-sided Dolphin can grow to 2.4–2.8 m in length. Calves are 1–1.3 m at birth and are dependent for up to 18 months.

The head has a gentle sloping forehead and short beak. The dorsal fin is tall, falcate, sharply pointed with a narrow base, and is located mid-back. The species has a black back, top of beak, flippers and flukes, with grey sides and a white belly and bottom of beak. A white band below the dorsal fin connects with a yellow band on the tailstock. The body is robust and the tailstock is strongly truncated. Flippers are sickle shaped and pointed.

Risso's Dolphin *(Grampus griseus)*

Worldwide, Risso's Dolphins prefer deep offshore waters, but in Ireland they appear to occur over the continental shelf and close inshore, often associated with islands and are very rarely recorded along the shelf edge or over deep water. They are found year-round in Irish waters, moving inshore in the summer months.

Risso's dolphins grow to an average of 3.2 m in length and weigh 400 kg, larger adults can reach 3.8 m and weigh 500 kg. Calves are 1.2–1.5 m when born.

The head is blunt and bulbous, sloping steeply to the mouth, with no beak. Risso's dolphins have a deep V-shaped crease which extends from the blowhole to the tip of the rostrum (to the upper lip) bisecting the forehead. The crease is visible at close range and is unique to this species. The eye is prominent, and the mouth slants upwards towards the eye. The dorsal fin is tall, prominent with a concave trailing edge, and is located mid-back. The pectoral fins are long, dark and sickle shaped. Risso's dolphins can show immense variation in colouration. At birth the calf is uniformly grey with seven pale vertical stripes, turning to dark grey to chocolate brown as a juvenile. As they age the adults fade to a pale grey to white colour. The underside of the belly is typically white with a whitish anchor shaped patch on the chest. Individuals accumulate distinctive white scaring along their bodies throughout their lives.

White-beaked Dolphin
(Lagenorhynchus albirostris)

White-beaked Dolphins are a pelagic species which have been recorded in Irish waters. This offshore species is rarely sighted along the continental shelf edge and further inshore along the Irish northwest and west coasts.

White-beaked Dolphins grow to an average length of 2.7 m and weigh 200 kg. Larger animals can reach 3.2 m in length and weight 275 kg. Calves are 1.2 m when born and weight 40 kg.

The head is short with a distinct beak and lower jaw projecting beyond the upper. The beak is not always white or light-grey, with animals in the south of the geographical range tending to have dark or even black beaks. The dorsal fin is prominent and set mid-way along the back. It is dark in colour, relatively large and sickle shaped. The flippers are broad at the base with pointed ends. The tail flukes are curved with a slight central notch. The tail-stock is relatively thick with a strong keel above and below. The fins, flukes and flippers are a uniform dark-grey, with a patchwork of white, light-grey, dark-grey and black along the flanks, and usually dark colour from the forehead to the trailing edge of the dorsal fin. There is a distinctive white or pale-grey saddle behind the dorsal fin which is characteristic of the species. Two white patches are normally found on the flanks, one in front of the dorsal fin and the other behind the dorsal fin. These patches may merge into a pale saddle behind the dorsal fin. The characteristic white patches on the flank and white beak turn black soon after death.

Cuvier's Beaked Whale
(Ziphius cavirostris)

Although rarely seen alive, Cuvier's Beaked Whales are the most frequently recorded stranded beaked whale species in Ireland. They are a deep diving species that exist in deep offshore waters west of the continental shelf.

Cuvier's Beaked Whales typically grow to 6 m, with larger animals reaching 7 m in length.

The head is small, typically pale, gently sloping forehead with a indistinct beak which becomes less distinct with age. The dorsal fin is small and falcate, set far back on the body. Colour can vary from light brown to grey or white depending on location, sex or age, with older animals appearing almost white. Cuvier's Beaked Whales have been recorded live stranded in Ireland.

Northern Bottlenose Whale
(Hyperoodon ampullatus)

The Northern Bottlenose Whale is a pelagic species more commonly observed in deeper waters beyond the continental shelf, and rarely sighted off the Irish coast. Little is known about the migratory behaviour of the Northern Bottlenose Whale, although it appears that they move northwards to sub-arctic regions in spring and southwards in early autumn. Stranding records of Northern Bottlenose Whales in Ireland and the UK show an increase in incidence in autumn, possibly coinciding with the southward migration of this species during this time of year.

Adult male Northern Bottlenose Whales can reach 9.8 m in length, with adult females growing to 8.6 m.

The head is the dominant feature of this species as the Northern Bottlenose Whale is the only whale in the North Atlantic with a bulging melon. The head is more rounded and not particularly defined from the beak in the female and young animals. The head of the male, however, has a flat front surface which overhangs the beak, becoming more buff with age. The bottle-like beak is moderately long. There are two teeth on the lower jaw of the males only, with another pair sometimes found just behind these. The dorsal fin is slightly falcate or triangular in shape, pointed at the tip and may be darker than the rest of the back. Flukes are broad with a concave trailing edge and there is no caudal notch on the fluke. The dorsal surface is dark-grey to brown with a greyish white ventral surface, forehead and beak. The skin can appear to have a mottled appearance, and the facial regions can turn white in older males. There are often scratches and scares along the body.

Sperm Whale *(Physeter macrocephalus)*

In Ireland Sperm Whales are frequently recorded in deep water west of the continental shelf and in the Porcupine Bight. Females and calves are found in groups of 10–20 animals, while younger males form bachelor groups of variable size and mature males are generally solitary. Nearly all records in Ireland are of solitary males and small groups. Sperm Whales regularly strand along the Irish coast, and are prone to mass stranding resulting from strong social bonds that exist between group members.

Male Sperm Whales grow to an average length of 15 m, with larger individuals reaching 20 m. Females grow to an average of 11 m, with larger animals reaching 17 m in length. Males weigh on average 40 tonnes, with females averaging 22 tonnes. Calves are 4 m at birth and are dependent for up to 3.5 years.

The species is identifiable by its characteristically enormous head with a blunt snout and relatively small underslung jaw. The head forms one-third of the overall body length and considerably more than one-third of the body mass. There is no true dorsal fin, however, approximately two-thirds down the back there is a distinct dorsal hump consisting of fibre and flesh which resembles a dorsal fin. Beyond this there are a series of knuckles, usually 4 to 5. Flippers are short and stubby, but the tail flukes are broad and powerful, creating the largest tail fluke surface area of any species. Sperm Whales are normally dark grey with light brownish underlay. The skin around the lips is usually white and there are often white blotches on other parts of the head, at the navel, along the hump, or splashed in random streaks along the flank and tail. The frequency of white patches increases with age.

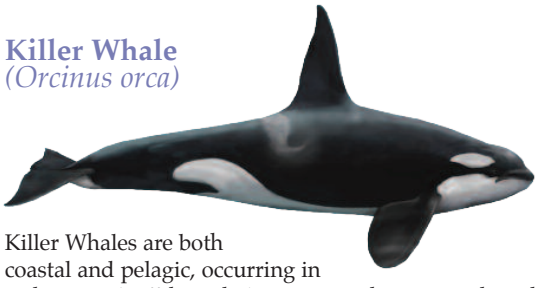
Pygmy Sperm Whale *(Kogia breviceps)*

The Pygmy Sperm Whales is a pelagic species and is found over the continental shelf edge, slope and in deep oceanic waters. Very little is known about the ecology of Pygmy Sperm Whales in Irish waters. In the last ten years there has been two reported strandings of this species, both on the west coast of Ireland.

Adult Pygmy Sperm Whales reach an average length of 2.7 m, with larger males growing to 3.4 m.

The head is square or conical, shark-like, with a small underslung lower jaw and inconspicuous beak. The dorsal fin is small and falcate, located just past mid-back. The body is short, robust and may appear wrinkled. The flippers are short and are located far forward on the body. Pygmy Sperm Whales have a dark bluish to grey back, lighter flanks to a white belly. There is a pale, crescent-shaped false gill on each side between the eye and flipper.

Killer Whale *(Orcinus orca)*



Killer Whales are both coastal and pelagic, occurring in inshore and offshore habitats in Irish waters, though most Killer Whales in Ireland seem to be of the Type II, fish eating ecotype. The biggest concentrations in Ireland occur over the continental shelf and around our offshore islands.

Adult Killer Whales grow to an average of 7–8 m, with some individuals reaching 9.5 m in length. Calves are 2.5 m at birth, reaching 4 m at weaning.

The head is rounded and tapered, with indistinct beak and straight mouth-line. The Killer Whale has the largest dorsal fin of any cetacean species, which can reach 1.8 m on adult males. The dorsal fin is located mid-way along the back, is shaped like an isosceles triangle and may cant forward. It is falcate and dolphin-like on females and immature animals. Killer Whales are mostly jet-black in colour on top and flanks, with chin, throat, underside along the ventral midline and belly patch continuing past the anus being white. This species has a conspicuous white patch behind and above the eye, with variable whitish/grey saddle patch behind the dorsal fin.

Minke Whale *(Balaenoptera acutorostrata)*

Minke Whales are the most frequently recorded baleen whale in Irish waters, and while the species is seasonal, peaking between May and October, it can be seen throughout the year along the entire Irish coast. Most sightings, however, are recorded along the south and west coasts. Minke Whales are mostly observed in Ireland in shallow waters, rarely seen beyond the continental shelf.

Minke Whales are the smallest of the baleen whales, reaching a maximum length of 10 m and weighing on average 9,200 kg. Calves are born 2.8 m in length weighing 350 kg and are dependent for only 6 months, the shortest known weaning period of any baleen whale species.

The head is one of the most distinctive features of the Minke Whale, being narrow and sharply pointed with a single ridge running down the centre of the triangular shaped rostrum beginning in front of the blowhole. The rostrum is flat and the baleen is short. The dorsal fin is tall, falcate and positioned slightly less than two-thirds of the way back from the tip of the rostrum. The pectoral fins are small, pointed, about one-eighth the total body length, and have a conspicuous white diagonal band (variable) on the upper surface. Minke Whales are generally black, brown or dark grey on their backs and whitish on the belly and underside of the flippers. Minke Whales sometimes have a pale chevron on the back behind the head and two regions of light grey on each side, one just above and behind the flipper and another just in front of and below the dorsal fin. The fluke may be pale grey, bluish-grey or white on the underside, usually with a dark margin. They are the most frequently stranded Mysticete in Ireland.

Humpback Whale
(Megaptera novaeangliae)

Humpback Whales have been observed off all Irish coasts, though most sightings are recorded along the south and southwest coasts but rarely offshore. Although they have been recorded throughout the year in Ireland, sightings mainly occur in late summer, autumn and winter. Humpback Whales are a migratory species and they use the deep waters along the edge of the continental shelf as a migratory corridor. However, low levels of sightings in late spring possibly suggest that a small number of non-breeding whales may remain here for the winter while the rest continue their migration to low-latitude breeding grounds.

Humpback Whales can grow up to 16 m in length and up to 36,000 kg in weight, with females being slightly larger than males. Calves are 4–5 m at birth and weigh 900 kg. Calves nurse for 5–7 months and are 8.2 m when weaned.

The head is broad and flat with a single median ridge and a series of fleshy knobs on the rostrum and lower lip called tubercles. The dorsal fin is set two-thirds of the way along the back and is small and irregularly shaped, with a broad base, raised hump at the front and knuckles at the back. The pectoral fins are characteristically elongated, usually measuring up to one-third of the total body length and are often white with knobs on the leading edge. The Humpback Whale is typically stout bodied, predominantly black in colour with white throat and belly. There can be variable amounts of white on both sides of the flippers and there is a distinctive black and white pattern on the underside of the flukes which is used to identify individual animals.

Sei Whale *(Balaenoptera borealis)*

The Sei Whale is a pelagic species more commonly observed in offshore waters.

Adult Sei Whales grow to an average length of 12–16 m, with larger animals reaching a maximum of 20 m.

The head, which can be between 1/5 and 1/4 of the total body length, has a single longitudinal ridge extending from the blowhole to the snout and no beak. The head and jaws are rather narrow and slightly arched, unlike other rorquals. The dorsal fin which is located two-thirds of the way along the back is well-defined, slender, erect and slightly hooked. Sei Whales are a mottled blue to grey colour on the dorsal side, with a paler grey to white underside.

Fin Whale *(Balaenoptera physalus)*

The Fin Whale is the second largest living animal on earth. Fin Whales are frequently observed in Irish offshore waters along the continental shelf edge and along the south coast in summer, autumn and winter. Fin Whales have been reported in Irish waters as early as May, with sightings peaking during October-December off the southwest, and later further east until about January/February. High encounter rates between August and January suggest a discrete population along our south coast which does not adhere to a predictable annual north-south migration, but may instead migrate between inshore and offshore waters. Fin Whales occasionally strand in Ireland, with no particular stranding pattern. Most records are from the south and northwest coasts, which may reflect their close proximity to the edge of the continental shelf. Live strandings have occurred along the Irish south coast where sightings are most frequent but are rare.

Northern Hemisphere Fin Whales can reach 24 m in length, with females usually longer than males, and can weigh up to 70,500 kg. Calves are 6 m when born and weigh up to 2,000 kg. Calves are dependent for 6–8 months and are 10–12 m when weaned.

The head is V-shaped with a flat top and a single prominent ridge. The snout is narrow and pointed without a downturn at the tip. The dorsal fin is located two-thirds down the back, is small, falcate and sloped backwards, however the shape is highly variable. The back and sides of their sleek, streamlined bodies are black to dark brown to grey in colour. The ventral surface is white. The lower lip is dark on the left jaw, white at the front and dark towards the back of the right jaw – this asymmetrical pigmentation is unique to this species. Greyish/white chevrons can be seen behind the head on either side, being more prominent on the right side, and a broad pale wash sweeps from the corner of the jaw to behind the blowhole.

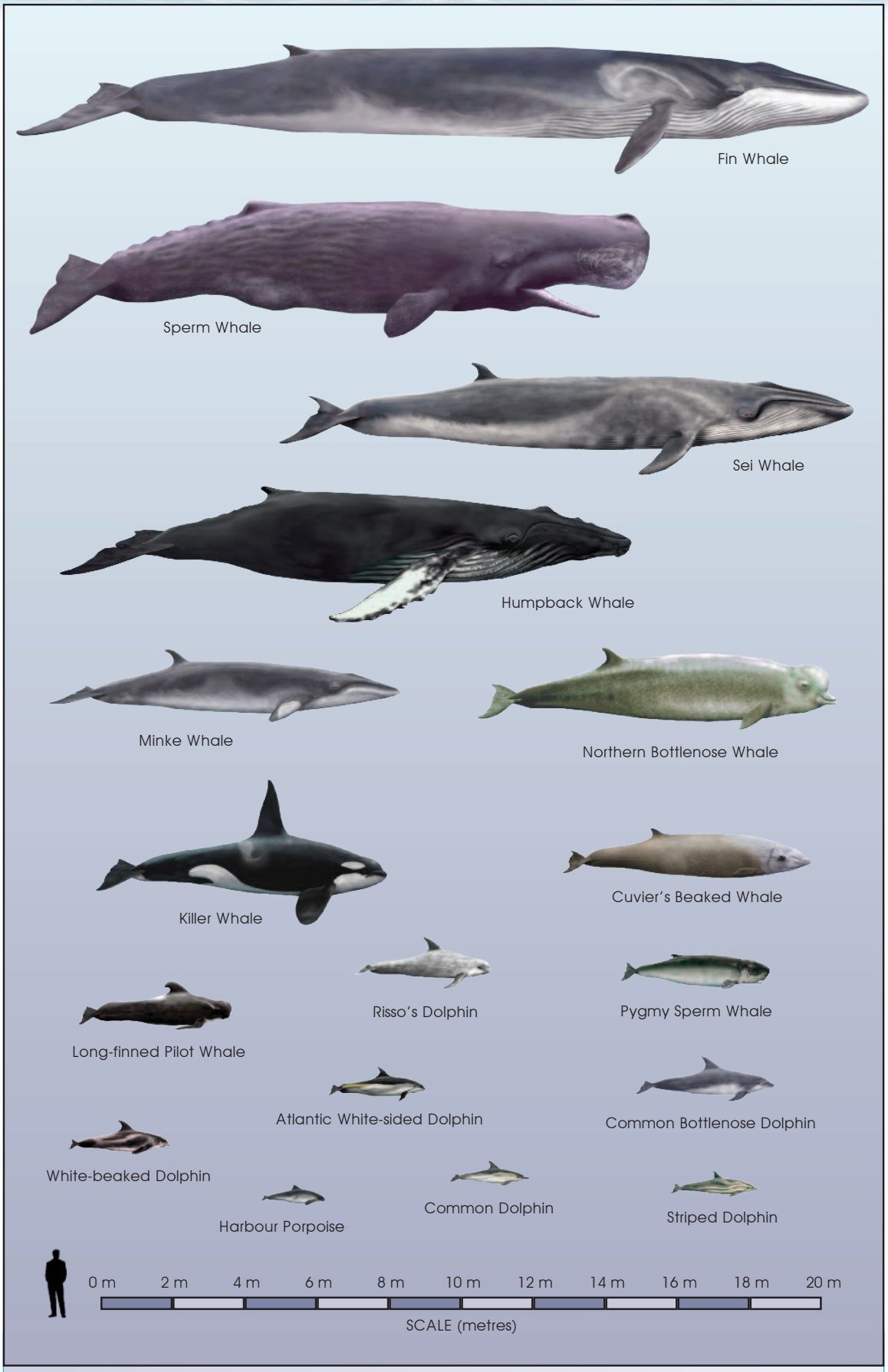


Figure 2.3. Comparitive sizes of cetacea which have stranded in Ireland (Illustrations: William Helps).

Organising the live stranding response

Responding to a live stranding is the responsibility of the trained Live Stranding Team. The Live Stranding Team consists of the **Care Team** and the **Response Team**. The Care Team is responsible for ensuring the highest standard of welfare for the stranded animal throughout assessment and response, including the rescue where deemed appropriate (see Chapter 5: Caring for the live stranded animal). The Response Team is responsible for assessing the stranded animal and undertaking the appropriate response to the stranding (see Chapter 6: Assessing the live stranded animal & Chapter 7: Responding to the live stranded animal).

In order to ensure an efficient and effective response it is recommended that a **Stranding Coordinator** should be nominated at the beginning of the stranding response. The Stranding Coordinator will ideally be the most experienced person in the Live Stranding Team. The Stranding Coordinator is responsible for organising and managing the activities of the Live Stranding Team, including the delegation of responsibilities and resources, supervising the Care and Response Teams and coordinating the collection and cataloguing of stranding information. The Stranding Coordinator may need to request assistance from untrained volunteers during the care and rescue of the stranded animal. Where this is necessary, the Stranding Coordinator must ensure that all untrained volunteers are properly instructed and supervised throughout the stranding response.

Responsibility for managing the stranding site, and the health and safety of those present at the stranding site, should be assigned to a **Health and Safety Coordinator** (see Chapter 9: Health and safety at the stranding site). This will allow the Stranding Coordinator to concentrate on the welfare of the stranded animal without compromising the health and safety of those responding to or observing the stranding.

Care, assessment and rescue of a live stranded Bottlenose Dolphin (Northern Ireland Environment Agency)

Caring for the live stranded animal – the 'Four Ps'

Depending on the cause of the live stranding, some animals may be alert and responsive, while others will be extremely weak and may not survive long after coming ashore. Where the stranded animal is alive, appropriate care should be provided immediately. Proper care administered in a timely manner will reduce suffering and improve the animal's welfare state, and may increase its chances of survival. Care of the stranded animal should ideally be assigned to one or more dedicated individuals, the Care Team (see Chapter 4: Organising the live stranding response), and should continue throughout assessment and response. The Care Team can include members of the public willing to volunteer, but should be coordinated by someone with knowledge and experience of caring for a stranded cetacean.

The following **'Four Ps'** provides a simple and easy way to remember the steps that should be followed when caring for a live stranded cetacean:

1. Positioning

The stranded animal should be corrected and supported in its natural, upright position (dorsal fin uppermost). The animal can be rolled into an upright position, ensuring that the pectoral fins are tucked tight to the body before moving to avoid injury or damage. Once upright, trenches should be dug, if possible, on either side of the animal to allow the pectoral fins to rest in their natural position. To prevent the animal from rolling onto its side bank sand or place soft supports on either side to stabilise the animal's position. Righting the animal onto its belly and supporting it in this position will be more natural for the animal and will allow for greater protection of the blowhole from sand and water (larger animals can be supported in an upright position using inflatable pontoons if available).

2. Palliative care

It is important to commence the provision of palliative care as soon as possible. The most important requirement is to keep the animal cool and moist at all times. This can be done by covering the animal with sheets or towels (items of clothing, seaweed or mud can also be used in emergencies) and keeping moist by applying cool water across the entire body regularly. Particular attention should be given to the extremities, including dorsal and pectoral fins and tail flukes, as these are important areas for shedding heat in cetaceans.

Stranded Common Dolphin in an upright position, with trenches dug for its flippers. Palliative care is provided throughout the response (Etienne Pouplard)

The blowhole must never be covered during care or rescue, to ensure breathing can continue unobstructed. When water is being applied around the head to cool the animal, the blowhole should be protected using cupped hands. Where the blowhole is compromised by

Stranded Common Dolphin kept cool and moist using a wetted towel and seaweed, note the blowhole is kept clear at all times (Etienne Pouplard)

a build-up of sediment or dirt it may be necessary to clear the obstruction by flushing the blowhole with a small amount of water. Flushing can only be done when the blowhole is closed. The best time to flush the blowhole is immediately after the animal has taken a breath. Gauge the time between breaths by observing the breathing sequence carefully for at least a number of cycles to ensure the flush coincides with a closed blowhole. Flushing is a last resort and is only recommended in cases of excessive build-up of dirt around the blowhole.

The practicality of palliative care will be determined by the size of the stranded animal. Smaller animals are easier to care for and typically require care for shorter durations as they can be lifted and returned to the water quite quickly. The care of larger stranded animals is complicated by size and mobility, demanding much greater resources for longer periods of time. For larger whale species it may not be practically achievable or safe to attempt to provide palliative care at all.

Stranded Bottlenose Dolphin receiving palliative care throughout rescue, note the blowhole is protected using cupped hands while water is applied (Northern Ireland Environment Agency)

3. Protection

The stranded animal should be protected from over-exposure to the prevailing elements to prevent against hyper/hypothermia. An excessive increase/reduction in body temperature can accelerate any deterioration in the welfare state of the animal and can reduce the likelihood of a successful response.

Cetaceans are physiologically adapted to maintain their body heat in the cooler environment of the sea, but are unable to regulate their body temperature when stranded. A stranded animal may suffer from hyperthermia even on seemingly cool, cloudy days. The risk is significantly increased when exposed to warm sun and high temperatures. In addition to an increase in body temperature, prolonged exposure to sunlight can result in excessive drying and blistering of the skin. This external deterioration can be compounded by exposure to wind. Therefore, where possible, the animal should be provided with shelter to protect from sun and wind exposure. Damaged or blistered skin should be shaded, kept moist and treated with dilute antiseptic/saline solution where available. Where shade cannot be provided, applying sun protection (sunscreen/zinc oxide) will reduce further damage to the skin from sun and windburn, and will help to prevent further dehydration of the animal.

Conversely, smaller cetacean species, young or emaciated animals may suffer from hypothermia in cold conditions due to a lack of blubber to aid heat retention. Stranded animals at risk of hypothermia should be provided with shelter from wind and rain, and have their extremities covered with a mineral or vegetable oil dampened cloth to aid heat retention.

Where the animal cannot be returned to the water immediately, or the stranding site is not suitable for returning the animal to the water, it may be necessary to move the animal to a more favourable location to protect it from over-exposure to the climatic conditions.

Where care is not provided, the stranded animal can suffer greatly as a result of stranding. Stranded Long-finned Pilot Whale on its side with blowhole submerged, unable to breath and evidence of burning and blistering of the skin due to exposure (Gareth and Amanda Doherty)

4. Personal behaviour

The stranded animal is almost certainly stressed, and as a consequence is highly susceptible to the onset of shock. Both stress and shock negatively impact the animal's welfare state, and where excessive and prolonged can result in the death of otherwise healthy animals.

The behaviour and interaction of the Care Team, and also the general public, can have an important influence on the levels of stress and shock in the stranded animal. Access to the animal should be restricted to the minimum number of carers necessary to service the animal's needs, with one carer responsible for remaining with the animal at all times where possible. The behaviour of the carer(s) should be calm and controlled, avoiding exaggerated and sudden movements. Noise should be eliminated or kept to a minimum, with all necessary noise controlled so as to avoid sudden or loud outbursts. Dogs and other domestic animals should be kept away from the stranded cetacean at all times.

Assessing the live stranded animal

It may not always be immediately obvious why the animal has stranded. Therefore, it will be necessary to assess the stranded animal before deciding the most appropriate stranding response. Where possible, all stranded animals should be assessed by an attending veterinarian to inform the appropriate response. However, where a veterinarian is not present, or will not be on site for several hours, response procedures should commence for animals considered to be healthy based on the following criteria:

Alive or dead

The provision of care and assessment are only required where the animal is alive. It is, however, not always immediately obvious if the animal is alive or dead.

In smaller cetacean species respiration is the best indicator that the animal is still alive. Dolphins and porpoises should take a breath once every 15-30 seconds. Using respiration as an indicator in larger species, such as Mysticetes and Sperm Whales, is more challenging as the time between breaths can be much greater.

Trained or experienced responders may choose to carry out additional tests to confirm the animal's status. The level of consciousness in live animals can be determined by testing the animal's reflexes as follows:

- **Palpebral reflex** the eye should close when the eyelid is gently tapped or touched at the corner. The cornea should not be touched.
- **Pupillary reflex** the pupil should constrict when exposed to sun/bright light after shading for 20 seconds.
- **Menace response** the eye should blink and withdraw into the socket when threatened by the flat of the hand.
- **Blowhole reflex:** the blowhole should be held closed and should tighten when touched around the edge.
- **Jaw tone:** the jaw should be firm and resist efforts to open.
- **Tongue and flipper reflex** the animal should strongly resist any effort to manipulate the tongue or flippers.
- **Corneal reflex** the eye should blink when squirted with clean seawater. (this is only recommended as a last resort and in the event that all other reflexes are non-responsive).

Testing for the presence or absence of a reflex in the stranded animal may provoke a violent response. Therefore, these tests should only be conducted by experienced stranding personnel.

Species

The species of the stranded animal is an important indicator of the likely cause of stranding, and is a significant factor in determining the appropriate live stranding response.

Pelagic (offshore) species are out of habitat in shallow waters, and so less familiar with navigating coastal topography. Pelagic species are, therefore, more likely to strand healthy due to navigation error or environmental factors. Experience has shown that a significant proportion of live stranded pelagic species may be suitable for rescue, and have a greater chance of survival, where they have received prompt care and accurate assessment.

Inshore species are familiar with the coastal environment and are therefore less likely to strand when healthy due to error. Strandings involving inshore species are generally caused by more serious problems such as old age, ill health or anthropogenic causes which result in severe physical injury or trauma.

However, if the animal appears in good health, is responsive and there are no obvious signs of injury or trauma, a rescue should be attempted regardless of the species.

Pre-stranding behaviour

The animal's pre-stranding behaviour may provide a valuable insight into the cause(s) and severity of the animal's condition. Behavioural observations are quick, non-invasive and can be used to determine if the animal is alert, weakly responsive or non-responsive. Where observed, pre-stranding behaviour can be an important factor in deciding the appropriate response.

Physical state

Stranded cetaceans which appear to be in a good nutritional state should be examined, where safe to do so, for physical injury or signs of trauma. This examination should, where possible, be carried out by a veterinary surgeon. Severe external injury or trauma to the body, such as deep lacerations or exposed bone, will be readily visible and provide a clear indication of the cause of stranding. Internal injuries may be harder to detect and diagnose. Excessive bleeding from the blowhole, mouth and anus are obvious signs of internal abnormalities.

Prolonged exposure can result in severe physical deterioration of the external condition over time. Excessive burning and blistering of the skin due to exposure to sun and wind can reduce the likelihood of survival for the stranded animal.

Larger cetacean species generally decline in health much more rapidly than smaller species, due to the damaging effects of mass and gravity on the internal physical state. The larger the animal and the longer it remains on the shore, the more severe the internal damage and the less likely it is to survive. This is further compounded by the fact that many large species of whale simply cannot be moved due to their physical size and mass. Therefore, time since stranding is of particular importance to the internal physical state of large whale species.

Stranded cetaceans suffering from injury or trauma, and animals suffering from severe exposure, which are not expected to be able to feed and survive on their own should not be refloated.

Nutritional state

The nutritional state of the stranded animal is the most commonly used method for assessing its health status. It is not recommended to refloat a stranded animal that is obviously malnourished or emaciated. However, the nutritional state can be hard to evaluate accurately without some experience. Therefore, where it is not immediately obvious, the nutritional state of the animal can be used as an important aid to assessing condition, but should not be used as an absolute measure.

The nutritional state of the stranded animal is evaluated through visual examination of the profile of the muscles on either side of the dorsal fin and the general shape of the body. The muscles either side of the dorsal fin should appear full and well-rounded. Any reduction in the muscle profile of the animal indicates a loss of body condition. The general shape of the body should be smooth and streamlined. In particular, a depression in the body profile immediately behind the blowhole, giving the appearance of a neck, is an indication of severe emaciation. The loss of muscle profile and body shape in a stranded animal is a strong indicator of malnutrition or emaciation caused by a more serious underlying problem.

Healthy animals will be feeding normally before coming ashore and therefore should not appear obviously thin or wasted. However, if the animal has been weakened by illness, injury or old age, it is likely to be suffering for some time, resulting in a malnourished or even emaciated condition. Where an animal is obviously malnourished, indicating a more serious cause of stranding, then the likelihood of a successful rescue attempt is severely diminished. Therefore, nutritional state must be taken into account when deciding the stranding response.

Breathing rate

The rate at which the animal is breathing can be used to indicate stress levels and respiratory condition. An increased rate of breathing may be an indicator of high stress levels or respiratory disease in the stranded animal.

Rates of breathing can be determined by monitoring the animal's blowhole. In healthy animals the blowhole will be held tightly closed, opening only during breathing. The number of breaths per minute should be recorded and monitored to assess any change in the animal's condition. A guide to evaluating the rates of breathing is provided below:

Small cetaceans – dolphins and porpoises	
Breaths per minute	**Status**
2–5 breaths	Normal
6–10 breaths	Mild stress or respiratory compromise
> 10 breaths	Severe stress or respiratory compromise
Medium – large cetaceans	
Breaths per minute	**Status**
1 breath	Pilot whale – normal
> 1 breath per minute	Mysticetes and Sperm whale – normal

Breathing rates will commonly increase during treatment, handling and moving. Any activity which causes a rapid increase in the animal's breathing rate should be stopped immediately, or completed as quickly and efficiently as possible. The breathing rate should return to normal once the stressor is removed. If the rate of breathing does not return to normal, within a reasonable timeframe, this may indicate that the animal is becoming over stressed or experiencing the onset of shock. Shock can also be detected by variations in the animal's breath cycle, such as a delay between breathing out and breathing in (>4 seconds in small

cetaceans) or breath holding. Over time, the stranded cetacean will develop respiratory fatigue. This occurs sooner in larger species whose chest cavity will be more severely compressed under their body weight. Signs include irregular and increased respiratory rate (species dependent) and audible gurgling sounds as the animal breathes in and out.

Every activity should be carefully planned in advance to ensure it is carried out efficiently and in the shortest possible time in order to minimise stress. The animal's breathing rate should be monitored throughout the stranding to ensure it does not becoming over stressed.

Body temperature

Cetaceans have evolved thermo-regulatory systems efficient at maintaining optimum body temperature in cooler marine environments. These systems do not work efficiently on land, and may in fact prevent the animal from regulating its body temperature when stranded. Stranded animals exposed to warm conditions on land may be unable to reduce their body temperature, resulting in hyperthermia. In some situations, however, animals which strand in poor nutritional state may be unable to maintain their body temperature in cold weather, and may become hypothermic. An excessive increase or loss in body temperature is detrimental to the welfare and survival prospects of the stranded cetacean. Body temperature should therefore be monitored in order to maintain it within critical limits.

The temperature of the stranded animal can be taken using a thermistor probe inserted into the rectum, at least 20–30 centimetres depending on species/size. Only a veterinary surgeon or suitably trained personnel should attempt to take the animal's temperature. Normal body temperature is between 36 and 37.5°C. Temperatures between 40 and 42°C are critical, with temperatures greater than 42°C considered terminal.

Heart rate

Heart rate can vary significantly in a stranded cetacean, however, where it is monitored over time it can be used to assess changes in the animal's condition. An increasing heart rate can indicate a deterioration in the animal's health status.

Mother/calf pairs and dependent young

Cow/calf pairs should be returned to the water and released together to avoid stress caused by separation and to maximise the chances of a successful refloat. Calves whose mothers cannot be identified should be considered orphaned. Orphaned maternally-dependent young should not be released under any circumstances as there is no chance of them surviving alone. If a dependent calf strands alone, check the area thoroughly for the presence of the mother, including in the water. If the mother cannot be located on land or at sea, or has stranded and died, the calf should not be refloated. Where the stranded calf has died or cannot be rescued, the mother may be released if deemed healthy after assessment. There is evidence to suggest that returning a dead calf to the water along with its mother may help to prevent the mother from restranding.

Stranding environment

The primary concern must always be human health and safety. This involves a careful evaluation of the stranding site and surrounds. The stranding environment will influence the safety of any response attempt and may limit the response options available for a live stranded cetacean. Attempts to intervene (care and response) should never be undertaken when the animal is in surf and should commence only when the animal has been stabilised and is above the tide line.

Monitoring a Sperm Whales pre-stranding behaviour at Ballyteige Bay, Co. Wexford (Ruairi O'Brien)

Responding to the live stranded animal

Responding to a live stranding event in Ireland can be challenging, depending on the species, number of animals, stranding environment and the availability of trained personnel and resources. In Ireland, there are three possible stranding response options available for live cetaceans; **rescue, euthanasia or a natural death**. The primary consideration in deciding the most appropriate stranding response is human health and safety. Where it is safe to intervene, the appropriate response shall be the action that achieves the best possible welfare outcome for the stranded animal.

Rescue

Stranded cetaceans that are assessed and found to be in good health and to have a good chance of survival post-release are suitable candidates for rescue. The following procedures should be followed to minimise the impact of the rescue on the welfare of the stranded animal:

Guide to lifting and moving small cetaceans

Step 1: Prepare the tarpaulin to be placed underneath the stranded animal by tightly rolling up one half.

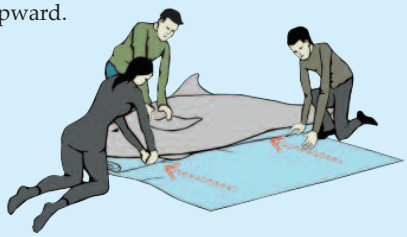
Step 2: Gently roll the stranded animal onto its side, ensuring the pectoral flippers remain tucked close to the body to avoid injury.

Lifting and moving

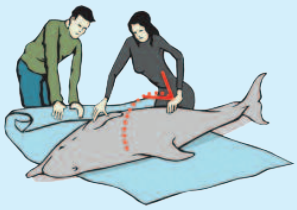
Some species of cetacean can be physically lifted and moved into the water during the rescue attempt. Lifting and moving a viable animal back to its natural habitat as quickly as possible can minimise injury and suffering caused by the stranding and maximise the chances of a successful rescue. Techniques for lifting and moving stranded cetaceans will vary depending on the animal's size. Smaller animals can be lifted and moved quite quickly using limited resources. Larger animals up to 2 tonnes in weight can be lifted and moved effectively using specialised refloating equipment. It may not be possible to lift and move an animal in excess of 2 tonnes safely without causing excessive stress or risking severe injury to the animal.

Smaller cetaceans can be lifted and moved into the water quite easily using a tarpaulin, where sufficient people power is available. The following steps will help to maximise efficiency during lifting and moving and minimise distress and risk of injury to the stranded animal:

Step 3: Place the rolled edge of the tarpaulin underneath the body of the animal, rolled edge facing upward.

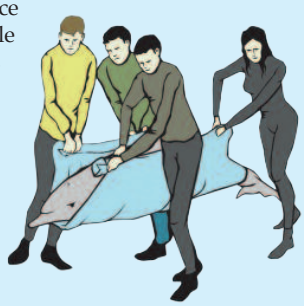


Step 4: Roll the animal onto its other side, again ensuring the pectoral flippers are folded tight against the body to avoid damage, and unroll the tarpaulin from underneath the animal.



Step 5: Return the animal to lie on its belly in the upright position. The animal will be lying in the centre of the tarpaulin ready for lifting and moving.

Step 6: The edges of the tarpaulin can be rolled up to improve grip during lifting. If the animal is too heavy to lift, the tarpaulin can be used to drag the animal into the water. The animal should only be dragged where surface conditions are suitable and never over rocks or rough surfaces. The animal should never be dragged without a tarpaulin.



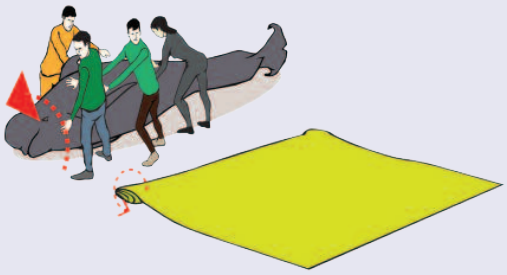
Specialised equipment such as a pontoon will be required to lift and move larger cetaceans (see below). A pontoon is a purposely engineered floatation aid designed to support the weight of a large stranded cetacean (up to 2 tonnes) during lifting and moving. A pontoon consists of a reinforced centre mat supported on either side by two inflatable cylindrical tubes. A fully inflated pontoon will provide support to the stranded cetacean when on land, and buoyancy and manoeuvrability to assist the rescuers when in the water.

Refloating a large stranded cetacean using a pontoon should be managed by experienced personnel as follows:

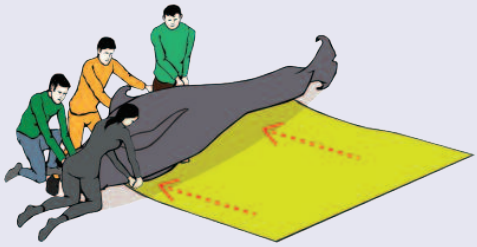
Guide to lifting and moving large cetaceans

Step 1: The centre mat should be positioned correctly for use, i.e. the mat has clear markings to indicate the front and rear, and the left and right. Prepare the mat to be placed underneath the stranded animal by tightly rolling up one half. N.B. The mat contains metal attachments on the outside surface which must always face away from the stranded cetacean. Take care to roll the mat so that the metal attachments are turned inward to avoid injury.

Step 2: Roll the stranded animal on to its side, folding the pectoral flippers tight against its body to prevent injury.



Step 3: Place the rolled edge of the mat underneath the animal, ensuring the front of the mat is slightly ahead of the pectoral flippers.



Step 4: Roll the animal onto its other side, ensuring the pectoral flippers are again folded tightly to the body, and unroll the mat completely from underneath the animal.

All illustrations: William Helps

Step 5: Return the animal to lie on its belly in an upright position. The animal should be positioned in the centre of the mat. Where the animal is too large to roll, it may be possible to slide the mat underneath the animal from the front where the surface conditions are suitable.

Step 6: The deflated cylindrical tubes are then attached to either side of the centre mat using the quick release metal attachments (the metal attachments are different shapes to ensure the tubes are attached at the same level on either side of the mat to provide stability in the water). The tubes should be attached as low as possible, with inflation/deflation valve at the posterior end of the animal, and evenly positioned so that the pontoon provides optimum supports for the animal once in the water. It may be necessary to roll the animal gently onto its side to allow for the deflated tubes to be attached.

Step 7: Once both tubes are evenly attached to the mat they must be inflated. Begin by inflating one tube to approximately half its volume, then fully inflate the opposite tube, before completing the inflation of the first tube. Inflate the tubes until they are firm, taking care not to over inflate.

Step 8: There are handles provided along the outside of the pontoon tubes to enable animals of a suitable size to be lifted and moved. Alternatively, the pontoon can be used to support the stranded animal in an upright position until the tide comes in to aid refloating. Lifting the pontoon using machinery is possible under expert supervision, once the animal's weight is evenly distributed and supported to avoid injury.

Step 9: Once in the water the animal should be supported in an upright position, ensuring the blowhole remains above the water at all times. The animal should be given adequate time to acclimatise before slowly deflating both tubes and allowing the animals release.

If the stranded animal is too large to lift and move safely, or there are inadequate personnel or resources available, the animal should be made as comfortable as possible at the stranding site (see Chapter 5: Caring for the live stranded animal). Where the stranding site is located in the tidal zone, the returning tide can help to refloat the stranded animal. Smaller species receiving the proper care can survive quite well while waiting for the tide to return. Larger stranded species may decline in health much more rapidly due to the effects of mass and gravity on their internal physical health (see Chapter 6: Assessing the live stranded animal). Large stranded animals that cannot be lifted or moved should never be dragged to the water by the tailstock. Dragging stranded animals will cause severe pain and distress and is likely to result in severe injury and permanent incapacitation. Similarly, great care should be taken not to push or pull the animal by its flippers, or to manipulate or pressure the flippers into unnatural positions.

Transport

It may not be possible to return the animal to the water at the site of the stranding due to safety concerns and/or environmental conditions. In these circumstances, transportation to a suitable release site is a viable option for small cetacean species. Transportation can exacerbate the stress and shock response in stranded animals and should only be considered where the release site is reasonably close. It is not recommended to undertake journeys of greater than 2 hours in duration without specialist equipment to monitor the animal's condition.

The animal should be placed on a soft base which provides comfort (non-abrasive), support and prevents excessive movement of the animal during transport, e.g. foam or air mattress. Care should be taken to avoid damage to the animal's sensitive skin and excessive pressure on the pectoral flippers. It will be necessary to continue the regular application of water throughout the journey to keep the skin moist and the body temperature controlled. The animal's breathing rate should be monitored continuously during transport to detect changes in stress level.

Re-aclimatising and release

Prolonged periods of restricted mobility when stranded can cause reduced circulation and muscle stiffness in the animal. This will affect the animal's ability to maintain its balance and swim normally when released. Reduced circulation and muscle stiffness can result in the released animal swimming in circles or on its side, making breathing difficult.

Where an animal has been stranded for some time it will be necessary to restore circulation and ease muscle stiffness prior to its release. In smaller cetacean species this can be achieved quite easily by holding the animal in shallow water for a period of time before releasing. Taking advantage of the animal's natural buoyancy, rock it gently from side to side. This movement will gradually restore circulation and alleviate stiffness of the muscles. Once the animal regains movement and appears ready to swim it should be moved periodically into deeper water to assess its ability to swim unaided. Acclimation is not complete until the animal is able to surface on its own to breathe and is swimming unassisted. The animal can then be released and guided out to sea. If the animal does not swim away, or returns to the shallows and re-strands, repeat the rocking procedure in suitable animals. It may be necessary to continue this procedure for several hours. Rocking should only be discontinued when the animal swims in an upright position without support.

Larger cetacean species refloated using a pontoon will follow a similar procedure. The animal can be supported in shallow water and gently rocked back and forth until it regains movement and starts to exhibit swimming motion. Once the animal is ready for release the two supporting inflatable tubes should be gradually deflated, lowering the animal into the water and allowing it to free itself and begin to swim unaided.

It is important to note that disorientation and difficulty swimming are not unusual and are seldom permanent in refloated animals, and should not prevent a rescue from continuing. However, if serious abnormalities are noted during refloating which compromise the animal's ability to breathe and swim effectively, or the animal persistently re-strands causing further damage and distress, the Response Team should re-assess the suitability of the animal for rescue.

Volunteers training in the use of pontoons, Greencastle, Co. Donegal (Frances Bermingham)

Marking the stranded animal before release

It is important that the rescued animal is clearly recognisable before release in order to identify it should it re-strand in another location (see Chapter 11: Science and live strandings). Where possible, complete the Marine Animal Rescue Coalition (MARC) Stranded Cetacean Report – Initial Report for all stranded animals. Where this is not possible, photographic and video recordings are the simplest and quickest recording method, and are generally readily available technologies at the stranding site. To aid identification in the water coloured animal markers or zinc sun block can be used to number/mark the animal's dorsal fin; this is particularly helpful for identifying individual animals during a mass stranding response. A small piece of wool, or other biodegradable material, tied around the animals' tailstock is also an effective means of identification. Plastic livestock tags placed on the trailing edge of the dorsal fin are a longer term option for identifying rescued individuals which are simple and cost effective. Identifying individual animals before release will help improve our understanding of cetacean rescue through accurate recording of rescued animals alive at sea or stranded again on shore.

Monitoring the stranded animal post -release

Stranded animals that have been refloated should be monitored to ensure they do not re-strand. Monitoring can be short-term from land, or longer term where a boat is available. Animals that strand after refloating should be carefully reassessed to ensure they are suitable for another rescue attempt. Individual animals identified, through records of distinguishing features, markings or post-release monitoring, as persistently re-stranding should not be refloated, and should be considered for euthanasia or allowed to die naturally.

Euthanasia

Euthanasia is the most humane response option for stranded cetaceans that cannot be rescued, or that become unsuitable for rescue over time due to deterioration in their condition. Animals that are not suitable for rescue should not be returned to the water under any circumstance. These animals should be euthanised as soon as possible to avoid prolonged pain, suffering and distress caused by the stranding.

Euthanasia is defined as 'the use of humane techniques to induce the most rapid and painless and distress-free death possible' (AVMA 2013).

Euthanasia is appropriate where:

- Rescue of the stranded animal is not possible
- The injury or illness suffered by the animal is sufficiently serious to compromise the likelihood of survival
- The method of euthanasia does not compromise the safety of personnel or the environment
- The application of the euthanasia method ensures that the death of the animal is as rapid and humane as possible

Euthanasia of a stranded cetacean is a highly specialised and extremely dangerous procedure which should only be carried out by a trained and experienced operator. The appropriate method of euthanasia will depend on the size and species of the stranded animal. Chemical euthanasia is the preferred method for all species. Physical euthanasia by shooting has been shown to be humane for small cetaceans (<7 metres) where it is carried out correctly by a trained operator.

The decision to euthanise the stranded animal should be based on a critical evaluation of the health and well-being of the animal and the availability of resources and expertise, and should not be influenced by external pressure from the public or the media to attempt the rescue of an unsuitable animal. Euthanasia can be extremely distressing for onlookers. The public and the media should be informed once a decision to euthanise has been taken by a qualified expert. It is advisable to prepare onlookers by explaining the process and the potential difficulties with both chemical and physical euthanasia before commencing.

To avoid causing upset to onlookers and to allow the operator to euthanise the animal safely, the surrounding area should be cleared, assisted by An Garda Síochána / the PSNI / or members of the local community where necessary (see Chapter 9: Health and safety at the stranding site). It is also advisable to erect a screen around the animal before commencing the chosen method of euthanasia to avoid unnecessary distress for the public or for other stranded animals.

Procedure for euthanasia

Euthanasia should only be attempted where the stranded animal has been stabilised or is above the tide line, and never when the animal is in the surf zone or in deep water. Where necessary, smaller cetacean species can be lifted and moved to a safer, more suitable location for euthanasia.

Chemical euthanasia

Chemical euthanasia is the preferred method for euthanising stranded cetaceans in Ireland. Chemcial euthanasia is extremely dangerous and should only be carried out by a trained and experienced operator. The following options can be considered for chemical euthanasia in Ireland.

Barbiturates (Sodium pentobarbital)	
Animal type	Large and small cetacean species
Dose rate	60–200mg per kg
Dolphins and porpoises	3–90g per metre
Whales	6–20g per metre

Administration: Chemical euthanasia should only be administered by a trained and experienced veterinary surgeon. Barbiturates are administered intravenously (into a vein of the flippers, dorsal fin, flukes or caudal peduncle), intracardiac or intraperitoneal where adequately sized needles are available. Records of stranded animals euthanised in Ireland using barbiturates administered into the pericardium from under the flipper (armpit) where the blubber layer is thin have demonstrated rapid times to death with minimal pain or distress.

Precautions: Prior administration of a sedative is advisable before administering large volumes of barbiturates in larger cetacean species. Terminal convulsions may occur without previous sedation. Barbiturates present a low risk to human safety, unless ingested or intravenous exposure, but pose a high risk of ecotoxicity/relay toxicity. If the animal is suffering from shock, and consequently impaired circulation to the heart and brain, the calculated dose rate may need to be increased to ensure effectiveness.

Etorphine (M99/Large Animal Immobilon)	
Animal type	Large and small cetacean species
Dose Rate	0.02–0.07mg per kg
Dolphins and porpoises	0.5ml
Large Animal	Immobilon per 1.5m (0.85mg per metre)
Whales	4ml Large Animal Immobilon per 1.5m (7mg per metre)

Administration: Chemical euthanasia should only be administered by a trained and experienced veterinary surgeon. Etorphine can be administered intravenous or intramuscular, however, administration into the blubber layer has also been shown to be effective due to an efficient capillary system. It is recommended to use a 20-25cm (8-10 inch needle) if available, however shorter

Trained veterinarian euthanising a Common Dolphin at Old Head, Co. Mayo (Shay Fennelly)

needles (e.g., 6 inch for pericardium) will also result in an acceptably humane death.

Precautions: Etorphine is banned in the Republic of Ireland. Where etorphine can be sourced in response to a live stranding it is available in two forms; M99 and Large Animal Immobilon. M99 is undiluted Etorphine, and is 4 times more concentrated than Large Animal Immobilon. Therefore, dose rates for M99 should be ¼ the recommended dose rate for Large Animal Immobilon. It may take several minutes for an animal to die post administration. This may be preceded by an excitatory phase which can cause some distress to onlookers. The excitatory phase can be countered through prior administration of a sedative. Etorphine is highly toxic and presents a serious risk for human safety as well as ecotoxicity/relay toxicity.

Physical euthanasia

Shooting is now considered to be a humane method of euthanasia for small stranded cetaceans (<7 metres). When carried out by a trained operator using the correct equipment (firearm and ammunition) shooting has been shown to be rapid, cost-effective and safe. Shooting can be particularly effective as a euthanasia technique in difficult situations such as mass-strandings.

Shooting	
Animal type	Small cetaceans (<7m)

Administration: Euthanasia must only by conducted by trained, licensed and experienced firearms users. The target is the animal's brain, as instantaneous unconsciousness is only achieved when the brain itself is traumatically injured. However, the brain is encased within the skull, which differs markedly between species. Therefore, the operator must have a thorough knowledge of the skull morphology of the stranded species, or be supervised by a person who has such knowledge. The operator must also have suitable equipment in order to ensure instantaneous insensibility and death. The minimum calibre necessary to achieve penetration is a .303 rifle using solid bullets of at least 140 grains. The target strike area is the blowhole. The trajectory should be a 45-degree angle aimed ventro-posteriorly (down and back) striking the blowhole and aimed towards the centre point of an imaginary line running between the pectoral fins. The shooter should be standing 0.5–1.0 metres in front of the animals head and the shots should be discharged with the muzzle of the rifle also 0.5–1.0 metres from the animals blowhole (the rifle should never be in direct contact with the animal). If there is any doubt about hitting the target with one shot, the shooter should fire three shots, tightly clustered along a centre line from the blowhole backwards. This will guarantee a quick and humane death. It is also possible to effectively euthanise a small cetacean using a horizontal shot aimed slightly above the centre point of an imaginary line between the eye and the ear. However, this is much more difficult to execute effectively.

Precautions: Great care must be taken before discharging any firearm in a public area. Members of the public must be moved back to a safe distance. Care should be taken not to discharge a firearm over surfaces with a high risk of projectile ricochets (stone or rock surfaces). Ideally, animals should be shot on a sandy surface to maximise safety. Extreme caution must be exercised if attempting to euthanise an animal that is moving or thrashing. It may be necessary to move the stranded animal to a more suitable location or position for shooting, away from rocks or out of the surf zone. Hollow or soft bullets should not be used due to a lack of penetration. Under no circumstances is it acceptable to use a rifle of less than .303 calibre or a shotgun.

It is essential that death is confirmed after euthanasia. Where death cannot be confirmed, repeated or additional techniques must be used to ensure the animal is not still alive and suffering.

The method of euthanasia will impact the options available for carcass disposal. There are a range of carcass disposal options for dead cetaceans, including beach or landfill burial, disposal at sea, incineration, rendering or composting. The use of chemical euthanasia may preclude some options.

Natural death

In all other circumstances, where rescue or euthanasia cannot be undertaken, the stranded cetacean should be made as comfortable as possible through appropriate care (see Chapter 5: Caring for the live stranded animal) and allowed to die naturally. When a decision is taken to allow the animal to die naturally it is important to communicate this to any onlookers to avoid a lack of action by the Response Team being perceived as neglecting the animal. The Response Team should create a safe area around the animal to prevent possible harassment or vandalism. The animal should be continuously monitored until death is confirmed.

Mass strandings

Mass stranding events present a much greater challenge for the Live Stranding Team. The time and resources available to the Care and Response Teams must be shared across a greater number of live animals, and the response decision must take account of the complex social order of the stranded group.

A mass stranding is defined as the stranding of two or more individuals (excluding cow / calf pairs) alive at the same time and place. Mass strandings are unique to highly social species, occurring as a result of the strong social bonds that exist between group members (see Chapter 3: What is a live stranding and why do they occur?). These strong social bonds can cause the stranding of large numbers of animals, many of which will be healthy and suitable for rescue if responded to in time.

Responding to a mass stranding

Averting a mass stranding

Mass strandings can be more readily detectible in the early stages due to the greater number of animals involved in entering shallow water and presenting at risk of stranding. If detected in time, it may be possible to intervene and avert a mass stranding where personnel and resource availability permit. Groups of animals which are found close to shore and are considered at risk of stranding can be herded back out to deeper water using people power and boats.

Averting a Common Dolphin mass stranding at Blacksod Bay, Co. Donegal (Ophelie Sagnol)

Herding a group of animals back out to open water can be quite challenging. Animals should always be herded as a unit, ensuring individuals are not separated from other members of their social group to avoid additional distress. Care must also be taken to ensure boats do not collide with any of the animals causing injury.

Prioritising the stranded animals

If the group of animals cannot be prevented from coming ashore, or the animals are found already stranded, all live animals must be prioritised for care (see Chapter 5: Caring for the live stranded animal) while they undergo assessment (see Chapter 6: Assessing the live stranded animal) and an appropriate decision is made regarding the response (see Chapter 7: Responding to the live stranded animal).

Stranded animals should be clearly marked to distinguish between live and dead, ensuring all live animals receive adequate care and attention. Available care personnel should be divided into teams, with each Care Team assigned to a single stranded animal. Each Care Team should have sufficient personnel and resources to adequately tend to the animal's needs. Where personnel or resources are limited attention should be focused on those animals with the greatest chance of survival. Prioritised animals will include adult animals in good health, younger animals and those that are stranded for the shortest period of time.

The suitability of prioritised individuals may change over time. The effects of the stranding may impact individual animals in different ways, causing the condition of some animals to deteriorate faster than others. In particular, animals suffering from the onset of physiological stress and shock as a result of the stranding may deteriorate quite rapidly, significantly reducing their likelihood of surviving a rescue. Therefore, stranded animals should undergo regular re-assessment during prolonged strandings to record changes in their condition over time.

Prioritised animals that are re-floated as part of a rescue group but subsequently re-strand should be carefully reassessed by the Response Team before commencing another rescue attempt. Re-floated animals may re-strand due to the physical and physiological impacts of

the initial stranding. Re-stranding will prolong the animals suffering and may cause further deterioration of its physical condition, reducing the likelihood of survival. Therefore, where the rescued animal continues to re-strand the Response Team should cease rescue attempts to avoid prolonging and worsening the animal's distress and suffering.

Rescue

The strong social bonding that exists between individual members of a mass stranded group is the most important factor to consider when responding to a mass stranding event. Re-floating individuals of a social group one at a time increases the risk of re-stranding, as rescued individuals are not likely to abandon members of their social group that are still ashore. Therefore, mass stranded individuals which have been assessed as suitable for rescue should be re-floated together as a group. While this is significantly more challenging for the Response Team, the chances of a successful rescue are greatly increased where the integrity of the social group is maintained intact as far as possible.

Suitable animals should be moved into shallow water together and allowed to re-acclimatise as a group. Social groups are normally matriarchal, and so it is advisable to try and re-float the largest females towards the front of the group in the hope that they will lead the rest of the group into open water. Mothers and calves should be moved together. A mother whose calf is dead may be less prone to re-stranding if the calf is brought into the water with her during re-floating.

Euthanasia or a natural death

The animal(s) that initiated the stranding, as well as any animal injured or suffering as a consequence of the stranding, may not be suitable for rescue. Returning these animals to the water as part of a re-floated group of healthy animals may risk the overall success of the rescue, as one unhealthy individual re-stranding may trigger the whole group to come ashore again. It is important to the success of the re-floated group, and for the welfare of the compromised animal, that only healthy animals with a good chance of survival are re-floated. Animals not suitable for rescue should be euthanised as soon as possible, preferably before the rescue group is re-floated to avoid vocalising animals left ashore attracting the re-floated group back into shallow water. To minimise additional distress to stranded cetaceans, to the public or to the Live Stranding Team euthanasia should be conducted behind a protective screen. Where it is not possible to euthanise the compromised animal(s) they should be left alone and allowed to die naturally (see Chapter 7: Responding to the live stranded animal).

Monitoring of the stranded animals post-release

Mass stranded animals that are re-floated can re-strand immediately after rescue, or in the days following a rescue. All rescued animals should be photographed and marked to assist in identifying individual animals and linking them to the original mass stranding event (see Chapter 7: Responding to the live stranded animal).

Mass stranding of Atlantic White-sided Dolphins at Killala Bay, Co. Mayo (Paul jepson)

Health and safety at the live stranding site

In all live stranding responses the primary concern is the health and safety of those present at the stranding site, either as part of the Live Stranding Team, members of the public or the media. All decisions taken during a live stranding must consider the risk to human physical health and safety, as well as the risk of zoonosis (the transfer of disease from the animal to the human).

A Health and Safety Coordinator should be appointed to manage and coordinate health and safety at the stranding site (see Chapter 4: Organising the live stranding response). All stranding decisions should be taken by trained and experienced personnel following a careful assessment of the animal, the environment and available resources. The Health and Safety Coordinator should be involved in all of these decision making processes. The recommendations of the Health and Safety Coordinator must be adhered to.

The Live Stranding Team who directly engages with the stranded animal is at the greatest risk, particularly during care, lifting and moving the animal, while in the water and during data and sample collection. Only trained personnel who are informed of the risks associated with live strandings should involve themselves in caring for or responding to a live stranded animal. The Response Team must have adequate equipment and resources to undertake a rescue. In particular, the use of gloves during assessment, response and data and sample collection, as well as protective clothing while in the water is recommended. A first-aid kit should be available on-site at all times.

Members of the public who are not familiar with stranded cetaceans and response techniques should maintain a safe distance from the stranded animal. The

Volunteers assisting with the refloating of a Long-finned Pilot Whale, on Inch Beach, Co. Kerry (Frances Bermingham)

Reflotation of a Long-finned Pilot Whale at Bettystown, Co. Meath (Mark Coleman)

media should respect the work of the Care and Response Teams by allowing efforts to proceed unobstructed. Where necessary, An Garda Síochána/ the PSNI/members of the local community may assist in the establishment of a controlled area around the stranding site to ensure the health and safety of onlookers. The controlled area should extend back a safe distance from the stranded animal and should be cordoned off and clearly marked using tape or string. All members of the public and media should be asked to remain outside the boundary of the controlled area. The public and the media are most likely to cooperate with the restriction of the controlled area where the stranded animal can still be seen from outside the boundary.

It may be necessary to enlist the support of members of the local community to provide on-going care or physical assistance during the rescue. Volunteers should be restricted to tasks which are considered safe, they should receive clear instructions for each task from a trained supervisor, and they should be allowed to stop their activities immediately if they so wish. Unfortunately, the health and safety of volunteers cannot be guaranteed, and all volunteers should be advised that their participation is voluntary and at their own risk.

Live strandings, especially mass strandings, are extraordinarily emotive events. It may be the first time many of the volunteers and members of the public will have witnessed such extreme levels of animal distress and suffering. It is also likely that many of those witnessing the live stranding will not understand the complexities of cetacean strandings and will have an expectation that the animal will be rescued. It is important that the response decision is made independent of emotion and expectation, and is based on the health and safety of responders and the welfare of the stranded animal. Managing emotion and expectation is best achieved through regular, clear communication with the public and the media present on site (see Chapter 10: Communication).

Live stranded Bottlenose Dolphin being cared for with minimal human contact to reduce distress (Joanne O'Brien)

Communication

Communication is an increasingly important component of all live stranding responses. Live strandings can be highly pressurised events which require management through clear and effective communication. The more difficult and prolonged the live stranding event is, the more emotionally charged the situation is likely to become. Meeting the demand for clear and timely communication from the local community, the media, as well as the Live Stranding Team can be extremely challenging with limited resources. Attempting to explain that a stranded animal is beyond saving and must be euthanised will undoubtedly be the most difficult message to deliver.

The most important communication is that which happens within the Live Stranding Team. Communication within the team is the responsibility of the Stranding Coordinator (see Chapter 4: Organising the live stranding response). Every member of the team, including volunteers, should be fully informed of their roles and responsibilities prior to commencing their activities, and should be kept up-to-date on all decisions and developments as they happen. Responding to a live stranding can be physically and emotionally draining, especially where the stranded animal does not survive. Therefore, it is important that all communication is supportive and encouraging by focusing on the positives (see Chapter 11: Science and live strandings).

The most challenging communication will likely be direct communication with members of the public and the media present at the stranding site. The following guidelines can be used to assist this type of communication:

- It is important to recognise and respect the natural curiosity and concern of the public, and the work of the media. Where possible, provide regular briefings on the status of the animal and the response efforts to members of the local community and the media present at the stranding site.

Communication has become an important part of the live stranding response. IWDG Live Stranding Training, Greencastle, Co. Donegal (Frances Bermingham)

• Ideally, all communications should be delivered through one or more appointed correspondents who work together to ensure a consistent message.

• The correspondent(s) should be experienced in live stranding response and should be kept informed of decisions and developments throughout the stranding.

• Briefings should be short, simple and clear.

• Briefings should explain the decision making process and the rationale behind the chosen course of action.

• Briefings should be honest, and should serve to manage the expectations of the public and the media throughout the stranding response.

• Briefings should be made after decisions have been taken and before action commences where this does not compromise the welfare of the stranded animal. This is particularly important in situations involving euthanasia. Euthanasia can be extremely distressing for all those attending a live stranding. It is important that the Response Team, members of the public and the media are properly informed prior to any action taking place.

• Once the stranding has concluded it is recommended to hold a debriefing meeting locally for members of the public and the media who may have questions concerning the outcome of the live stranding response.

Live strandings which are complicated and prolonged by factors such as size of the animal, number of animals, a difficult stranding environment or limited resources have the potential to become high profile media events broadcast to a much wider audience beyond the local community. Where engaged with early and updated regularly, the media can be a valuable resource for informing and managing expectations. However, despite the best efforts of the Live Stranding Team, once opened to this broader level of interest and scrutiny, feedback may not always be positive and encouraging. In particular, on-line reporting and social media have created a real-time reporting forum for comments and criticisms, many of which can be ill-informed, unrealistic and negative. Concerns can be addressed and actions explained most effectively through informed media outlets. Therefore, communication resources should be directed towards media outlets that provide a fair and honest account of the live stranding. It is important that the Live Stranding Team is not concerned or distracted by any negative comments and that valuable communication time and resources are not lost to unhelpful and uninformed debates.

IWDG Live Stranding Training Course, Salthill, Co. Galway (Simon Berrow)

Science and live strandings

All strandings, regardless of the outcome, provide an invaluable opportunity to advance our understanding of marine mammal science. Stranded animals are an infrequent and often temporary source of information about marine mammal biology, ecology, as well as the marine environment in which these animals live. Collecting and studying this information is, therefore, of critical importance to understanding and improving their care, protection and conservation.

In order to interpret this information correctly it is important to have a clear and standardised approach to the collection and cataloguing of stranding information. Where possible, the IWDG recommend the use of the Marine Animal Rescue Coalition (MARC) Recording Sheets provided in this manual by all IWDG trained stranding responders.

These Recording Sheets include:

- MARC Stranded Cetacean Report – Initial report
- MARC Stranded Cetacean Clinical Assessment Form
- MARC Stranded Cetacean Euthanasia Document
- MARC Stranded Cetacean Action Record
- MARC Mass Stranding Overview Form

Where the above MARC Recording Sheets are not available during the stranding, extremely valuable information can still be collected. The simplest and quickest method of data collection is photographic and/or video records which can be taken on a mobile phone, camera or video recorder. Photographic or video images can help to identify the species, sex, age and approximate size (body length / girth) of the animal. Images are also important for individual identification or diagnostic indicators such as colour patterns, fin/fluke size and shape, markings, scars or wounds. Ideally, photographs should show a full dorsal, lateral and ventral view, including the open mouth exposing the teeth or baleen. Photographs should also include some indicator of scale for size determination.

Mass strandings present a much greater challenge for those attempting to collect important information from stranded animals. It is vital that a record of the pattern of the mass stranding is taken, showing the location and position of each individual animal. To avoid confusion, all animals should be individually identified by numbering both sides of the dorsal fin (see Chapter 7: Responding to the live stranded animal) before recording and/or photographing. All information collected from each individual animal should be carefully catalogued using the number on its dorsal fin. Identifying individual animals using numbers will also help to identify any animal that re-strands. While it is important to collect as much information from as many animals as possible during a mass stranding, it may be necessary, due to restrictions in time or resources, to prioritise information and/or animals. It is important to the scientific value of the information that the collection and cataloguing of the most appropriate information from the most suitable animals is prioritised.

Recording information from a live stranded Common Dolphin at Blacksod Bay, Co. Mayo (Etienne Pouplard)

More invasive data and sample collection from live and dead animals should only be undertaken by trained operators. Where possible, the IWDG recommend the completion of a full necropsy on all animals that come ashore dead or subsequently die as a consequence of stranding to better understand and address the causes of cetacean stranding in Irish waters.

Data collection, while important, must never compromise human health and safety or the welfare of the stranded animal.

MARC Stranded Cetacean Report
Initial report

Date:

Report written by
Name:
Address:
Tel. no:
Email:

Attending vet:
Name:
Address:
Tel. no:
Email:

LOCATION OF STRANDING

Name of beach/cove:
OS map reference:
Access to beach:
Nearest town or village and county:

INITIAL ASSESSMENT

Number of animals stranded: Total: **Alive:** **Dead:** **Time assessment made:**

How long stranded: **Estimated / Actual**

Weather conditions:
Sea state:
Tide status:
Additional notes or useful information:

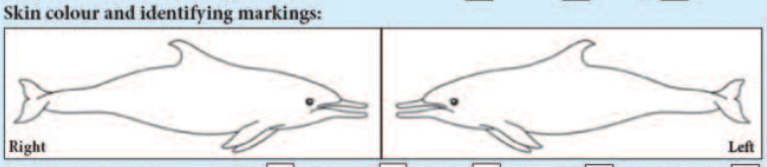
Number of MARC members present at initial assessment:

Note: A MARC Stranded Cetacean Report is needed for each individual animal

INITIAL INDIVIDUAL STRANDED CETACEAN REPORT

Species:
Body Length: **cm** **Girth:** **cm**
Age: **Neonate/ Juv / Adult** **Sex:** **Male / Female / Unknown**

If species unknown: Description of beak/snout: Absent ☐ Short ☐ Long ☐
Skin colour and identifying markings:



Identification notes:

Photographs taken: Right ☐ Cranial ☐ Left ☐ Caudal ☐ Dorsal fin ☐ Fluke ☐ Location on beach ☐

Name / ID
Microchip number:
If present tag number, colour and contact details:

POSITION OF CETACEAN WHEN FOUND

Sun: ☐ in direct sunlight ☐ in shade
Sea: ☐ in the surf ☐ above the surf
Beach: ☐ on sand ☐ on shingle ☐ on rocks

TRIAGE

Status: ☐ alive ☐ dead (move on to another animal and record details later)
Require vet attention:
☐ immediate ☐ medium priority ☐ euthanasia (vet required)

Additional MARC Stranded Cetacean Reports:

- MARC Stranded Cetacean Clinical Assessment Form
- MARC Stranded Cetacean Action Record
- MARC Euthanasia Form
- MARC Mass Stranding Overview Form

Please ensure all of the relevant documents are completed: these are essential for auditing and improving the successful management of stranded cetaceans

Thank you for your help today.

MARC Stranded Cetacean Clinical Assessment Form

Species: _____ **Date:** _____

ID/Name: _____ **Time:** _____

Microchip number: _____ Sheet no.: _____ of

Report written by: _____ Attending vet: _____ If vet not present please put N/A

Number of animals currently stranded: Total: _____ Alive: _____ Dead: _____

Time since stranded (hrs/min): _____ Est / Actual Time since rescue started (hrs/min): _____

MARC Clinical Assessment forms should be filled out as part of the initial assessment and triage and at any times where a full assessment or veterinary health check is undertaken. Accurate data collection is essential to ensuring improved outcomes in cetacean stranding management and promoting best practices in animal welfare.

INITIAL CLINICAL ASSESSMENT

Status: ☐ alive ☐ dead

Visual assessment

Behavioural signs / observations e.g. if seen in the water before the stranding:

Lying position: Dorsal ☐ Ventral ☐ Lateral ☐ L / R **Demeanour:** Depressed / Struggling / Alert / Apprehensive / Calm

Trauma, lesions or skin damage:

Skin condition: Smooth ☐ Wrinkled ☐ Peeling ☐ **If yes to either wrinkled or peeling please indicate on the above diagram (or write whole body)**

Skin tone: Firm ☐ Spongy ☐ Very spongy ☐ **A sponginess when hands are pressed against the flanks may be consistent with dehydration**

Body condition: Poor ☐ Moderate ☐ Good ☐ **Poor (Muscles concave/dipping) / Moderate (muscles slightly rounded/flat) / Good (muscles convex)**

Any discharges present? From mouth, blowhole, anus, genital slit or wounds, indicate if it is blood, mucus, pus or other.

Any refloat attempt(s) already made? Yes ☐ No ☐ If yes, how was it carried out and how long was taken over it?

Clinical assessment

Respiratory: Respiratory rate _____ bpm **Normal: Dolphins/porpoises 2-5 bpm, pilot whales approx 1 bpm, some longer**

Respiratory quality: shallow / weak /explosive **Respiratory noise:** absent / harsh / bubbling / coughing

Cardiovascular: Heart rate _____ bpm Capillary refill time _____ sec Mucous membrane colour _____

Auscultation:

Body Temperature: _____ °C / °F

Eyes: Left Open ☐ Closed ☐ Cloudy ☐ Other _____

Right Open ☐ Closed ☐ Cloudy ☐ Other _____

Reflexes/muscle tone: Palpebral reflex: Normal ☐ Sluggish ☐ Absent ☐

Blowhole tone: Normal ☐ Sluggish ☐ Absent ☐ **Should close eye when gently touched at corner of the eyelid**

Jaw tone: Normal ☐ Sluggish ☐ Absent ☐ **Should normally be held closed and tighten on touching its edge**

Additional notes:

Clinical plan: **Medical and rescue plan should be documented here, including drugs, doses and rehabilitation consideration**

Signed: _____ **Time of next review:** _____

MARC Stranded Cetacean Euthanasia Document

Species: _____ Date: _____

ID/Name: _____ Time: _____

Microchip number: _____

Report written by: _____ Attending vet: _____

If vet not present please put N/A

Number of animals currently stranded: Total: _____ Alive: _____ Dead: _____

Time since stranded (hrs/min): _____ Time since rescue started (hrs/min): _____

Justification for euthanasia

Signed: MRCVS

Method of euthanasia

Body Length: _____ m

Est Weight: _____

Euthanasia only to be undertaken following veterinary assessment and under veterinary guidance

Note: For known species estimated weights can be extrapolated from body length, details are found in the BDMLR Handbook, Cetacean Veterinary Section.

Premedication / Anaesthesia:

Time	Drug	Dose				Route	Area of admin	Delivery success	Effect
		Dose rate (mg/kg)	Total dose (mg)	Conc (mg/ml)	Total volume (ml)				

Euthanasia method (firearm):

Type: _____ Calibre: _____ Ammunition: _____

Area targetted: _____ No. shots: _____

Efficacy of euthanasia

Confirmed successful euthanasia: Yes ☐ No ☐ Unsure ☐ How:

Time confirmed: _____ Vet signature: _____

Additional notes:

If euthanasia is required on welfare grounds please document all aspects of the euthanasia event including behaviour from the time of administration to time the animal is confirmed dead: this information is essential in reviewing methodology and application of euthanasia techniques consistent with best animal welfare practices.

MARC Stranded Cetacean Action Record

Species: | Date:
ID/Name: | Time:
Microchip number: | Sheet no.: of

Summary Accurate data collection is essential to ensuring improved outcomes in cetacean stranding management and promoting best practices in animal welfare.

Time																							
RR																							
HR																							
Temp																							

Time	Notes and observations	Initial	Plan and treatments

Please initial all notes when entering information.

MARC Mass Stranding Overview Form

Date:

Report written by
Name:
Address:

Tel. no:
Email:

Attending vet:
Name:
Address:

Tel. no:
Email:

LOCATION OF STRANDING

Name of beach/cove:
OS map reference:
Access to beach:

Nearest town or village and county:

INITIAL ASSESSMENT

Number of animals stranded:
Total: **Alive:** **Dead:**
Time assessment made:
Time stranded: Est / Actual
Weather conditions:
Sea state:
Tide status:
Additional notes or useful information:

Species:

Mass stranding manager:

ID/Name	Sex	Age	Initial assessment	Initial vet check	Next vet check	Done	Next vet check	Done	Prognosis	Refloat	Euthanasia	Notes

The **Irish Whale and Dolphin Group** (IWDG) was established in December 1990 as an all-Ireland group dedicated to the conservation and better understanding of cetaceans (whales, dolphins and porpoises) in Irish waters through study, education and interpretation. This document recognises the growing importance of cetacean welfare science to the understanding of cetaceans in Irish waters and the protection and conservation of healthy, sustainable cetacean populations into the future.

The IWDG relies on members and partnerships to achieve its goals. Please visit www.iwdg.ie and join the IWDG to support our work.

IWDG www.iwdg.ie
Irish Whale and Dolphin Group