‘Out of Habitat’ Marine Mammals II – Second International Workshop Report

6–7 December 2022

Walrus in Tenby, UK. Photo: Rob Lott

Please note that no one involved in this workshop or the production and publication of its report accepts any liability for any use of the advice provided here. Marine mammals are large wild animals and the situations in which they are encountered may be dangerous. People taking part in efforts to rescue or otherwise interact with them do so at their own risk.

This workshop was organised by OceanCare with Laetitia Nunny and Mark Simmonds acting as conveners. Mark Simmonds chaired. The views expressed in each case study are those of the individual presenters. The views in the conclusions are those of the workshop participants in general unless otherwise stated.

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Beluga in the River Seine, France. Photo: Sea Shepherd France

INTRODUCTION

Marine mammals may come into contact with human beings for a variety of reasons and such interactions typically require careful management to protect the welfare of the animals involved and the people they are interacting with (Simmonds and Nunny, 2022). In some cases, these marine mammals might be 'out of habitat', a term that has been used to describe animals that appear in areas where they are not usually present and where they may come into close contact with human activities. Situations involving out of habitat animals can negatively impact their welfare. There may also be consequences for people in the vicinity; for example, if their property is damaged or because they are fearful that the animal may harm them in some way.

In 2020, research was started to better understand this issue, including drawing together case studies and making contact with those trying to manage situations involving out of habitat marine mammals around the world (Nunny and Simmonds, 2020). In 2021, a workshop was held to discuss a number of case studies and potential methods for managing these situations (Anon, 2021).

In December 2022, a second workshop was convened to continue discussing the issues related to these animals, including the potential reasons for them being out of habitat. New case studies were presented and discussed, and some further details were added to the toolkit initiated at the first workshop.

The toolkit, list of workshop attendees and the workshop agenda are included in the annexes to this report.

The workshop did not spend time on definitions, choosing to use those determined at the 2021 workshop; see Box 1 below (Anon, 2021). However, there may be a need to further define words which are commonly used to refer to species that are not in their usual locations; for example, 'vagrant'. The ICES Working Group on Introduction and Transfer of Marine Organisms (WGITMO) Report 2008 defined vagrants as "*species that for a variety of reasons (physiological, physical changes in the environment) expand to an area, remain for a time then disappear; i.e. transitory but not migratory*" (Pederson *et al*., 2008).

Box 1. *Definitions*

Habitat: the place where an animal makes its home. Ideally, it meets all the environmental conditions that an animal needs for its survival and good health, including food, water and appropriate physical, biological and chemical conditions. In some cases, human-caused change may mean that original habitats are now suboptimal for the species concerned.

Imminent: impending or ongoing threat.

Out of habitat: found outside of what is normally regarded as its usual/typical habitat.

For example: *A humpback whale far upriver would be out of habitat; conversely, a bottlenose dolphin close inshore is not usually a cause for concern in itself.*

Out of range: found outside of what is regarded as its natural range, defined in geographical terms and taking into account historical records.

Poor health: the animal shows signs of disease and/or malnutrition and/or wounding.

Vagrant: "species that for a variety of reasons (physiological, physical changes in the environment) expand to an area, remain for a time then disappear; i.e. transitory but not migratory" (Pederson *et al*., 2008)

CASE STUDIES

CASE STUDY 1: FREYA THE WALRUS – Siri Martinsen and Maria Lien (NOAH – for animal rights)

Walruses were once abundant around Svalbard, a Norwegian archipelago in the Arctic Ocean, but 350 years of unregulated hunting brought them to the brink of extinction. Walruses were protected in 1952, at a time when there were only about 100 animals left [1]. After more than 60 years of protection, the population size in Svalbard is still small, and the species is categorized as 'vulnerable' on the Norwegian Red List of threatened species. However, the number of walruses has been slowly increasing in recent years and the population was estimated to be around 5500 individuals in 2018[2]. There is no permanent population on the mainland of Norway, but walruses are occasionally observed along the coast[3,4,5,6]. Walruses were probably a more common sight on the mainland in Norway before they were hunted almost to extinction, especially in Northern Norway[7].

Martinsen and Lien reported on the case of Freya, a female walrus estimated to be five years old and weighing around 600 kg. She was first sighted in Sørollnes, Norway in December 2019. She was later observed in the United Kingdom, including Shetland, and in Denmark, Sweden, Germany, Netherlands, and several places in Norway[8]. In spring 2022, Freya spent considerable time in Kragerø county situated west of the inlet of the Oslofjord in Norway, and in July she travelled into the fjord. She was killed by Norwegian authorities in the Oslofjord on 14 August 2022.

The Directorate of Fisheries is the authority responsible for the welfare of marine mammals in Norway. The Institute of Marine Research (IMR) serves as an advisory body to the Directorate and meetings between the Directorate and the IMR were held regularly during the summer to assess Freya's situation[9].

Freya was often seen resting on leisure boats (see Figure 1), and sometimes caused damage to them. In June, a floating jetty imitating an ice floe was constructed. It was made using white tarpaulin and heavy weights to make the jetty lie low in the sea[10]. The hope was that Freya would use this to rest on, instead of the boats. But Freya never used the jetty, and soon moved to a different location.

***Figure 1**. Freya resting on a boat (Photo: Fiskeridirektoratet)*

1 Environmental observations, Svalbard and Jan Mayen: https://mosj.no/en/indikator/fauna/marine-fauna/walrus/
2 Norwegian Red List of Threatened Species 2021: https://artsdatabanken.no/lister/rodlisteforarter/2021/27802
3 Walrus euthanized in Kristiansund, December, 2012, NRK: https://www.nrk.no/mr/_-helt-riktig-a-avlive-hvalrossen-1.10867801
4 Walrus observed in Hammerfest, 2019, NRK: https://www.nrk.no/tromsogfinnmark/hvalross-har-blitt-turistattraksjon_-_-vis-respekt-og-hold-avstand-1.15445024
5 Walrus observed in Fræna, March 2013, NRK: https://www.nrk.no/mr/kvalross-ute-av-kurs-1.10953150
6 Walrus observed in Senja, August 2022: https://www.vg.no/nyheter/innenriks/i/k62qEA/freya-har-faatt-en-utfordrer-ny-hvalross-observert
7 Øystein Wiig, Professor in mammalogy, University of Oslo: https://forskning.no/ntb-sjodyr/laer-mer-om-freya/2058795
8 Map of Freya's movements: https://www.google.com/maps/d/u/0/viewer?hl=no&ll=59.55816067251342%2C10.947768432549765&z=7&mid=1dWCp2CObfw6_l-v378GIf2VD9SOjOF-4
9 Fiskeridirektoratet, Freya: https://www.fiskeridir.no/Soek?search=freya
10 NRK, 23 June 2022: https://www.nrk.no/vestfoldogtelemark/her-lager-kommunen-eget-_isflak_-til-hvalrossen-freya-1.16014298

In July, she travelled north into the Oslofjord. The areas surrounding the fjord are relatively densely populated and Freya's presence caused much media attention and attracted a lot of people (Figure 2). All through July the Directorate recommended that people stay away and leave Freya in peace as much as possible. Some boats were damaged, but in general the situation was calm and seemed to be managed well. This took a sudden turn on Thursday, 11 August, when the Directorate wrote on their webpage that "*The Directorate of Fisheries' assessment is that the public's negligent behaviour and failure to follow the recommendations from the authorities can endanger life and health (...) The Directorate has observed several potentially dangerous situations at the Kadettangen bathing area this week. It has also been observed that people have thrown objects at the walrus*" and "*We are now considering further measures, where euthanasia may be a real alternative*"[11].

NOAH reached out to the Directorate on Friday, 12 August, and offered to put the Directorate in contact with marine mammal experts and veterinarians who would be able to assist in moving Freya, if necessary. The Directorate responded that they already had the knowledge and resources to move her. NOAH is also aware that a team of volunteers with marine mammal experience approached the Directorate on the same day with an offer to provide continuous monitoring of the walrus and contribute information to the public on how to behave around her, but this offer never received an answer. In the early morning hours of Sunday, 14 August, Freya was shot in the head with a rifle and killed[12].

Freya received a lot of media attention both in Norway and internationally. A search in the Norwegian media archive Retriever shows that the name 'Freya', together with the word 'walrus', was mentioned in almost 2,000 articles and news reports in 2022[13]. Most of the attention seemed to be positive. But there were some voices arguing that she should be killed. In June, the mayor of Kragerø said that he wanted Freya to be moved or euthanized, due to the inconveniences she was causing[14]. In July, a biologist wrote an opinion piece called "Shoot Freya!". NOAH responded to this and sent out several press releases relating to the situation, arguing that measures should be directed towards people, not Freya[15].

***Figure 2**. People approaching Freya (Photo: Fiskeridirektoratet)*

NOAH has not obtained any official written decision regarding the killing of Freya, but has obtained various notes made by the authorities before and after the killing. In a press release from 14 August, the Directorate wrote: "*The decision to euthanise was made after an overall assessment where we concluded that human*

11 Press release from the Directorate of Fisheries, 11 August 2022: https://www.fiskeridir.no/Yrkesfiske/Nyheter/2022/behov-for-ytterligere-hvalrosstiltak
12 Aftenposten, 16 August 2022: https://www.aftenposten.no/oslo/i/eE2z0Q/skjoet-freya-med-rifle-og-fraktet-henne-vekk-med-baat
13 Faktisk.no, 26 August 2022: https://www-faktisk-no.translate.goog/artikler/0rg4y/dette-skjedde-i-kulissene-for-hvalrossen-freya-ble-avlivet?_x_tr_sl=auto&_x_tr_tl=en&_x_tr_hl=no&_x_tr_pto=wapp
14 TV2 "Ordfører vil flytte eller avlive Freya", 20 June 2022: https://www.tv2.no/nyheter/innenriks/ordforer-vil-flytte-eller-avlive-hvalrossen-freya/14881237/
15 "Bomskudd mot Freya" Siri Martinsen, NRK Ytring, 26 July 2022: https://www.nrk.no/ytring/bomskudd-mot-freya-1.16048937

life and health could be at risk". Subsequently, the Directorate sent a letter to NOAH, dated 24 August, with answers to NOAH's questions about the legal and other assessments that had provided the basis for the killing.

In summary, the Directorate of Fisheries justifies the decision to kill the walrus as follows:

Due to "*several disturbing episodes*" where people – despite the authorities' warnings – sought contact with the walrus in the water, and where the walrus appeared near people swimming in the water, the Directorate considered that an emergency situation had arisen and that this gave an independent basis for euthanasia. The Directorate wrote: "*Emergency law competence is based on customary law, and measures without legal basis to save lives or prevent harm can be implemented by analogy from emergency law (Section 17 of the Criminal Code), cf. legal theory. This type of decision is not subject to special formal requirements, including requirements for written decisions. The decision to euthanise must nevertheless be factually justified and sound deliberations must have been made between various considerations. In this case, she was considered a danger to life and health both because people repeatedly sought out the animal, but also because the walrus sometimes surprised people in the water. The walrus gradually appeared more stressed and the situation affected animal welfare. Alternative measures to culling were considered, but these were considered to be very resource-intensive, combined with the fact that there was great uncertainty about feasibility*."

NOAH believes that the Directorate incorrectly applied the law and based the decision on inaccurate information, and therefore was wrong to invoke emergency legal competence. In NOAH's view, it was not possible for the Directorate to use § 17 of the Criminal Code, as it is clear that there were other reasonable ways to avert danger to life and health, and that the walrus was not causing any immediate danger when she was shot.

The Directorate further refers to the Biodiversity Act § 15, which in turn refers to the Marine Resources Act. The Directorate wrote in its letter of 24 August: "*The regulation for harvesting seals on the Norwegian coast (the Coastal Seal Regulation), is based in the Marine Resources Act. The regulation applies in Norway's internal waters and maritime territory, including the Oslofjord, cf. § 2. In the Coastal Seal Regulation § 3 it is stated that 'the regulation applies to seals of all species'. The Directorate of Fisheries assumes that the walrus is a seal species that is covered by the regulation.*" The Directorate used the regulation's section 11, third paragraph. According to that provision, the Directorate of Fisheries can in "*special cases*" grant permission to capture seals: "*...The Directorate of Fisheries, which has general management responsibility for seals, can itself decide to capture seals in 'special cases'. This case is considered to be such a case*."

NOAH argues that neither the provision in The Biodiversity Act nor The Coastal Seal Regulation applied as a legal basis for killing Freya. It is questionable that the walrus as a species can be categorized as a 'seal'. A general understanding of the term 'seal' does not include the walrus species. Usually, in Norway, the term 'coastal seal' will include species that have a natural habitat on the Norwegian coast, such as grey seals (*Halichoerus grypus*) and harbour seals (*Phoca vitulina*)[16]. The species walrus (*Odobenus rosmarus*) belongs to a separate family, Odobenidae (the walrus family), and is separate from all the seal species in Norway, which are 'true seals', belonging to the family Phocidae[17].

Additionally, the killing was not in accordance with the Bern Convention's articles 6 and 9. The walrus is listed on the 2021 Norwegian Red List for species as vulnerable, and is also on Annex II of the Bern Convention. The species is strictly protected by the Convention, cf. article 6, and euthanasia can only be adopted in exceptional cases in accordance with article 9.

NOAH requested the Civil Ombudsman to investigate the legality of the Directorate's (oral) decision to kill Freya and to establish the lack of basis in Norwegian law for her killing. But after an overall assessment, the

16 The Directorate of Fisheries, facts about Coastal Seals: https://www.fiskeridir.no/Yrkesfiske/Tema/Sjoepattedyr/Kystseljakt/Fakta-om-kystsel
17 The Great Norwegian Encyclopedia, True Seals: https://snl.no/ekte_seler

Ombudsman came to the conclusion that they would not investigate the matter further. They wrote: "*In the assessment, we have, among other things, emphasized the nature of the case, that the decision has been implemented, and that, based on our review of the case, it appears unlikely that further investigations will lead to decisive legal objections to The Directorate's decision. We note in this context that some of the objections raised in the complaint require an assessment of factual circumstances for which review by the ombudsman is not suitable, or relate to issues that require special professional expertise*"[18]. NOAH is now working with the Green Party to get the Parliament's inquiry committee to review Freya's case.

What we can learn from Freya's situation

As the walrus population increases, more walruses might show up in populated areas. To avoid the unnecessary culling of animals, there are several things that should be done:

- Management of media: The media often sensationalizes wild animals and can contribute to people seeking out the animal. Disclosing the location may contribute to large numbers of people flocking to see the animal, and this should be avoided.
- The public's behaviour can put wild animals in great danger, making education around this essential. Schools should teach children to respect wildlife and how to behave around wild animals. In specific situations where wild animals show up close to populated areas, the media should focus on how to behave around wild animals, instead of portraying them as sensational or even dangerous.
- If the public does not respect the recommendations to stay away from wild animals, increased involvement of law enforcement may be necessary.
- Transparency in decision making: Secrecy and lack of transparency in decision making causes speculation and lack of trust. This is particularly evident in Freya's case. The lack of a written decision makes it very difficult to review the basis and the legality of the decision.
- The authorities need to be prepared. Experts and veterinarians with relevant and up to date knowledge on how to move marine mammals, interpret their behaviour, assess their health etc. exist, but may not be in contact with relevant authorities. Communication and cooperation between different experts and authorities should be established. For this to work there has to be a willingness from the authorities to listen to outside expertise.
- A change in policy: The current Norwegian laws and regulations for protection of marine mammals are vague. A change in policy that would make marine mammals explicitly protected is desirable. A more specific regulation would be beneficial for the animals and would also make law enforcement easier.

CASE STUDY 2: A WALRUS IN FINLAND – Dan Jarvis (British Divers Marine Life Rescue)

Jarvis reported on another walrus in Europe in recent months. On 17 June 2022 a female walrus was first sighted travelling along the Baltic coast of Germany, subsequently passing through Poland, Latvia, Estonia and finally ending up in Finland, where it unfortunately died on 19 July. Generally, the animal stayed out of trouble and the main issue was with people attempting to get too close to it, resulting in public appeals to give it space and allow it to rest, and occasional efforts by authorities to cordon off the area around it.

In Finland the animal became entangled in some fishing equipment known as a 'fyke' – a bag shaped trap – which had become caught on its tusks[19]. The fisherman who owned the gear managed to free the animal with assistance from the Coastguard, but his boat was capsized and sank during the procedure and he had to be rescued from the water. Luckily he was uninjured. Damage was estimated to be approximately 10,000 euros and the fisherman was not insured.

18 Letter from The Civil Ombudsman to NOAH, 17 November 2022
19 https://yle.fi/a/3-12541655

Two days later it was reported that the walrus had hauled out further along the coast and that its condition had deteriorated markedly, including lethargy and laboured breathing. It was also reported to be in poor nutritional condition. Helsinki Zoo became involved and attempted to feed it tranquilisers in food to allow a health assessment; however, it refused to eat and swam off. Land-based in situ containment was also considered but deemed impractical and unsafe. A decision was then made to sedate the animal and transport it to the zoo for care in an operation that lasted several hours. The walrus died during transport to the facility[20] and post-mortem examination results simply stated that the animal appeared to be malnourished. The incident led to significant public debate and criticism on social media directed at the zoo for their perceived mishandling of the situation.

Note: In November 2022 another walrus, known as 'Thor', arrived in the Netherlands, travelling west along the coast as far as Brittany, France, over the next month[21]. On 12 December he came ashore near Southampton, UK, and then again at Scarborough on 30 December and finally Blyth on 2 January 2023. In each instance local authorities, Coastguard, Police, British Divers Marine Life Rescue and RSPCA worked together to set up cordons to keep crowds back a safe distance and to provide appropriate messaging to the public in person and online. There were only a small number of people who ignored the advice and cordons and attempted to get closer, all of whom were curtailed by authorities present.

CASE STUDY 3: LEOPARD SEALS IN NEW ZEALAND – Krista van der Linde and Ingrid N. Visser (leopardseals.org)

Leopard seals (*Hydrurga leptonyx*) have a southern circumpolar distribution. Their primary range is south of the Antarctic convergence, in the sub-Antarctic Islands and Antarctica (Jefferson *et al*., 2015; Rogers, 2018; Figure 3). When found outside of their primary range, some might consider individuals to be out of habitat. However, there are other aspects to consider, such as their secondary range, which includes continents and islands abutting the Southern Ocean including New Zealand (NZ), Australia, north-central Chile and South Africa (Jefferson *et al*., 2015; Rogers, 2018; Figure 3). Other northern extralimital occurrences are from Pitcairn Island and the Cook Islands (Jefferson *et al*., 2015; Figure 3).

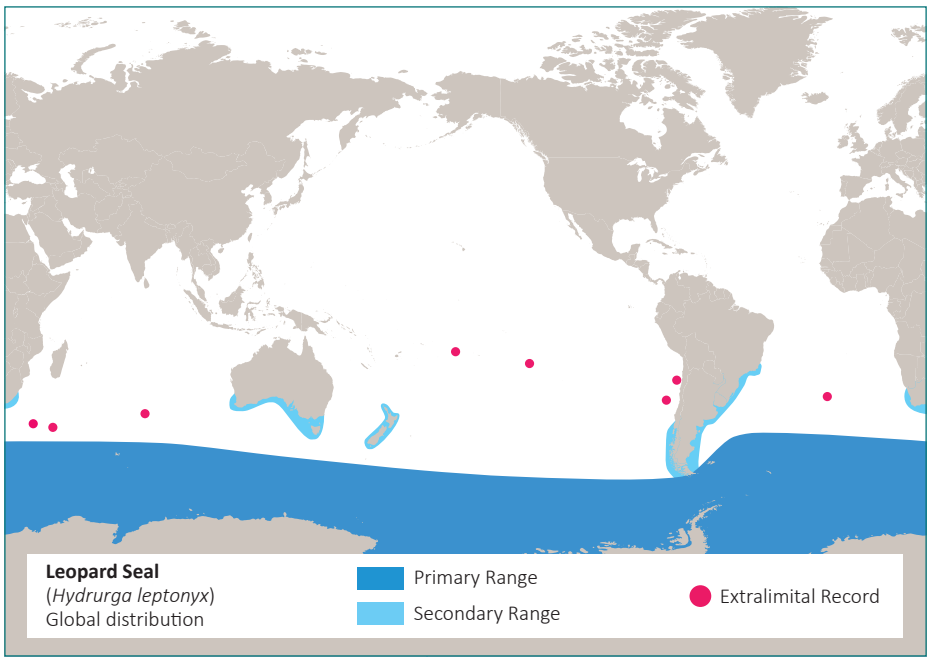

Figure 3. *Leopard seal distribution (from Jefferson et al., 2015)*

20 https://yle.fi/a/3-12543595
21 https://bdmlr.org.uk/advice-issued-as-walrus-appears-in-uk; https://www.theguardian.com/commentisfree/2023/jan/08/thor-the-disoriented-walrus-enthralled-brits-but-cut-no-ice-with-climate-sceptics

Within that framework, leopard seals in NZ were previously classified as a 'Vagrant' species. However, they have recently been reclassified as 'Resident' (Hupman *et al*., 2020) based on inter alia, the species being documented in NZ since the 1200s (Smith, 1985); year-round, in all regions (Hupman *et al*., 2020; Figure 4); at major coastal cities (LeopardSeals.org unpublished data); and giving birth in the region (Hupman *et al*., 2020; van der Linde *et al*., 2022a). Such data validates NZ as being part of their secondary range and, perhaps, a movement towards primary occupation of NZ waters.

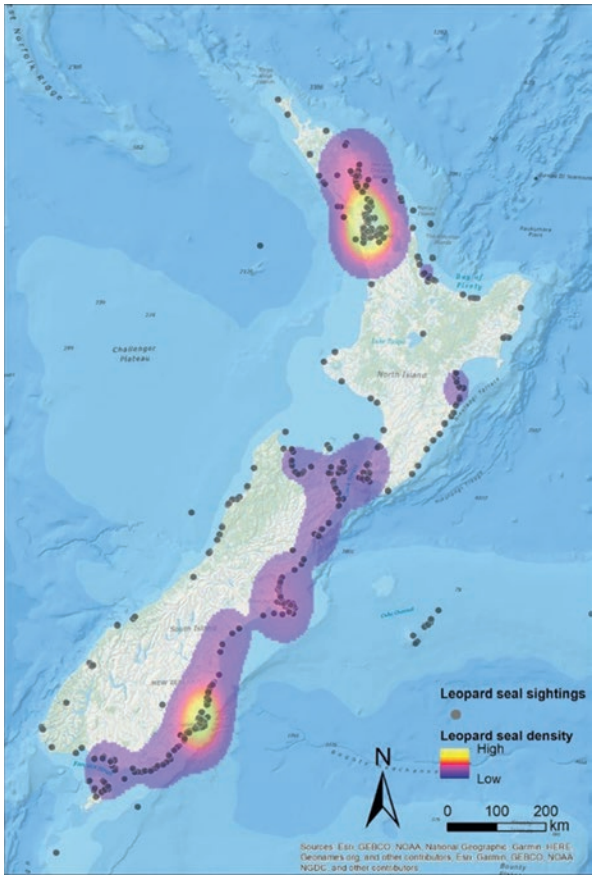

Figure 4. *Leopard seal distribution in New Zealand (from Hupman et al., 2020)*

Leopard seals in Antarctica are known to rely on sea-ice to give birth (Southwell *et al*., 2003; Jefferson *et al*., 2015; Rogers, 2018). However, there is a growing body of evidence that leopard seal births occur on other substrates, including *terra firma* (van der Linde *et al*., 2022a). This behavioural flexibility is perhaps one of the factors that has allowed leopard seals to expand their occupation into northern waters and, therefore, occupation of new habitats in regions outside of the Antarctic (van der Linde *et al*., 2022a).

Using NZ leopard seals as a case study, we illustrate that they occupy a diverse range of habitats. These include natural environments such as open ocean; waterways (estuarine, freshwater and saltwater); and mangroves/mudflats, including hauling out on beaches (Figure 5). In addition, man-made facilities at marinas have been occupied, including the use of boat ramps, roads and pontoons as haul-out platforms (Figure 6). Such habitat selection has not been by accident, as there is evidence that certain individuals have purposefully chosen these habitats, with some remaining for extended periods in these environments (LeopardSeals.org, unpublished data). Considering these habitats are 'novel' choices for leopard seals in comparison to those occupied within their primary range, further research is required to understand the consequences of occupying such environments and if these should be considered out of habitat individuals or if these are more the norm for the species in this region.

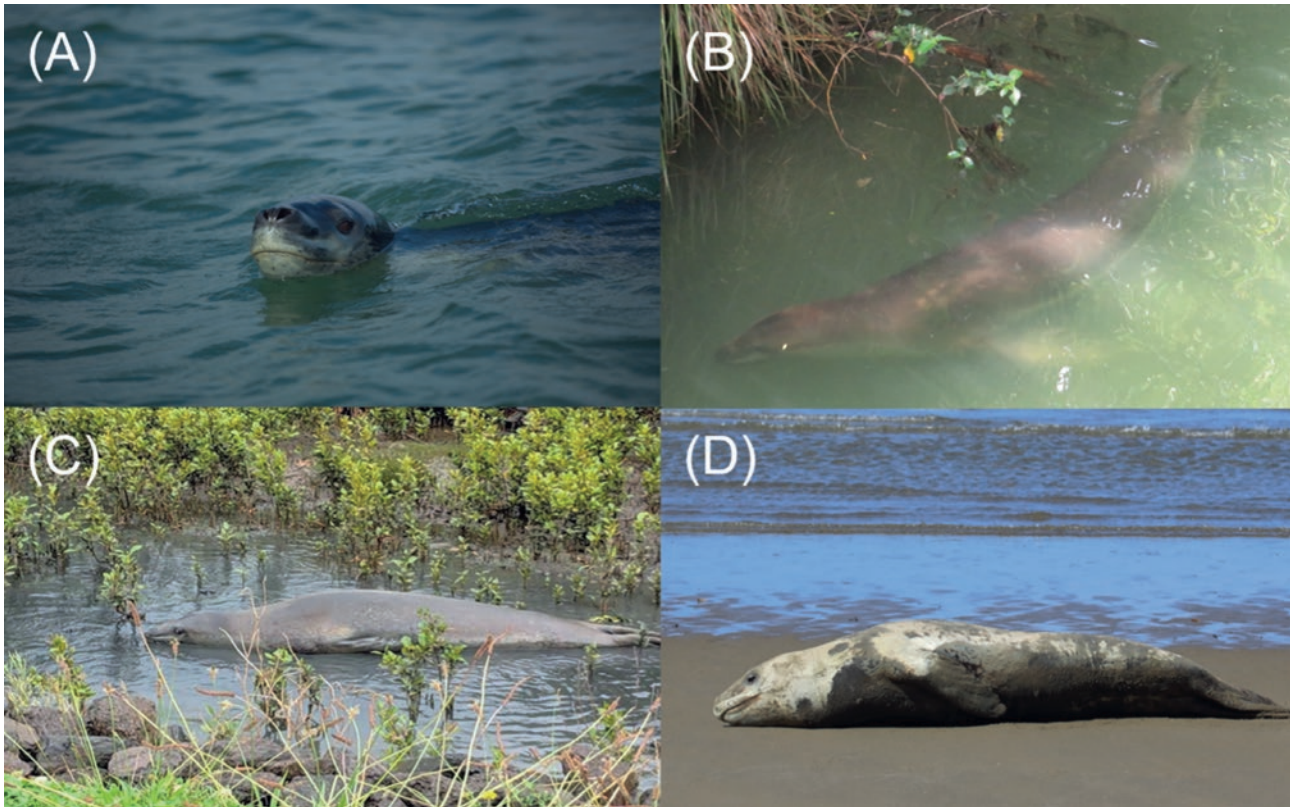

***Figure 5**. Leopard seal occupation of natural habitats in New Zealand (Photos: LeopardSeals.org)*

***Figure 6**. Leopard seal occupation of man-made habitats in New Zealand (Photos: LeopardSeals.org)*

One consequence of leopard seals occupying urban habitats is an increase in cohabitation conflicts (van der Linde *et al*., 2022b). Humans have created conflicts for leopard seals by providing misinformation about the species (and therefore negatively influencing public perception), making proposals or threats to disturb/harm, and causing inconvenience, tension, disputes, disturbance and harm to them. Leopard seals have created conflicts for humans by causing inconveniences, tension, damage to property and disturbance (van der Linde *et al*., 2022b).

Van der Linde *et al.* (2022b) suggested that the most sensible way to address these conflicts is to implement a combination of two different approaches: (1) short-term mitigation tools along with (2) long-term preventative strategies. Such a combination aids in reducing current problems while fostering the rapid development and implementation of innovative approaches to address future issues and eradicate conflicts (Distefano, 2005). Drawing on examples from the active management of pinnipeds in urban environments internationally, alongside the conflicts described between humans and leopard seals in NZ, van der Linde *et al.* (2022b) recommended the following strategies to reduce conflicts: (1) monitoring leopard seals; (2) improved education and advocacy; (3) establishment of designated safe areas for leopard seals; (4) research into and provision of effective enrichment; (5) expanded research on leopard seal occupation in NZ waters and the threats/conflicts they face; (6) establishment of a formalized stakeholder group; (7) improved legislation and definitions; and (8) effective application of the legislation for non-compliance. Below in Table 1 we outline the status of each of these strategies, based on what actions have been completed to date and those that are still required.

Table 1. *Strategies to reduce conflicts that are occurring between humans and leopard seals in New Zealand (as stated in van der Linde et al., 2022b), including the actions taken to date and those that are still required.*

Strategy	Actions completed to date (Organisation who completed actions)	Actions required
Monitoring leopard seals	Attendance of call outs in public places, behavioural monitoring of injured animals (LeopardSeals.org)	Increased monitoring
Improved education and advocacy	Creation of website, social media channels, information pamphlets and public talks to increase public knowledge about their distribution, non-aggressive behaviour and how to manage an encounter (LeopardSeals.org) Page on website (Department of Conservation-DOC)	Increased education and advocacy
Establishment of designated safe areas for leopard seals	None	Creation of dedicated areas where there is no foot access and barriers for their protection
Research into and provision of effective enrichment	Research into effective enrichment for leopard seals damaging property (LeopardSeals.org)	Provision of enrichment
Expanded research on leopard seal occupation in NZ waters and the threats/conflicts they face	Research has been conducted on leopard seal body condition, conflicts, diet, distribution, individual identification, movement, reproduction and threat status (LeopardSeals.org)	Further research

Strategy	Actions completed to date (Organisation who completed actions)	Actions required
Establishment of a formalised stakeholder group	A management plan has been formulated (LeopardSeals.org)	Establishment of a formalised stakeholder group and implementation of the management plan
Improved legislation and definitions	None	Improve definitions of what constitutes harassment and disturbance
Effective application of the legislation for non-compliance	Limited (DOC)	Increased investigations for instances of harassment, disturbance and harm

Conclusions

Defining what habitats are occupied by leopard seals throughout their range will enable better assessment of what is considered 'normal' or 'out of habitat' for this species. Leopard seals were formally classified as Vagrant species in NZ and there has been a continued perception that only juvenile individuals in poor body condition (Rounsevell and Pemberton, 1994) visit this region. However, Hupman *et al*. (2020) showed that this was not the case, and that leopard seals in NZ are predominantly adults in good health. Furthermore, it was shown that they have occupied NZ since the 1200s and that they have year-round Residency in this region, which eventually led to their threat status being changed (to Resident) in 2020. Therefore, while leopard seals in NZ were previously referred to as Vagrants and were considered outliers of the wider population, we could think of those animals venturing to NZ as pioneers, taking advantage of suitable habitats and prey and being important in terms of helping the species/population to colonise new 'habitat' in a rapidly changing world.

Identifying conflicts that occur, and management strategies to combat them (such as the above), will allow better management of leopard seals in areas where cohabitation occurs, such as in NZ. The implementation of such strategies to date has led to: better protection for leopard seals against disturbance, harassment and harm; increased awareness of leopard seals being a native species in NZ; increased understanding that leopard seals are not typically aggressive towards humans; increased understanding of their ecology; and a proactive plan forward to manage leopard seal and human cohabitation. Further implementation of the suggested strategies is still required, and should be completed with urgency, considering the health and safety issues faced by both humans and leopard seals in NZ.

CASE STUDY 4: TWO MINKE WHALES IN THE OLD PORT OF MONTREAL – Patrick Weldon, Robert Michaud, Janie Giard and Stephane Lair (GREMM- Research and Education Group on Marine Mammals)

On 8 May 2022, a juvenile minke whale (*Balaenoptera acutorostrata*) was observed in the Saint Lawrence River, swimming against the current, in a 160-metre-wide canal in the old port of Montreal, roughly 450km from its known distribution area, near Tadoussac (48.149026373321504,-69.65408046673775), in the Saguenay-Saint Lawrence Marine Park (Figure 7). This unusual sighting was especially impressive given the journey's challenges upstream through brackish and fresh waters, navigation through the busy Saint Lawrence Seaway, shallow passages (Lake St. Pierre, 11m average depth) and narrow corridors (less than 2km between shores). Along with the risks associated with prolonged exposure to freshwater habitats, whales present in these less than desirable environments are confronted with high concentrations of human activities (e.g. maritime traffic,

pleasure crafts, fishing activities, pollution) as well as potential accidental entrapment by human infrastructures (e.g. canals, locks, marinas).

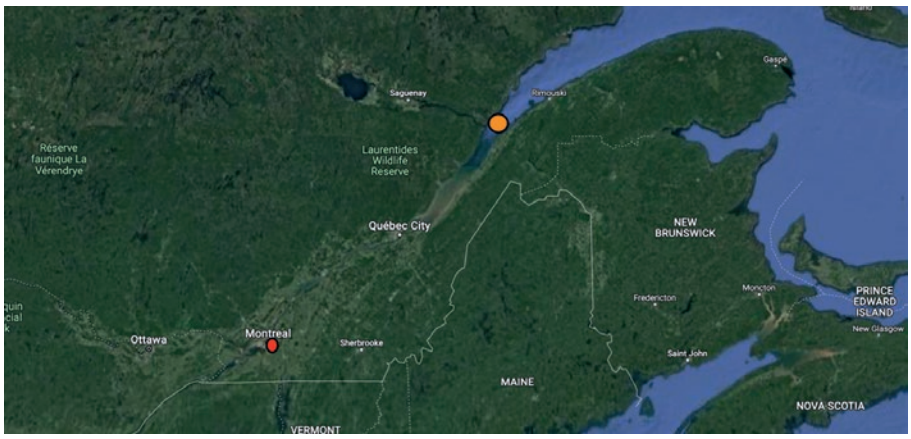

***Figure 7**. In red, position of minkes in Montreal, May 2022. In orange, limit of known distribution (Source: Google Maps 2023)*

Relying on the efforts of the QMMERN's (Quebec Marine Mammal Emergency Response Network) response teams and a trained volunteer network, a 12 hour/day vigil was held in rotating shifts to monitor the whale's behaviour, condition and movements. The first assessments, assisted with drone imagery, showed that the free moving whale appeared to be in good body condition and did not present any signs of direct human interaction (Figure 8). The 3.4m long animal (Ba#1) swam against the current in the same location for two days before disappearing overnight and reappearing on the opposite side of St. Helen Island, across from the old Port of Montreal, in close proximity to busy shipping lanes.

***Figure 8**. Ba#1, Chenal Le Moyne, Montreal, 8 May 2022 (Photo: Alain Belso)*

A few days later, on 11 May, the QMMERN hotline received a report from a tanker ship informing of the sighting of a second minke whale (Ba#2) swimming upstream towards Montreal about 20km downstream from Ba#1. On 12 May, the second whale arrived in the waters of the city and took up temporary residence in the same canal where the first individual was sighted on 8 May (Figure 9)[22]. Measurements of the whale, obtained with drone photogrammetry, confirmed that the second individual was also juvenile and photos revealed signs of scoliosis and mild emaciation (Figures 10 and 11).

22 https://www.cbc.ca/news/canada/montreal/seconod-minke-whale-montreal-1.6450036

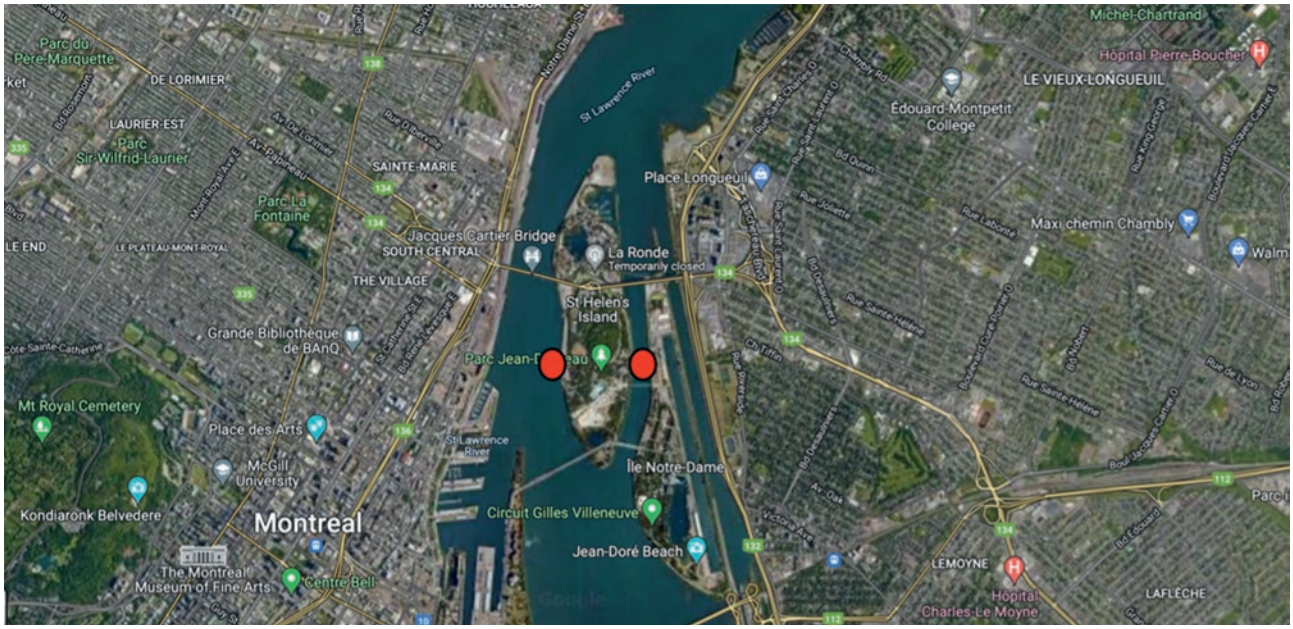

***Figure 9**. Positions of Ba#1 (west side of island) and Ba#2 (east side of island) in Montreal, May 2022 (Source: Google Maps 2023)*

***Figure 10**. Ba#2, Chenal Le Moyne, Montreal, 12 May 2022 (Photo: GREMM)*

Once we completed the evaluation, the intervention plan focused on monitoring and ensuring a safe space for the whales through notifications to navigators, on-the-water patrol and messages aimed at the general public. We also prepared a contingency plan in case of live or dead stranding.

The QMMERN's ethical framework recommends direct intervention, such as relocation through capture and/or by forcing or attracting an animal away from an area, only in the event of an animal trapped in human infrastructure, if the incident is the direct result of human interaction and/or if the animal belongs to an endangered population and its rescue is expected to have a positive impact on the population recovery. Otherwise, the QMMERN guidelines recommend we "let nature run its course".

A four-part plan was set in motion (Table 2).

Table 2. *Four-part plan for managing minke whales in Montreal.*

Intervention strategy	Objective of action	Actions completed
1 - Navigation management	Minimise the risk of collision with large vessels and recreational craft Reduce on-the-water harassment	Navigational warnings (updated twice a day) to inform federal and regional authorities of whales' movements Collaboration with federal fisheries officers to monitor and issue on-the-water warnings Press release urging citizens to observe whales from land and not on the water Contact with regional marinas to display "Whale in area" signs Transmission of close contact with the whales reported immediately to authorities and when possible, vessel in question
2 - Shoreline monitoring	Track the whales' condition and behaviours over time	12-hour vigil of whales (team of 24 volunteers on rotating shifts and QMMERN response team) Daily drone footage used to track whales, find if missing, document and report changes in condition Daily photo documentation sent to partners to ID whales, update on condition and receive veterinary consultations of health Use of *ZooMonitor* application to record behavioural data for veterinary analysis to inform response strategy
3 - Public perception, media relations and sensitisation strategy	Respond to questions, concerns and suggestions from the public and media	Published daily updates (Link here) FAQs page (Link here) Daily interviews with media Awareness through reception of calls on QMMERN hotline
4 - Contingency plan in the event of stranding or death	Preparedness for multiple possible outcomes	Search for potential necropsy site (highly populated area added increased difficulty) Contact with contractors willing to tow carcass to necropsy site Waste management strategy to ensure public health and safety Analysis of whale length and weight for potential laboratory necropsy

Figure 11. *Ba#2 in Montreal, 12 May 2022 (Photo: Justin Taus)*

On the morning of 15 May, after seven days of swimming on the spot, against the current (three days for Ba#2), both whales vanished from their previously known locations. The last reported sighting of Ba#1 was by a Coastguard commander on 14 May, who observed, just before its 'disappearance', a series of about 15 impressive jumps out of the water. On 27 May, a single minke carcass was found floating 20km downstream and was recovered and necropsied[23]. Although it was impossible to confirm the identity of the animal, the shape of its spine (scoliosis) suggested it might be Ba#2. The animal was towed and transported to the Faculty of Veterinary Medicine in Saint Hyacinthe for a necropsy (Figure 12). The post-mortem examination of the carcass revealed no obvious cause of death; no signs of a traumatic event were detected and the body condition did not indicate the animal died of starvation. The only significant finding was the presence of a cutaneous infection (*Saprolenia* sp) developed through prolonged exposure to freshwater. Pathologists hypothesised that this animal's death might be related to its prolonged exposure to the fluvial waters of the Saint Lawrence River.

Although it is still unclear why both whales found themselves in the same area at the same time, some hypotheses have been suggested; navigational errors, exploratory behaviours, following prey, inexperience or an increase in population. Preliminary reports from pathologists suggest Ba#2 was in good condition when arriving in Montreal. However, the deteriorating condition of the carcass did not allow for the detection of an underlying pathological condition that might have affected the whale's spatial orientation capacities. The outcome of Ba#1's journey upstream is still unknown.

23 https://montreal.ctvnews.ca/body-of-minke-whale-spotted-near-montreal-recovered-from-river-necropsy-performed-1.5922759

Figure 12. *Presumed carcass of Ba#2, Varennes, 27 May 2022 (Photo: Urgences Marine Environnement)*

These are not the first events of cetaceans finding themselves in the fluvial part of the Saint Lawrence River. In the early 2000s, a minke whale was observed in Contrecoeur, about 30km downstream from Montreal; in 2012 a beluga (*Delphinapterus leucas*) was monitored for five weeks in Montreal waters, and in 2020 a humpback whale (*Megaptera novaeangliae*) took up residence for over a week in the old port of Montreal[24].

Managing and responding to public interest and concern represented a substantial part of the response strategy for this incident. Prior knowledge of the area and of mitigation strategies were facilitated by the fact that a very similar incident occurred (the humpback in 2020) in the same area no less than two years before the Montreal minkes. Protocols and response strategies were thus readily accessible to responders. See Table 3 for details of response groups involved and their roles.

24 http://www.cwhc-rcsf.ca/docs/technical_reports/Rapport%20Mn%20Mtl%20final.pdf?v=20210127

***Table 3**. Response groups and their roles in responding to the minke whales in Montreal.*

Response groups	Roles
QMMERN coordination centre	Coordination of intervention and media relations
QMMERN volunteers	Vigil and public education/outreach
QMMERN mobile response teams	Documentation and vigil
Department of Fisheries and Oceans (Conservation and Protection)	On-the-water patrol and search
Department of Fisheries and Oceans (Management)	Coordination support
CQSAS (centre Québécois sur la santé des animaux sauvages)	Veterinary consultations, necropsy
Montreal Biodome- Espace pour la vie	Volunteer support for vigil, use of HQ facilities
Urgences Marines	Towing and transport of whale carcass
Mériscope	Access to Photo ID catalogue for identification of whales

CASE STUDY 5: MARINE MAMMALS IN THE RIVER SEINE, FRANCE – Lamya Essemlali (Sea Shepherd France)

Essemlali (the President of Sea Shepherd France) reported on two recent cases from France. The first case involved an orca (*Orcinus orca*) that was spotted in the River Seine on 16 May 2022, seemingly in poor health[25]. No action was taken to prevent the animal from moving upstream and it travelled 110km inland. A decision to intervene was finally taken by the Director of the Seine-Maritime Prefecture. Orca sounds were played to the animal on 28 May, with the idea of luring it back to the sea but this was unsuccessful and the orca did not respond. (It was noted that no one knew from which population the orca came and that different populations have differing dialects.) Some monitoring was undertaken using a drone as there were concerns that approaching it by boat could cause additional stress. The authorities decided that euthanasia was the best course of action. Sea Shepherd France insisted that a confirmed diagnosis from a veterinarian was mandatory before proceeding to euthanasia. However, in the end, euthanasia was not necessary as the orca was found dead on 30 May (Figure 13).

***Figure 13**. Dead orca in the River Seine (Photo: Sea Shepherd France)*

25 https://www.reuters.com/business/environment/killer-whale-lost-frances-seine-river-is-poor-health-2022-05-25/

The second case involved a male beluga, which was spotted in the River Seine on 2 August 2022 (Figure 14). On the same day, the Prefecture of l'Eure contacted Sea Shepherd, inviting them to take part in the working group dealing with the situation. The next day, Sea Shepherd France put together a team of boat drivers, a cetologist and a marine biologist. They found the beluga and drove slowly behind him until he reached a lock at St Pierre-La-Garenne. He entered the lock, a small boat went in with him and instructions were given to close the lock.

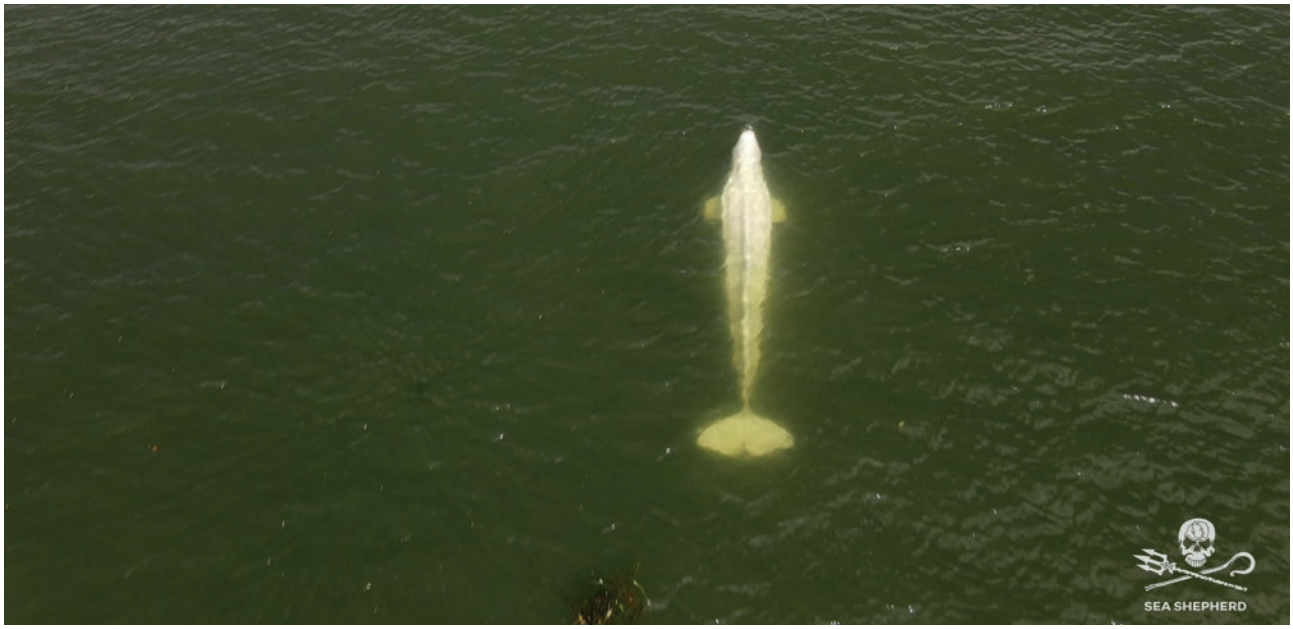

***Figure 14**. Beluga in the River Seine (Photo: Sea Shepherd France)*

For four days, 24 hours a day, a team monitored his behaviour and breathing. All his breaths were counted and he was monitored for signs of stress. He was filmed and the video and descriptions of the observations were sent to Robert Michaud, a beluga expert based in Quebec. The opinion of a beluga specialist was sought because there is no knowledge in France about this species which was clearly outside of its normal range and habitat and because some people in the working group set up by the government were already mentioning euthanasia as the only solution. The beluga, although very skinny, seemed alert, swam normally and showed signs of curiosity towards his environment. He rubbed his back on the wall of the lock to get rid of algae that had started to appear on his skin. Some people in the group were concerned about this skin condition, but, after rubbing himself, his white skin colour was restored. Robert Michaud took part in the next meeting with the working group and the French government officials. He said that even if the beluga was very thin, from what he could see in the videos and the description of his behaviour, it would be premature to take the decision to euthanise the animal.

Unfortunately, attempts to feed the beluga failed. There was no sign of virus or parasitic infection. The decision was taken to try to return him to the sea, although the ideal solution in the view of Sea Shepherd would have been to put him in a sea pen under veterinary observation to determine his health status and if he was suffering from something curable or not.

Unfortunately, France is not prepared and does not have the necessary equipment to transport an animal like a beluga in the best conditions, especially under time pressures as in this case. The team from Marineland of Antibes came to help and monitor the transport phase (Figures 15 and 16). Additionally, the lock in Ouistreham (Normandy) where the beluga was going to be monitored, was only available for three days. After that, no matter what, the beluga would be released into the sea (the lock had direct access to the sea). Unfortunately, the beluga did not survive the trip. During transport in the truck (a 3-hour drive), he showed trouble breathing and foam appeared around his blowhole. The decision was taken by the veterinarians to euthanise him before he reached the lock of Ouistreham.

Sea Shepherd France tried to help the beluga the best they could in a difficult situation. No one in this area, including the French government, was ready to deal with this kind of situation. Many things could have been done better to maximise the beluga's chances of survival. This case can serve to help France learn how to be better prepared for dealing with marine mammals in distress. Essemlali added that many lessons can be learnt from what happened and that Sea Shepherd France is willing to work with the French authorities and national and international experts on live marine mammals to put together a network and a process that will be effective and proactive. This is necessary in a country like France which has 3,000 kilometres of coastline. This is a challenge for the coming months and years.

***Figure 15**. Beluga being removed from the lock at St Pierre-La-Garenne (Photo: Sea Shepherd France)*

***Figure 16**. Beluga during transportation (Photo: Sea Shepherd France)*

UPDATE ON STRAIT OF GIBRALTAR ORCAS – Ruth Esteban (Madeira Whale Museum)

Esteban gave an update on the unusual behaviour of the Strait of Gibraltar orcas which she also reported on at the 2021 workshop (see Anon, 2021 and Esteban *et al*., 2022). Since 2020 orcas have been interacting with sailing boats along the Iberian Peninsula. Often the boats can continue their trip; however, sometimes there is damage to the boats, mainly the rudders, and the maritime authorities need to intervene. There is still no explanation for how this behaviour started, or what is motivating the animals to behave in such a particular way. A group of experts was created whose main objective is to respond to this unprecedented situation, evolving and adapting the best strategies to follow, as the animals and sailors change their tactics. The international experts, other stakeholders and the relevant authorities are in constant contact with one another, trying to maintain a broad perspective of the situation and find the best advice possible. It has been crucial from the beginning to establish clear communication with the relevant authorities.

Communication with the media has been challenging from the beginning, as the situation gained a lot of attention, and sensationalist headlines were published. Friendship-Orcas is a communication and outreach project that is underway, as the general public's perception of this endangered subpopulation has been severely affected[26].

Additionally, a survey to study possible mitigation solutions has been financed by the Government of Spain but, unfortunately, adverse weather conditions and the fact that the animals have moved around a lot have meant that it has yet to be implemented.

Information regarding the orcas continues to be provided via the website https://www.orcaiberica.org/

UPDATE ON SOLITARY-SOCIABLE DOLPHINS – Laetitia Nunny (OceanCare)

Solitary-sociable dolphins are not necessarily out of habitat but lessons can be learned from them and applied to out of habitat animals. Nunny presented an update regarding the small number of dolphins that live mainly apart from their own kind and may come to associate with people. Whereas a dolphin that lives away from other dolphins is simply a solitary dolphin, the individuals that then interact with humans to some degree or another have come to be called 'solitary-sociable dolphins'. It is difficult to come up with one definition of what constitutes a solitary-sociable dolphin, as they are all unique individuals exhibiting different behaviours but, generalising a little, it can be said that they have limited or no contact with other dolphins and regularly closely approach humans, often engaging in touch, social, sexual and play behaviours with people.

In the last 14 years, 50 solitary dolphins have been reported, with the vast majority (33) being bottlenose dolphins (*Tursiops truncatus*/*Tursiops aduncus*) and many of them exhibiting solitary-sociable behaviour. For information regarding the various stages of sociability that these animals may pass through, see Nunny and Simmonds (2019). Nunny gave some examples of current solitary-sociable bottlenose dolphins including Confi (also known as Manoliño), who lives in Galicia, Spain, and was recently injured when someone shot him with a harpoon from a spear gun[27]. Nunny pointed to the report from the previous Out of Habitat Marine Mammals Workshop (Anon, 2021), Wilke *et al*. (2005) and Nunny and Simmonds (2019) for information on how to best manage solitary-sociable dolphins.

The efforts that have been made to manage solitary-sociable dolphins, including those used to outreach to the public, may help to inform the management of out of habitat animals. In some instances, the solitary-sociable dolphins themselves may be outside of their usual habitats and range too. Examples of good practice might include the appointment of teams to watch over the individual, as happened in the case of Dave, a dolphin in

26 https://fundacionbancosantander.com/en/environment-and-research/recovery-of-natural-spaces/friendship-orcas-
27 https://www.20minutos.es/noticia/5077457/0/el-delfin-manolino-consigue-librarse-del-arpon-por-si-mismo/

Kent, United Kingdom, and the use of posters to ensure that the public is informed about the risk of getting into the water with these animals.

CASE STUDY 6: HVALDIMIR THE DISPLACED 'RUSSIAN SPY' BELUGA IN NORWAY – Rich German and Courtney Vail (OneWhale.org)

German and Vail reported on Hvaldimir, a male beluga whale who appeared in Hammerfest, Norway, in April 2019 wearing a harness. The harness had a buckle which said: 'Equipment St. Petersburg'. Based on his behaviour, it was clear he was a trained whale who was habituated to humans. He is believed to have been born around 2010 and he may have spent up to eight years in a Russian military programme. It is unknown whether he was purposefully released or if he escaped.

Hvaldimir spent close to four months in Hammerfest before heading south. Initial intervenors included several marine mammal trainers who conducted supplemental feeding of Hvaldimir and ultimately concluded, through short-term research, that Hvaldimir was feeding on his own. Hammerfest posted signs instructing the public not to touch or swim with Hvaldimir, approach him by boat, or throw objects in the water.

He has been living without conspecifics in the fjords of Norway since his departure from Hammerfest. While he is able to feed himself, his attachment to humans and boats has not waned. Unlike other military beluga whales who escaped or became wayward animals (e.g., Aydin[28]), Hvaldimir has not been retrieved by his original captors.

While Hvaldimir may appear to be a free whale, he is not fully independent. He is a trained whale reliant upon humans for social interaction and he is conditioned to exhibit certain behaviours, such as wrapping rope around boat propellers. He responded to hand signals when he first arrived in the Hammerfest region, and his daily range is restricted by his consistent propensity to follow boats between salmon farm operations.

OneWhale's team of experts feels his life is in serious jeopardy. He is the target of a large amount of unregulated tourism, which puts him—and potentially people—in danger. Up to 300 people have been seen in his presence during summer days (see Figure 17). He has been injured by boat propellers, sharp objects and fishing hooks multiple times. Based on his size and propensity to seek interaction with humans, Hvaldimir does pose a potential risk to the public.

***Figure 17**. Hvaldimir surrounded by tourists (Photo: OneWhale)*

28 https://apnews.com/article/15f1a2e51a0ba44966d02302c937bc69

Also, he spends most of his time at salmon farms, where he opportunistically feeds and sometimes disrupts operations. He spends 16+ hours a day under the catamaran of the farm he visits and often is a nuisance to the workers, which poses a major problem for them. There are concerns that the authorities might decide to euthanise him like they did Freya the walrus in August 2022 (see Case Study 1).

OneWhale was formed to help protect Hvaldimir. "Team Hvaldimir" was created in the summer of 2021 as a public safety programme. The team on the ground works daily with the salmon farms and the public, providing educational information on Hvaldimir's situation. OneWhale began assembling a team of advisors and experts, including marine mammal veterinarians, in June 2021.

In March 2021, OneWhale organised a veterinary team to travel to Norway to conduct Hvaldimir's first official health assessment after he had suffered from a serious gum infection documented by onsite Team Hvaldimir members. The administration of antibiotics was considered. His teeth are now extremely worn from foreign objects placed in his mouth by tourists and the exploration of his environment (Figures 18 and 19). Hvaldimir has also been documented repeatedly striking or biting the metal hulls of boats with his mouth[29].

***Figure 18**. Hvaldimir playing with ropes (Photo: OneWhale)*

29 https://www.youtube.com/shorts/gNwQfqM_bwQ and https://www.youtube.com/watch?v=KqIgx3vad7o

***Figure 19**. Hvaldimir playing with chains (Photo: OneWhale)*

At the time of the inspection, a fishhook and line that was embedded in Hvaldimir's tail fluke was removed, and his condition was determined to be improving. Hvaldimir's weight has fluctuated with the seasonality of the salmon farms and his travel predominantly southward along Norway's coastline. Hvaldimir's wounds from propeller strikes – one quite serious – were documented and monitored but healed on their own (Figure 20).

***Figure 20**. Hvaldimir injured by boat propeller (Photo: OneWhale)*

The OneWhale team has been integral in helping to protect Hvaldimir, but because he may live another 30-40 years, maintaining a watchful eye as he moves about the country, as well as a mobile outreach and education programme, the team does not consider it a long-term sustainable solution. It is likely that Hvaldimir is still alive today because of Team Hvaldimir's presence and interventions.

OneWhale marine mammal advisors and experts believe the best long-term solution is to create a marine reserve for him where he can experience relative freedom inside a large fjord. They are working with the town

of Hammerfest to create the Norwegian Whale Reserve which will serve as a temporary safe haven for him with the hope he can eventually be released into a wild habitat. The reserve will also be available to other formerly captive whales around the world and those that need short-term rehabilitation from injuries or illness.

Two leading Norwegian government agencies – the Directorate of Fisheries and Mattlilsynet – have come out publicly saying Hvaldimir is a 'wild whale', and he is 'just fine'. Both agencies have been invited to visit Hvaldimir and assess his situation on multiple occasions. As far as OneWhale knows, nobody from either organisation has ever come to evaluate Hvaldimir in person.

Hvaldimir's unique case has presented a variety of common challenges and possible solutions faced by out of habitat and/or solitary-sociable marine mammals:

- As a highly habituated, solitary and human-trained whale, the consideration of novel approaches in Hvaldimir's case is warranted. During a 2005 Society for Marine Mammalogy workshop exploring solutions for highly habituated solitary social odontocetes, marine mammal experts proposed the possibility of developing stewardship programmes or unique designated enrichment areas[30].
  - OneWhale has implemented engagement and enrichment strategies with Hvaldimir based upon marine mammal expert guidance to distract him from salmon farm operations when necessary for his protection and survival.

- Consideration of options for Hvaldimir's long-term protection, and based on his ongoing health assessments, have included:
  - removal to a commercial facility for rehabilitation (proposed by early intervenors when Hvaldimir was in Hammerfest in April 2019);
  - monitoring and visual observation to document his behaviour and travels;
  - active intervention to reduce conflict with salmon farm operations and the public;
  - engagement with regulatory authorities to identify possible solutions;
  - active intervention to address health concerns (i.e., mouth infection and embedded fishhook);
  - formal public outreach, education, and safety programme;
  - dedicated social media channel and updates on his condition and status; and
  - creation of a protected safe zone where he might be rehabilitated for return to wild beluga populations.

- Because of Hvaldimir's unique circumstances as a trained whale and visibility over social and other media, criticism about his care, stewardship and OneWhale interventions has resulted in judgments and opinions being offered from a distance by others.
  - These remote interventions from some members of the public have influenced media reports and the positions of government officials who have not conducted an onsite assessment of the whale. OneWhale believes the conflict resulting from these statements and actions threatens to undermine the frontline field volunteers and organizations who have dedicated the time to consistently show up, raise funds and assemble expertise to identify the best long-term solutions for Hvaldimir's welfare.

OTHER CASE STUDIES

Brian Sharp (IFAW) described some cases of minke whale rescues in the USA, highlighting the importance of post-release monitoring.

Ingrid Visser (Orca Research Trust) presented some case studies involving orcas in New Zealand.

30 https://www.researchgate.net/publication/299533601_Frohoff_TG_Vail_CS_and_Bossley_M_Eds_2005_Unpublished_Book_for_the_Workshop_on_Research_and_Management_of_Solitary_Sociable_Odontocetes_16th_Biennial_Conference_on_the_Biology_of_Marine_Mammals_San_Di?channel=doi&linkId=6021c19b92851c4ed55b7fc2&showFulltext=true

CONCLUSIONS: KEY 'TAKE HOME' MESSAGES

The workshop was limited by the time available for discussion. However, there were some strong general conclusions that came through the process:

Whilst cases considered here may appear isolated and exceptional, evidence from around the world shows this not to be the case. Not all such animals make it into the news, but what is clear is that they often present significant problems to those trying to manage these situations. In many cases, problems arise, not because of the animal, but due to the public's desire to be involved and, as such, authorities may be best placed to handle these situations by preparing for 'people management'.

It appears that these situations are increasing in number, or frequency, and this may be related to one or more of the following:

- climate change; for some species, where the animals may be moving away from their more usual territory to find prey or suitable habitat;
- population growth;
- prey depletion;
- hunting;
- habitat degradation;
- a reflection of increased awareness and/or the availability of information (e.g., through phone cameras); and
- the ability to share this information via social media platforms.

Whatever the reasons behind the apparent increase in out of habitat animals, greater efforts should be made to prepare for these situations and, as part of this, forming an international, interdisciplinary expert group that can swiftly provide advice to the relevant authorities and voluntary rescue sector seems highly appropriate.

People with knowledge of the local area need to consult with species-specific experts. Context is critical alongside species knowledge, so a wide range of experts should ideally be consulted, including, but not limited to, stranding experts, veterinarians, biologists, ecologists and animal welfare scientists. Personnel experienced in capture, handling and relocation may further be required in some circumstances. Robust, holistic welfare assessments, that include, but are not limited to, health evaluations, are essential.

The participants in the workshop also concluded that it would be appropriate for us and our colleagues around the world who are involved in these matters to better engage with governments/those in positions of influence to try to negotiate the best outcomes for the animal(s). Recognition of the existence of a formal coalition of experts may be helpful in this. International collaborations via appropriate intergovernmental organisations such as the International Whaling Commission (IWC) and the Convention on the Conservation of Migratory Species of Wild Animals (CMS) and its respective partners may be an appropriate means of acquiring real-time advice and fostering collaborations.

Framing out of habitat animals as unusual or rare events may not be in the animals' best interests. In normal circumstances we should anticipate that wild animals will redistribute themselves either individually or collectively, and we should be prepared for when this happens. We should seek opportunities to reframe this and ensure that the relevant authorities are aware of the need to address such animals as part of the spectrum of biodiversity. How to respond to marine mammals, not only those that are out of habitat, but also those which are at risk of severe weather events (e.g. seal pups) should be included in national climate change response/adaptation plans.

As well as how they are considered by those tasked with monitoring or managing them, thought also needs to be given to how out of habitat marine mammals are referred to in the media and educational material. The language used to refer to out of habitat animals should be more positive, perhaps, for example, using the term 'pioneer' rather than the term 'vagrant', as the latter could have negative connotations. Similarly, the term 'climate refugee' might encourage sympathy and respect towards the animal involved.

Out of habitat individuals are not necessarily an issue in themselves. They only become an issue when there is a negative interaction with humans. In some circumstances, the out of habitat animal's interaction with humans or human property could be seen as a case of Human-Wildlife Conflict (HWC) (e.g. Esteban *et al*., 2022) and, therefore, there may be benefits from consulting with experts in HWC, including the management of terrestrial wild animals (Nunny, 2020; Nunny *et al*., 2020) and considering the role that individual or social learning may play in mitigating these circumstances. Real or perceived conflicts need to be communicated with caution to mitigate risks of the animal being vilified.

Rewilding projects may also provide insights into how to manage situations where animals have been reintroduced into areas where they were absent for a period e.g. bison in southern England[31] and wolves in the United States[32].

There can be varying views on out of habitat animals, ranging from curiosity and tolerance to seeing them as a nuisance or even dangerous. Some governments, and more generally those stakeholders in positions of influence, may have a particular view that is not always in the best interests of the individual animal. For example, they may not view a single out of habitat individual as important from either a welfare or a conservation perspective. This may mean that those with an interest in protecting the animal come up against opposition and they need to be prepared for this. Similarly, there may be conflicts when decisions have to be made regarding an individual animal in a poor welfare state if it is considered important from a conservation perspective e.g. an endangered species.

Whilst out of habitat animals may be outliers of the wider population, they may also be important in terms of helping the species/population to colonise new habitat in a rapidly changing world where most contemporary environmental change is caused by human activity[33]. Given the recent agreement by the UN Convention on Biodiversity COP 15 to preserve biodiversity,[34] these individuals should be treated as part of the integrated network of their species and the potential they have to contribute to preserving both the genetic diversity of their species and transmitting knowledge on new habitats as climate change and other environmental pressures increase should be recognised.

Information needs to be readily available about out of habitat animals for policy makers/the relevant management authorities. We hope that the report of this workshop will help with this and we will seek to publicise it. The development of a peer-reviewed paper will be an important tool for sharing information with governments, other relevant policy makers and non-governmental organisations.

FURTHER POINTS

Out of habitat animals may be highly mobile and appear in the territories of more than one nation. This can present a challenge in terms of determining which country has responsibility for the animal. This deserves further consideration.

31 https://www.rewildingbritain.org.uk/explore-rewilding/reintroductions-key-species/rewilding-superstars/european-bison
32 https://www.nps.gov/articles/wolf-restoration-in-yellowstone-reintroduction-to-recovery.htm
33 See Lewis and Maslin (2015) for a discussion of the Anthropocene and how to define when it began.
34 https://www.unep.org/news-and-stories/story/cop15-ends-landmark-biodiversity-agreement

Implementing some form of individual identification for out of habitat animals may be valuable in some cases to enable tracking and determining whether multiple sightings are of one individual or several. If an animal is tagged, the welfare implications of this action need to be thoroughly considered (see Horning *et al*., 2019, for best practice recommendations for tagging pinnipeds and Andrews *et al*., 2019, for cetaceans).

The development of a decision tree and/or adaptive management framework for those faced with an out of habitat marine mammal would be helpful. It is important to document decision-making in detail, as well as the procedures employed and the reasoning for those undertaken, to assist managers in future situations.

Post-release monitoring is important if an out of habitat animal is translocated, or a stranded cetacean is refloated.

Human health and safety issues should always be considered, in parallel with the welfare of the out of habitat animal(s).

Mechanisms of people management, including public expectations (Stockin *et al*., 2022), need to be addressed to ensure best welfare and conservation outcomes for out of habitat animals. Tried and tested wording around situations such as euthanasia, where messaging has generally been successful and accepted by the public, could be shared to help others less familiar with such situations to replicate the text in a manner sympathetic to the animal and those involved in management. Allowing members of the public to understand the needs of the animal and the context of the scenario, perhaps also comparing with events they are more familiar with, can help with creating positive awareness and acceptance.

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ANNEX I: DEVELOPING A TOOLKIT

After the 2021 'Out of Habitat' Marine Mammals Workshop, attendees provided details of methods that have been used or could be used to intervene in out of habitat cases. This has been added to with details from more recent case studies. See Table 4.

***Table 4**: Interventions that have been used when a marine mammal is out of habitat. 'Outreach' is classified as a level of intervention. Instances where the animals were just monitored before subsequently departing the out of habitat zone when they were ready are not included.*

Type of intervention	Description	Further details / example	Published sources and links for further information.	Notes
Public Outreach and Educational Approaches	Signage	Deployment of signs with solitary dolphins in UK	https://marineconnection.org/wp-content/uploads/2020/06/2020-solitary-flyer-A5.pdf	
		Poster on northern side of Carlingford Lough to advise the public on how to behave around Finn the solitary dolphin		
		Signage in harbour at St Mary's, Isles of Scilly, regarding Wally the walrus and the importance of keeping a distance		
		Signs in Hammerfest instructing public how to behave around Hvaldimir the beluga		
	Website info	'Typical' behaviour for an urban leopard seal	https://www.leopardseals.org/owha-nz-leopard-seal/	This individual has been in the area for 6 years. See Anon (2021)
		Safety protocol for sailors in areas with Iberian orcas	https://www.orcaiberica.org/safety-protocol	
		Info in Italian, Spanish and French regarding Wally the grey whale	https://rivistanatura.com/risolto-il-mistero-della-balena-grigia-wally/#https%3A%2F%2Frivistanatura.com%2Fwp-content%2Fuploads%2F2021%2F04%2FGray-whale-alert-Italy-SCHEDA2_26.04.2021.jpg	
		News updates/press releases and advice issued about the walrus situation on the Isles of Scilly	https://bdmlr.org.uk/walrus-in-the-isles-of-scilly https://bdmlr.org.uk/walrus-moves-on-from-isles-of-scilly	Controlling the public and media narrative early was imperative to get key messaging and advice into the public domain as quickly as possible, which enabled the organisations involved to become by default the go-to source of updates and accurate information
	Social media	Seal Rescue Ireland used social media extensively with Wally the walrus	https://twitter.com/seal_rescue/status/1373353384204468226	
		Extensive educational information about leopard seals in NZ	https://www.facebook.com/LeopardsealsightingsNZ/	
		News stories/press releases issues and advice shared widely about Wally the walrus at the Isles of Scilly	https://www.facebook.com/150950398600504/posts/1428120074216857/ https://www.facebook.com/249604935134752/posts/4091250957636778/ https://www.facebook.com/249604935134752/posts/4063080950453779/ https://www.facebook.com/249604935134752/posts/4297940220301183/	Controlling the public and media narrative early was imperative to get key messaging and advice into the public domain as quickly as possible, which enabled the organisations involved to by default become the go-to source of updates and accurate information
		OneWhale.org has dedicated social media channels providing updates on Hvaldimir's condition and status	https://www.facebook.com/onewhaleorg https://www.instagram.com/onewhaleorg/ https://twitter.com/onewhaleorg	

Type of intervention	Description	Further details / example	Published sources and links for further information.	Notes
Dissemination of information including links to international initiatives	The IWC Strandings Initiative helps to disseminate information globally and responds to cetaceans in difficult circumstances		https://iwc.int/strandings-initiative	
	The Global Marine Animal Stranding Toolkit provides access to training materials of best practices in stranding response and investigation		https://www.gmast.org	
Cancelling / postponing of activities which could disturb animal(s)		Thames beluga (2018-2019) – survey work and fireworks display were stopped	https://www.theguardian.com/environment/2018/oct/19/benny-the-beluga-whale-forces-firework-display-postponement	
		Restriction of navigation for small sailing boats (killer whales, Spain)	https://www.mitma.gob.es/el-ministerio/sala-de-prensa/noticias/jue-01102020-0806	
		Fireworks display cancelled due to Southern right whale entering Wellington Harbour (New Zealand)	https://www.rnz.co.nz/news/national/361256/matariki-fireworks-postponed-due-to-whale-visit	
		Fireworks display cancelled due to presence of walrus in Scarborough, UK	https://news.sky.com/story/scarboroughs-new-year-fireworks-cancelled-to-protect-thor-the-walrus-12777768	
		Access to fuel dock restricted whilst leopard seal hauled out in NZ (use of 'danger' tape and high-viz cones at pedestrian and boat access points)	https://www.facebook.com/LeopardsealsightingsNZ/	
		Royal Navy ceased submarine testing due to presence of beaked whales in Clyde Lochs (esp Loch Goil)		
		Commercial fishing fleet asked to switch off onboard refrigeration (power generators) due to presence of juvenile minke whale in Fraserburgh Harbour		
		Atlantic white-sided dolphins in Stornoway Harbour, the Harbour Master restricted access to the harbour by boats whilst the dolphins were in the area	http://www.hebrides-news.com/dolphins-strand-in-stornoway-harbour-9821.html	
		Minke Whale in Fraserburgh Harbour. Although only in situ for 3 days, significant public interest and engagement. Harbour master and crews in major fishing port to cease activity and cut power/noise levels. Public to stop attempts to swim with/lead animal out Public Thank you event afterwards to acknowledge local efforts	http://www.crru.org.uk/rescue_strories_article.asp?id=14	

Type of intervention	Description	Further details / example	Published sources and links for further information.	Notes
Physical exclusion		Temporary barriers (buckets filled with water placed approximately 2m apart) put in place to prevent haul-out of leopard seal		Successful when used, but marina managers have stated that they 'can't be bothered' to fill and place buckets
		Pennant flags on a rope, tied to buckets filled with water, to stop leopard seal haul-out		Unsuccessful with potential risk of entanglement and inability of seals to surface if dragging buckets
		Boat owners advised to use obstructions along the sides of their vessels to prevent walrus in Scilly hauling out on them		Only a couple of boat owners attempted this, most others were either indifferent or claimed it was too much trouble for them or would be bad for their business
Scaring, deterring or distracting marine mammals	Pingers	Used with dolphins in Venice lagoon		
	Boat engines in reverse	Some reports of this deterring orcas in Straits of Gibraltar		
	Orca sounds	Used with Sacramento humpbacks	https://en.wikipedia.org/wiki/Delta_and_Dawn	Little to no evidence this worked
	Walrus vocalisations	Planned to be used with walrus in Scilly to deter it from hauling out on boats		Recordings of adult male and pup vocalisations sent, but not used in the end. Some discussion still needed over whether this would deter the walrus, make it react aggressively, or help it habituate further
	Polar bear scent and faeces	Planned to be used with walrus in Scilly to deter it from hauling out on boats		Objects used by polar bears in a zoo sent down, but not used in the end. No faeces allowed to be used due to potential of contaminating environment with non-native bacteria
	Poking with a pole	Used with walrus in Tenby to remove it from blocking lifeboat slipway		Risky for people having to get close to the walrus. Could cause more stress but did work sometimes
	Spraying water	Used with Sacramento humpbacks		
		Used with leopard seal in NZ		Could damage eyes
		Used with Wally the walrus in Tenby to remove it from blocking lifeboat slipway		Walrus habituated to it
	Air horns	Used with leopard seal in NZ		Ineffective. See Anon (2021) and case study 3
		Used with walrus in Tenby to remove it from blocking lifeboat slipway		The walrus habituated to it
	Underwater speakers	Suggestion to use noise sources to drive northern bottlenose whales (NBWs) had been sought but experts had thought it too risky without more data on sensitivity to volume and frequency		
	Moving or blocking with a vessel	Used with the walrus in Tenby to remove it from blocking lifeboat slipway and in Scilly to deter it from hauling on boats		The most effective method used in Tenby after the walrus habituated to other forms of deterrent used there as the lifeboat was much larger. Also worked in Scilly with a smaller boat, although it briefly had a stand off
	Enrichment	Engagement and enrichment strategies have been implemented with Hvaldimir to distract him salmon farm operations		
Acoustics used to attract animals	Humpback songs	Used with Sacramento humpbacks	https://en.wikipedia.org/wiki/Delta_and_Dawn	Little to no evidence this worked
	Sperm whale social sounds (codas)	Used to lure sperm whales out of Scapa Flow, Orkney, Scotland	Goold (1999)	Unsuccessful
	Orca calls	Used with lone orca juveniles, Pacific Northwest		
		Used with orca in the River Seine		No evidence this worked. See case study 5

Type of intervention	Description	Further details / example	Published sources and links for further information.	Notes
Translocation and handling		Springer the orca translocation in 2002	https://www.fisheries.noaa.gov/west-coast/endangered-species-conservation/orphan-killer-whale-a73-springer	
		Nepi the beluga 2017	https://gremm.org/en/le-beluga-de-la-riviere-nepisiguit-est-revu-bien-vivant/	
		Grey and common seals habituated to human contact via feeding (various)		Usually unsuccessful – animals often quickly returned to the same or other busy public areas even when moved to offshore islands. The problem is behavioural and requires management of people to stop interacting to give any chance of the animal rewilding. Signage, public messaging, proactive engagement with stakeholders all better options
		Fur seals (various)	https://archive.md/VPioQ	Some are effective translocations, in others the seal turns up again after a period of time
		Beluga in the River Seine		See case study 5
Approaches to driving marine mammals	Herding with kayaks including banging on fibreglass with paddles	Pod of 30 mature pilot whales in a bay on Sanday, Orkney, Scotland loitering in 2-3m of water. Herding with kayaks succeeded in moving whales away from shore. Larger boats were not used due to shallow depth and fear of pushing animals to strand	https://bdmlr.org.uk/pilot-whales-herded-to-safety	Once out of the bay 4 larger boats (motor launch, fish farm supply and RIB) were able to take over and herd pod out to full open water. Animals remained on surface and while did seek to evade are much easier to drive than NBWs
	Herding with boats whilst beating on metal bars	Attempted in New Zealand with orcas in a narrow bay		Failed and raised concerns about possible stranding and hearing loss in orca as deployed too close to animals, all orca departed by themselves. See Anon (2021)
		Use of motorboats to herd NBWs in Scotland but due to depth of water (80m in points) this seemed to vary in effectiveness. Banger poles were added, this was more effective, but most when hit with high tempo (scaffolding poles and hammer combination) still lost effectiveness in deeper water. NBWs appear to react to driving by diving and turning laterally (in either direction) and swimming rapidly so a long well-disciplined line covering the full surface may offer best chance of success		Limited success, while this works with other species, didn't appear to have the same effect on NBWs. In addition they appeared curious about the boats themselves unless a lot of revs/noise energy were used
	Herding with kayaks / small boats	In 2013, an adult common bottlenose dolphin in river Corno- attempts to drive it under a road bridge by banging on the side of a motorboat		Unsuccessful. The dolphin later disappeared and is believed to have found its own way out
		Kyle of Durness Mass Stranding. Previously stranded pilot whales (approx. 20) driven out of the Kyle by use of RIBs shepherding at the 5 and 7o'clock positions. Going at reasonable speed to avoid risk of animals turning onto remote beaches		At least 2 individuals videoed being assisted by pod-mates due to equilibrium issues following stranding
		Atlantic white-sided dolphins in Stornoway Harbour, several kayaks and a small RIB gently herded the dolphins out of the harbour		

Type of intervention	Description	Further details / example	Published sources and links for further information.	Notes
Approaches to driving marine mammals	Herding with kayaks / small boats	Used for driving two separated pilot whale pods that had spent over 24 hours in the shallows exhibiting signs of stress and increasing risk of stranding in Orkney. Then again a week later when one pod returned and came into a busy harbour		Worked well with having boats in a U or V formation behind the animals to shepherd them to more suitable areas further offshore away from land
		Used for driving a pilot whale pod post-stranding to deeper water in the Hebrides		Worked well with having boats in a U or V formation behind the animals to shepherd them to more suitable areas further offshore away from land
		Used to drive a lone harbour porpoise out of an intertidal river/ busy waterway		Worked well with having boats in a U or V formation behind the animal to the river mouth into the main estuary channel and left to go on its way
	Herding with small boats/kayaks while stranded animals held in refloatation pontoons alongside boats to lead the other animals	Used in the common dolphin mass stranding in Fal Bay	https://bdmlr.org.uk/wp-content/uploads/2020/04/resources-bdmlr-cwtmsn-report-may09.pdf	Very successful: the dolphins in the pontoons were communicating with the free-swimming animals, who began following them as they were slowly moved down the river alongside boats to safe open water habitat for release. Further vessels kept up a U-shaped formation behind them to keep the pod together
Engagement with stakeholders and authorities	Multi-organisation management plans	Used with Wally the walrus in Tenby and Scilly		Largely successful depending on opinions of those involved at the outset. Best attempted early in an incident to help the main rescue/conservation organisations involved to lead the narrative, otherwise it becomes difficult to control actions and messaging further down the line. Education and positive engagement and communication are key to getting partners on board to support what is best for the animal's welfare, paired with joint public communication to advise of the situation, key advice and action plans
		Used with minke whales in Montreal		See case study 4
	Engagement with regulatory authorities	To identify possible solutions for Hvaldimir there has been engagement with the Norwegian Directorate of Fisheries and Mattlilsynet		Invitations for these government agencies to visit Hvaldimir have been declined so far. See case study 6

ANNEX II: ATTENDEES

Animal Welfare Institute	Naomi Rose
British Divers Marine Life Rescue (BDMLR)	Dan Jarvis
British Divers Marine Life Rescue (BDMLR)	Molly Gray
Department of Conservation (New Zealand)	Hannah Hendriks
Groupe de recherche et d'éducation sur les mammifères marins (GREMM)	Patrick Weldon
Groupe de recherche et d'éducation sur les mammifères marins (GREMM)	Méduline Chailloux
IFAW	Brian Sharp
Leopardseals.org	Krista van der Linde
Madeira Whale Museum / Atlantic Orca Working Group	Ruth Esteban
Marine Animal Rescue Coalition (MARC) solitary dolphins working group	Lenni Sykes
Marine Connection	Liz Sandeman
Massey University	Rebecca Boys
Massey University	Karen Stockin
MITECO (Spanish Government)	Elvira García-Bellido
Morigenos- Slovenian Marine Mammal Society and Sea Mammal Research Unit, University of St Andrews	Tilen Genov
NOAH – for animal rights	Siri Martinsen
NOAH – for animal rights	Maria Lien
OceanCare	Chérine Baumgartner
OceanCare	Nadia Deckert
OceanCare	Laetitia Nunny
OceanCare	Mark P. Simmonds
Onewhale.org	Rich German
Onewhale.org	Courtney Vail
Orca Research Trust	Ingrid Visser
RSPCA	Adam Grogan
Sea Change Health	Claire Simeone
Sea Shepherd France	Lamya Essemlali
University of Canterbury	Katharina Peters
Whale and Dolphin Conservation (WDC)	Philippa Brakes
Whale and Dolphin Conservation (WDC)	Pine Eisfeld-Pierantonio
	James Barnett
	Mike Bossley

ANNEX III: AGENDA 'OUT OF HABITAT' WORKSHOP

Session 1- Tuesday 6th Dec 2022 (12:00-15:00 Pacific Time, 20:00-23:00 GMT, 21:00–00:00 CET)/Wednesday 7th Dec 2022 (09:00–12:00 NZDT) Check your time zone here: https://dateful.com/eventlink/7946415480

1. Introduction	Setting the scene – the need for new international collaborative action	Mark Simmonds (OceanCare)
2. Case Studies	2.1 Freya the walrus	Siri Martinsen and Maria Lien (NOAH)
	2.2 New Zealand leopard seals	Krista van der Linde and Ingrid Visser (leopardseals.org)
	2.3 Minke whale rescues	Brian Sharp (IFAW)
	2.4 Minke whales in Montreal	Janie Giard and Robert Michaud (GREMM)
	BREAK – 15 MINUTES	
	2.5 Marine mammals in the River Seine	Lamya Essemlali (Sea Shepherd France)
	2.6 Any other case studies – Orcas in New Zealand	Ingrid Visser (Orca Research Trust)
3. Shared lessons from other difficult interactions	3.1 Update on solitary-sociable dolphins	Laetitia Nunny (OceanCare)
	3.2 Update on Strait of Gibraltar orcas	Ruth Esteban (Madeira Whale Museum)
	3.3 Lessons learned- discussion	

Session 2- Wed 7th Dec 2022 (12:00-15:00 Pacific Time, 20:00-23:00 GMT, 21:00–00:00 CET)/ Thurs 8th Dec 2022 (09:00–12:00 NZDT) Check your time zone here: https://dateful.com/eventlink/3208503094

4. Reflection on previous day		Mark Simmonds (OceanCare)
5. Causes of 'out of habitat' behaviour		
6. Further development of network and tools to address problems	6.1 Post-release monitoring of stranded cetaceans	Brian Sharp (IFAW)
	6.2 New interventions	
	BREAK – 15 MINUTES	
7. Education and communication		
8. Liaison with relevant national and international bodies		
9. Development of a peer-reviewed paper		
10. Conclusions and recommendations		