Chapter 11
Cetaceans in Captivity

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Abstract Several species (and over 3000 individuals) of small cetacean are held in captivity around the world, primarily for public display and entertainment. Scientific evidence strongly supports concerns about individual animals' welfare, including mental and physical health. Conditions in captivity cannot meet an individual's biological needs, and restricted space, a limited social environment, artificial surroundings and behavioural restrictions all contribute to stress and early mortality. Wild cetacean populations in some countries are targeted by live captures to supply the public display industry, presenting a risk to conservation as well as welfare. Public opinion is shifting on cetacean captivity and may signal a change in the way cetaceans are held in captivity in the future.

11.1 Introduction

The capture and confinement of cetaceans presents a challenge to marine mammal welfare. The most commonly held cetaceans in captivity are belugas (*Delphinapterus leucas*), bottlenose dolphins (*Tursiops truncatus* or *Tursiops aduncus*) and orcas or killer whales (*Orcinus orca*). Other species, including finless porpoises (*Neophocaena phocaenoides*), harbour porpoises (*Phocoena phocoena*), Indo-Pacific humpbacked dolphins (*Sousa chinensis*), Irrawaddy dolphins (*Orcaella brevirostris*), Pacific white-sided dolphins (*Lagenorhynchus obliquidens*), Risso's dolphins (*Grampus griseus*) and short-finned pilot whales (*Globicephala macrorhynchus*), are among those species which are also held in captivity (Couquiaud 2005; Ceta-Base 2016a).

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While a few of these small cetacean species are held for research or even military purposes, the vast majority are held for public display and entertainment in stand-alone commercial facilities ('dolphinaria') or as exhibits in zoos or aquaria (Reeves and Fisher 2005). The majority of such facilities use the cetaceans in circus-style shows featuring tricks that bear little resemblance to the types of behaviour seen in wild cetaceans or which present a trained or choreographed version of 'wild-type' behaviours. An increasing number of facilities also offer interaction programmes where members of the public feed, touch or enter the cetacean enclosure to wade or swim with the individuals held (Whale and Dolphin Conservation 2015).

At least 3000 individual cetaceans are held in more than 50 countries around the world and in well over 300 facilities (Ceta-Base 2016a). In most countries where cetaceans are held, there is no official reporting system, and so the exact numbers of captive animals are hard to determine (Whale and Dolphin Conservation 2015; Whale and Dolphin Conservation Society 2009).

Welfare science is a growing field, and it is only recently that the first steps have been taken to quantify and systematically measure welfare among captive cetaceans (Clegg et al. 2015). Nevertheless, scientific evidence strongly supports a number of concerns relating to mental and physical health among captive cetaceans, all of which can have potentially negative impacts on an individual's welfare or wellbeing and, ultimately, on the animal's health and mortality (Rose 2014; Waples and Gales 2002; Maas 2000; Small and DeMaster 1995a). Ill health is difficult to diagnose in captive cetaceans (Rose et al. 2009) as clinical signs are often very subtle or are masked. It is not uncommon for dolphinarium staff to find an individual who is initially lacking in appetite, dying one or two days later and before any cause can be determined or treatment administered (Blake 2012). Furthermore, the lack of collated available data on captive cetaceans, and of their physiological, behavioural, survival and reproductive data (Whale and Dolphin Conservation 2015), currently makes effective welfare assessment problematic.

The primary threat to a cetacean's welfare in captivity is the zoo or aquarium's inability to provide a species-specific environment that meets an individual animal's biological needs (Whale and Dolphin Conservation 2015). Restricted space, a limited social environment, artificial surroundings and behavioural restrictions all contribute risk factors for stress, may contribute to abnormal behavioural changes, affect the health of the animals, necessitate the use of tranquilisers and result in early mortality in some animals (Maas 2000; Noda et al. 2007; Knight 2013).

11.2 Restrictive Space

In the wild, cetaceans are almost always in motion, even when resting. Many travel great distances every day, in search of food and for other activities. This is natural behaviour, for which they have adapted physically and behaviourally. Captive facilities provide only a fraction of the space across which a cetacean would travel in the wild (Tyack 2009). Bottlenose dolphins can travel tens of kilometres a day

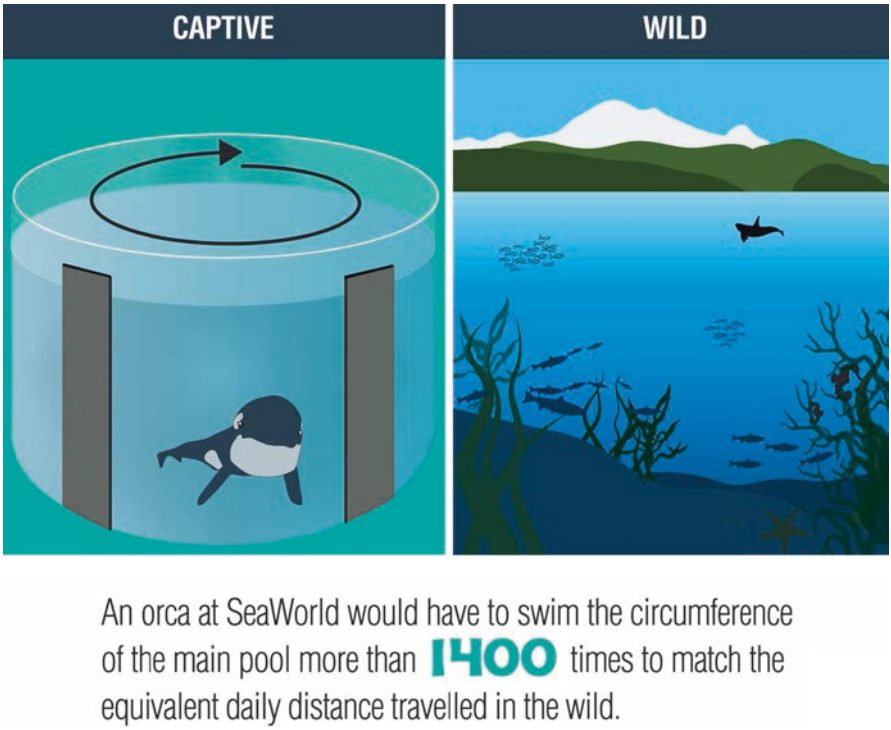

Fig. 11.1 The equivalent daily distance travelled in the wild by an orca cannot be achieved in a captive facility. *Image credit*: Kimberley Palfi for Whale and Dolphin Conservation

(Mate et al. 1995) with home ranges often exceeding 100 km^2 (Sprogis et al. 2015). A wild orca pod can cover over 160 linear kilometres a day, foraging and socialising (Baird 2000).

Even in the largest facilities, such as those at SeaWorld parks in the United States, a captive orca, for example, would need to swim around the perimeter of its tank 1400 times each day to cover the distance of its wild counterpart (Fig. 11.1). Pool depth is also severely restricted, as is the ability to swim at high speed. A common feature of captive orca 'society' (the social arrangements of a group kept in captivity) is the presence of dominant, often aggressive, hierarchies (Hargrove 2015). Restrictive enclosures offer no opportunities for subordinate whales to escape any given situation in order to diffuse an altercation. Similar threats are also known to exist for bottlenose dolphins and belugas in captivity (Waples and Gales 2002; Evans 2015).

Space may be further limited in captivity by the introduction of visitors to the cetacean's environment in 'swimming with dolphins' and other interaction programmes. Close contact between cetacean and human individuals in these programmes has potential to lead to the transmission of disease (Couquiaud 2005; Geraci and Ridgway 1991; Waltzek et al. 2012; Buck and Schroeder 1990; Hunt et al. 2008).

11.3 Limited Social Environment

Cetaceans are highly social, forming wide-ranging communities and societies built on complex structures and with individual interdependence formed from strong social bonds (King and Janik 2015; Krasnova et al. 2014; Blasi and Boitani 2014; Cantor and Whitehead 2013; Whitehead 2011).

In captivity, the social environment is severely limited. Individuals sharing a pool are often unrelated, may have been collected from widely different locations or may even be from different species or subspecies (Rose et al. 2009), and these mixtures of animals may not, therefore, share a common dialect. This may hinder their ability to exchange information and, as a result, limit social bonding, as individuals may not recognise the sounds or signals made by one another (Fig. 11.2).

Waples and Gales (2002) noted that psychological stressors in captive dolphins can be linked to social interactions between individuals, and this can result in aggression, injury, illness and impacts on the ability to rear calves and even result in death, where, in a limited physical environment, social pressures can escalate and social encounters intensify with limited opportunity to escape. These authors recommend that group structure in captivity should resemble that found in the wild. But captivity cannot provide the fluidity of group composition experienced by wild cetacean populations or provide the space to allow cetaceans to disperse from one another during conflict, avoidance mechanisms which are probably essential to reduce stress and violent encounters (Frohoff and Packard 1995).

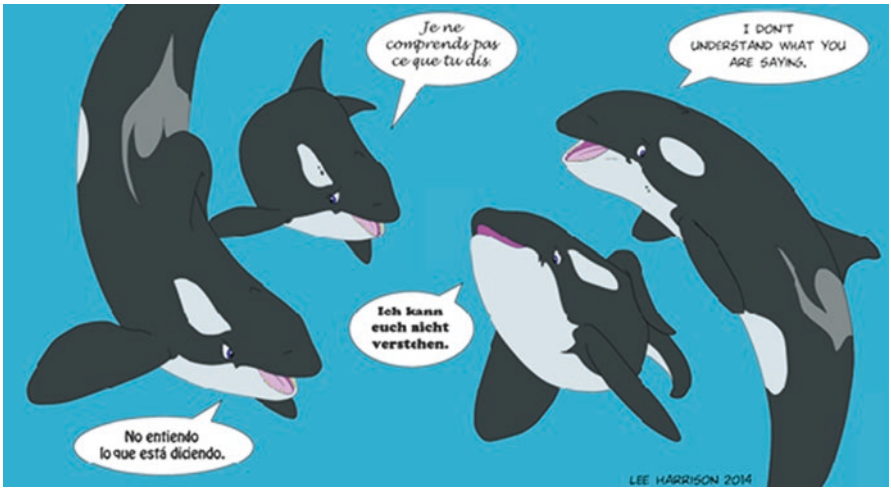

Fig. 11.2 Individuals sharing a pool are often unrelated, perhaps hindering their ability to exchange information with one another. *Image credit*: Lee Harrison

Research has shown that orca societies have developed strong bonds between group members with individuals rarely spending more than a few hours apart from one another (Bigg et al. 1990). In this respect, they may be more highly bonded than humans. Orcas, like other dolphin species, can recognise themselves in a mirror (Delfour and Marten 2001), a trait that researchers attribute with being self-aware. This indicates that these animals probably have complex knowledge of themselves and their environment and so are likely to have thoughts about themselves and the world around them (Reiss and Marino 2001; Butterworth et al. 2013). Cetaceans are also considered to possess unique 'dialects' and have evolved a rich culture which is passed down through generations (Ford 1989).

The historic reputation of orcas as ruthless killers (Hoyt 1990) has given way to a greater appreciation of a creature that scientists now believe may be second only to humans in terms of behavioural, linguistic and ecological diversity and complexity (Rose 2014). Life in a small tank removes huge portions of the animals' capacity to make decisions, to judge situations focussed on feeding, social interaction or mobility, and profoundly limits 'choice' for these complex, sentient beings. They are denied key life strategies such as the ability to hunt, to explore and to migrate.

11.4 Aggression

A striking feature of orca society is the virtual absence of overt aggression within and between pods and ecotypes and also existence of a culture of cooperation and team work that prevails among groups of animals (Spong and Symonds 2000). The only recorded incident of a wild orca attacking a human occurred in 1972 when a Californian surfer, possibly mistaken for a seal, was bitten by an orca before being rapidly released (Lodi News-Sentinel 1996). The last 50 years have generated a long catalogue of aggressive acts by captive orcas towards each other and their trainers (Kirby 2012). Tilikum and Keto, male orcas held by SeaWorld, were implicated in the deaths of four humans (including three trainers) as documented in Gabriela Cowperthwaite's powerful, ground-breaking film, *Blackfish* (Fig. 11.3).

In 2015, a beluga died at a SeaWorld park after developing an infection in his jaw that was fractured during what was described as an 'interaction' with two other whales (Evans 2015). Visitors are also at risk of cetacean aggression. In 2008, three tourists were injured while swimming with dolphins in Curaçao after a bottlenose dolphin breached on top of them, seemingly deliberately (Rose et al. 2009; Marine Connection 2008). A number of such incidents have been reported in the media around the world, with many others likely going unreported (Vail 2012).

Fig. 11.3 There are no accounts of orcas deliberately attacking humans in the wild. In captivity, there are many recorded incidents of aggression by captive orcas towards each other and their trainers, some fatal. *Image credit*: Kimberly Palfi for Whale and Dolphin Conservation

11.5 Early Pregnancy and Calf Separation

In captivity, because of the artificial nature of the environment and the fact that calves of a number of cetacean species held in captivity are often separated from their mothers at a young age, whales and dolphins cannot learn the skills important to survival or essential nursing skills necessary to care for their own young (Rose et al. 2009). High rates of neonatal mortality are considered a major problem in captivity (Van Lint et al. 2006).

In the wild, orcas typically have their first calf at around 14 years of age and subsequent calves at intervals of approximately five years (Olesiuk et al. 2005). In

captivity, however, orcas have routinely become pregnant—including via artificial insemination—much earlier (Hargrove 2015). At Loro Parque in the Canary Islands, Kohana, a female orca, became pregnant at just seven years of age and gave birth to Adan, a male, in 2010. In 2012, Kohana became pregnant again by the same male and gave birth to a female, Vicky. This young orca mother had two calves by the age of 10 and rejected them both. One theory as to why she did this is that she had no idea what to do with them as she herself was removed far too early from her own mother. This 'de maternalisation' is likely to be due to failure of one generation to 'teach' the next generation maternal skills. The calves had to be hand-reared by trainers, but, tragically, Vicky died in 2013 at just 10 months of age (Batt 2012).

The captive orca industry has a shallow gene pool (a limited number of reproductive animals), leading to many accounts of inbreeding. The father of both of Kohana's calves was in fact her *uncle.* Both Adan and Vicky were blood related to over 80% of the orcas held at SeaWorld, and Vicky and her mother shared the same grandfather (Batt 2012).

Wild orca offspring in the most studied populations stay with their mothers for life, with some matrilines consisting of four generations (Ford et al. 2000). SeaWorld has removed 19 orca calves from their mothers, including one at 10 months, one at 20 months and one at 24 months; and only two of these removals were on medical grounds (Hargrove 2015). Jett and Ventre (2015) demonstrated that captive orcas face the highest risk of dying between the ages of two and six and speculate that avoiding the separation of mothers and calves may reduce this figure.

11.6 Environmental Quality and Complexity

Orcas are the most widely distributed cetacean on the planet and probably the most widely distributed large mammal in the world after humans (Rice 1998). Clans of orcas roam every ocean of the world and most seas. They range from the polar ice edges to the tropics and from the shoreline to the deep, open ocean. These opportunistic predators have evolved sophisticated strategies to thrive in most marine ecosystems (Baird 2000). Scientists now recognise several different ecotypes of orcas around the world (Bigg et al. 1990; Pitman and Ensor 2003).

Bottlenose dolphins, comprising more than one species, are also widely distributed, consuming a large variety of different food and inhabiting a range of environmentally complex environments (Wells and Scott 2009).

Belugas inhabit Arctic or sub-Arctic environments and have adapted ecologically and behaviourally to these extreme conditions (O'corry-Crowe 2009).

A man-made tank can never replicate the complexity, expanse, choice and range of habitats in the ocean environment nor meet the full range of an individual cetacean's biological capacities and the range of exposure to the physiological adaptations with which the animal is equipped. In captivity, cetaceans cannot be provided with an environment that simulates their natural habitat. Water is chemically treated, often with chlorine, which prevents the placing of live fish (feeding of live prey such

as fish is unlawful in many countries) and plants into their tanks and can also present health problems if used excessively or incorrectly (Couquiaud 2005). Tank water is also filtered to prevent the build-up of excrement and other waste, and most of the tanks holding cetaceans are smooth sided, small and empty of stimuli, perhaps to facilitate cleaning. Tanks lack species-specific enrichments (Couquiaud 2005) such as sand, rock, plants and changes in surface texture and depth, and, with nothing to use their anatomical and physiological adaptations on, many of the features which make cetaceans unique (their telos) become redundant, including the capacity to fully utilise their natural use of sound through echolocation (Au 2009). Some dolphinaria also provide only indoor facilities, lacking exposure to natural light and to natural daylight hours or daylight light patterns.

Captive cetaceans are often kept in climates to which they are not adapted (Couquiaud 2005), even to the extent of belugas, an Arctic species, being held in sea pens in the naturally warm seawater off the Turkish coast (Williamson 2008). Sea pens, while potentially offering greater environmental diversity and therefore a more enriched environment (Ruiz et al. 2009; Ugaz et al. 2013), have often been located in water that is too shallow, too warm and subject to tropical storms and in areas where pollution is a problem (Rose et al. 2009). Water quality can also be a problem in indoor tank environments, and many countries which regulate captive cetacean facilities include a number of water quality parameters that must be followed to comply with the law (Williamson 2006).

11.7 Noise

Cetaceans are highly adapted acoustic animals, living with the capacity to make sense of the complex auditory world of the ocean. Noise in the captive environment can have a potentially dramatic impact on their behaviour and physiology, in some cases causing them to refuse to eat (Couquiaud 2005). Noise is carried faster in water (Wright et al. 2007), and the loud music of shows and adjacent rides in facilities located in theme parks adds to, and contributes to, the noise of pumps and filters (Couquiaud 2005). The European Association for Aquatic Mammals (2009) recommends that mechanical equipment that produces sound in close proximity to dolphins should be isolated acoustically.

11.8 Behavioural Restrictions

In captivity, many of the choices available to individuals in the wild are removed. Food, shelter and medical care are provided, and breeding is usually controlled by the holding facility (Couquiaud 2005). Stereotypic behaviours, behavioural evidence of stress and high rates of infection and poor health are common among

wide-ranging carnivores when they are denied sufficient space to carry out natural behaviour (Clubb and Mason 2003).

Orcas in the wild display a whole range of different adaptive behaviours, from 'spy hopping' to tail slaps and breaching (Jefferson et al. 2008). They are also one of the fastest moving creatures in the ocean, capable of swimming at speeds of over 20 km/h (10.8 knots) (Ford 1989). Orcas possess one of the largest brains by volume in the animal world and have developed some highly complex and sophisticated hunting strategies, which vary from region to region and also in the approaches taken to the targeted prey (Ford 2009). Perhaps the most spectacular behaviour is that witnessed among orcas in Antarctica, where certain populations use a hunting technique known as 'wave washing', in which the orcas work cooperatively to create a wave to flush a seal off an ice floe (Visser et al. 2008; Pitman and Durban 2012). Another hunting technique known as 'carousel feeding' has been perfected by orcas off the coast of Norway. This technique involves orcas cooperatively herding schools of herring into a tight ball and driving them towards the surface, then picking off individual fish that have been stunned by tail slapping (Similä and Ugarte 1993).

Bottlenose dolphins show a high capacity for problem-solving and tool use (Whale and Dolphin Conservation 2016a). Some members of a population in Australia have been documented carrying sponges on their beaks to protect them from sea urchins when foraging on the sea floor (Whale and Dolphin Conservation 2016b).

Belugas have a sophisticated sonar system, which helps them move around in shallow water, and are one of the most vocal of cetaceans. They sometimes travel hundreds of miles upstream in rivers to reach their summer calving grounds (Whale and Dolphin Conservation 2016c).

The one-dimensional caricature of cetacean behaviours which is demonstrated to the public in marine parks around the world, where all choice and decision-making has been removed, pays a great disservice to these cognitively outstanding creatures. Dysfunctional, socially disparate cetacean groupings are coupled with a lack of space, low environmental stimuli, no capacity to hunt or forage in a realistic way and combined with the spectacle of stereotypical behaviours such as jaw popping, bar chewing, repetitive swimming and motionless logging at the pool surface (Jett and Ventre 2011; Frohoff 2005).

11.9 Stress

Stress is reported to severely affect the health of cetaceans in captivity. Symptoms which are associated with stress include weight loss, lack of appetite, anti-social behaviour (including aggression), self-destructive behaviour, reduced breeding success, arteriosclerosis, stomach ulcers, blood cell count changes and increased susceptibility to diseases and increased mortality rates (Rose et al. 2009; Romero and Butler 2007; Frohoff 2004; Schmitt et al. 2010; Fair and Becker 2000; St. Aubin and Dierauf 2001).

Handling, restraint, confinement, transport, isolation or crowding and an artificial diet are risk factors for stress in captive cetaceans and, ultimately, lead to measurable reductions in their life expectancy (Maas 2000; Noda et al. 2007; Thomson and Geraci 1986). Waples and Gales (2002) describe three cases of illness or death in the space of one year among a group of captive bottlenose dolphins in Western Australia. These animals were most likely suffering from stress as a result of changes in social relationships, aggression from other dolphins and loss of social support. Schmitt et al. (2010) found that stress hormones (concentrations of plasma adrenocorticotropic hormone (ACTH), cortisol, and aldosterone) increased significantly in captive belugas during routine physical examination, and similar effects have been recorded in captive porpoises (Desportes et al. 2007).

11.10 Use of Tranquilisers

Psychotropic drugs are often used in the care of captive cetaceans (Knight 2013). The most commonly used is Diazepam (Valium® and generics), a benzodiazepine drug which veterinary staff use to facilitate the handling of whales and dolphins for certain procedures, such as clinical diagnostic tests (including bacteriological swabbing and blood sampling) and transport. Depending on the dose, benzodiazepines can be used to reduce anxiety and excitability and also to control stereotypical behaviours (Knight 2013).

Marine parks such as SeaWorld report that drugs such as benzodiazepines are used by the facility veterinarians for the care and treatment of the marine mammals they hold (Cornell 2011). At the Rimini dolphinarium in Italy, irregularities in the administration of tranquilisers were cited as one of the factors which resulted in the permanent closure of the facility by the public authorities (Cronin 2014).

As voluntary breathers, cetaceans must be conscious and awake to breathe (Lyamin et al. 2008). Diazepam can decrease the responsiveness of the respiratory system (Khan 2014), and so this possible side effect in whales and dolphins is of particular concern. Diazepam is also used to encourage feeding in some captive animals, as it appears to act by enhancing the taste and flavour of food (Dowling 2015). Its use on captive dolphins, however, is questionable, as research indicates they can only taste salt (Zhu et al. 2014).

11.11 Early Mortality

Female orcas in the wild can live to an estimated maximum of 90 years with a mean expectancy of 46 years. Male orcas live an estimated maximum of 70 years with a mean of 31 years (Olesiuk et al. 2005). Bottlenose dolphins can live for up to 50 years in the wild (NOAA Fisheries 2016).

Small and DeMaster (1995b) found that mortality rates of captured bottlenose dolphins increased by six times immediately after capture and that this mortality rate did not drop down to the 'base captive mortality rate' for up to 35–45 days. Two studies from the 1990s (Small and DeMaster 1995a; Woodley et al. 1997) demonstrate higher annual mortality rates for bottlenose dolphins (5.6 and 5.7% annually) and orcas (6.2% annually) in captivity than in the wild (bottlenose dolphins 3.9% and orcas 2.3% annually).

In a 2015 study by Jett and Ventre, looking at captive orca mortality on a global scale since 1961, it was found that nearly two-thirds of orca deaths occurred in the first five years of a whale's captivity. Orcas in US facilities fared better than facilities in other countries, with a median survival rate of 12 years, and since 1985, captive orca survival has improved but still lags far behind their wild counterparts.

Data is lacking to enable a clear comparison in mortality rates between wild and captive belugas, although Woodley et al. (1997) indicated that there was increased mortality in captivity. Re-evaluation of ageing techniques in belugas from the wild has put the maximum life span of belugas at 60 years (Stewart et al. 2006). In captivity, belugas routinely die before the age of 30 (Rose et al. 2009).

Considering that, in captivity, cetaceans receive veterinary care if they are found to be sick, do not have to hunt for food, are not exposed to pollution in the natural marine environment (but may be exposed to long term chemical exposure in tank water) and are protected from predators; it seems probable that other factors are playing a role in reducing the annual survival rates for cetaceans in captivity.

11.12 Threats to Wild Populations

Cetaceans rely on well-organised groupings for, inter alia, foraging, defence against predators and transmission of specialised behaviour between generations (Whitehead et al. 2004). The capture of cetaceans from wild populations for live display in captivity currently occurs in only a handful of places around the world, including Russia and Japan (IUCN 2015; International Whaling Commission 2014, 2015).

The removal of key individual cetaceans, animals crucial to social cohesion in cetacean populations, may have long-term implications for population viability (Lusseau and Newman 2004; Williams and Lusseau 2006). Reeves et al. (2003) noted that live removals are equivalent to killing, as the individuals brought into captivity can no longer help maintain the genetic inputs to their wild populations.

Live capture operations for public display typically target young female cetaceans whose temperament makes them easier to handle in aquaria (Rose et al. 2009). The bias in wild populations which results from taking into captivity young females is another cause for conservation concern (Williams and Lusseau 2006).

11.13 Beluga Captures

In the Russian Far East, belugas are captured in the Sakhalin–Amur region in the Sea of Okhotsk under a quota set by the Russian government (Shpak and Glazov 2013), capture being for display in aquaria in Russia and overseas. The belugas are targeted as they congregate in the relatively warm coastal waters during the summer months where they breed, forage and moult (Shpak et al. 2010), and selected animals are taken from a population estimated at just under 4000 individuals (Shpak and Glazov 2014).

In 2013, 81 beluga individuals were captured and transported to holding facilities in Russia prior to onward transfers to national and international aquaria. Thirty-four whales are believed to have died during capture, seven died at the holding facilities and three considered to be at risk of death were released (Shpak and Glazov 2014). Based on available knowledge, and noting that more research was needed, an independent scientific review panel looking at proposed removals of belugas from this population calculated the sustainable annual removal to be 29 individuals, way below current capture levels (Reeves et al. 2011). Concerns continue to be raised by local and international beluga scientists that the captures are unsustainable (International Whaling Commission 2014, 2015).

During capture, belugas are approached in shallow waters by the capture team in boats, encircled using seine nets while surrounded by further boats. Once within the confines of the net, any belugas deemed at risk of entanglement are wrapped in the net and held at the surface or tied to the side of one of the boats. The net (and the belugas trapped inside it) is then pulled to shore (Georgia Aquarium 2012). The stress involved in this process for these self-aware and socially aware whales, approached by boats, trapped in nets and pulled to shore, is reported to be severe (St. Aubin and Geraci 1992; Curry 1999; Butterworth et al. 2013). Footage of beluga captures in Russian waters from the late 1990s showed very crude methods of capture and transport that put the individuals targeted at considerable risk of injury or death (Woodyer 2012).

11.14 Box Out Case Study: Georgia Aquarium Application to Import Wild-Caught Belugas

In 2012, Georgia Aquarium applied to the US National Marine Fisheries Service (NMFS) to import 18 belugas captured in Sakhalin Bay for public display. While the application requested ownership of the belugas by Georgia Aquarium, the Aquarium planned for 15 whales to undergo immediate transfer to other US facilities, including three SeaWorld parks, under ‘breeding loans’ (Georgia Aquarium 2012). Following a public comment period, in which members of the public were invited to submit their views on the proposed import, and which resulted in approximately 9000 responses (NOAA Fisheries 2015), the NMFS denied Georgia

Fig. 11.4 Belugas captured in Russia are held in inadequate holding pen conditions. *Image credit*: Lloyd Hannemann

Aquarium its import proposal. The agency based its decision on the impact of live captures on the population, its belief that allowing the import would contribute to demand to capture further belugas for the United States and worldwide and its determination that five of the belugas proposed for import were potentially still nursing young and not yet independent at the time of their capture (NOAA Fisheries 2015). The Aquarium appealed this decision, but it was upheld in the US District Court of Atlanta (Georgia Aquarium Inc. vs. Penny Pritzker, 2015). The Sakhalin–Amur population of belugas has subsequently been included in the US Marine Mammal Protection Act as a 'depleted' population, now well below 60% of its historic abundance, which means imports are now prohibited (Whale and Dolphin Conservation 2016d). Meanwhile, captures for aquaria in China and other countries continue, with individuals exported from Russia to be held in wholly inadequate conditions (Fig. 11.4).

11.15 Japanese Drive Hunts

In Japan, annual quotas are given by the Japanese government for the killing and live capture of over 2000 small cetaceans in what are known as 'drive hunts' (Butterworth et al. 2013). Individuals are herded out at sea with small fishing vessels, and through the use of underwater noise, these groups of animals are driven towards the shore, where they are netted off and then removed alive for display in

aquaria or killed for meat or other products (Butterworth et al. 2013; Vail 2015). Several species are targeted for live capture from the hunts, including bottlenose dolphins, false killer whales, Pacific white-sided dolphins, Risso's dolphins and short-finned pilot whales (Ceta-Base 2016b).

The prolonged and stressful process involved in the drive hunts during the herding offshore, dragging by the tail fluke alongside the capture boats, confinement in the netted-off cove and removal from the water and their pod mates (many of whom may go on to be killed), sometimes over many hours or even days, is likely to be have profoundly severe welfare impacts (Butterworth et al. 2013; Connor 2007).

Concerns regarding the sustainability of the drive hunts in Japan have been expressed by the International Whaling Commission and other scientific bodies (International Whaling Commission 1993; Kishiro and Kasuya 1993; IUCN 2015; Wells 2012; Marsh 2013). In 2014, the International Whaling Commission's Scientific Committee reported that the issue of total removals in the drive hunts needed to be more critically examined and incorporated into population assessments. It also noted that there was a lack of current accurate data on both stock identity and size for the bottlenose dolphins in the waters off Taiji, where the hunts take place (International Whaling Commission 2015).

11.16 Orca Captures

The first orca captures occurred in the Pacific Northwest of America in the early 1960s and continued until the mid-1970s when this practice was banned under state law (Pollard 2014). During this early capture period, 55 orcas were taken for display in marine parks. In 1976, the capture teams turned their attention towards Iceland, where 54 whales were taken over the next 13 years (Williams 2001). During the 1980s and 1990s, Japan was also active in supplying orcas to its marine parks—none of the 20 captured orcas taken during this time have survived (Jacobs 2006). The Russian government issues annual catch quotas for orcas (up to 10 per annum) for both the domestic market and export overseas (FEROP 2016), and today Russia remains the only country in the world where wild orca captures continue for the aquarium trade.

11.17 Conclusions: The Future for Captive Cetacean Welfare

Public opinion is shifting on cetacean captivity. Evidence of poor cetacean welfare has been brought to the attention of the millions of viewers of documentaries such as *Blackfish* and *The Cove*, and a majority of young Americans opposing cetacean captivity (Racanelli 2016). Concern for captive orcas has led this quantum shift in perspective (Whale and Dolphin Conservation 2014). In March 2016, in response to what he referred to as the changing mind-set of society and a shrinking customer

base, SeaWorld's Chief Executive Officer, Joel Manby, announced an end to orca breeding at SeaWorld (Munarriz 2016).

Research reveals concerns for other species too, with a majority of UK holiday-makers indicating opposition to seeing whale and dolphin shows (Payne 2014) and discomfort about dolphin welfare expressed by people who had swum with them in captivity (Curtin and Wilkes 2007).

The number of facilities holding cetaceans in some parts of the world, including Europe, is declining (Whale and Dolphin Conservation 2015). However, in other parts of the world, including China and the Caribbean, it is increasing (China Cetacean Alliance 2015; Vail 2014).

Discussion is now focused on what alternatives exist for the thousands of individual bottlenose dolphins, orcas, belugas and other species currently in captivity. While a return to the wild under strict criteria may be possible for some (Williamson 2014), others may be too physically or mentally altered by long term captivity to survive without human care. Plans are now underway to create cetacean sanctuaries, offering individuals the chance to live out the remainder of their lives in enclosures in a natural cove or bay, protected from storms and pollution, where their health and welfare needs can be taken care of in a more naturalistic environment, without performing in shows, and with public observation strictly controlled or from a distance (Williamson 2016). This may be the future for cetaceans currently in captivity, a future which has the potential to address many of the threats to cetacean welfare presented by their current confinement in captivity.

For further information on captive cetacean welfare, news stories, blogs and up-to-date statistics, please visit whales.org/captivity.

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