The Case Against

MARINE MAMMALS IN CAPTIVITY

ANIMAL WELFARE INSTITUTE + WORLD ANIMAL PROTECTION

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LIST OF ACRONYMS + ABBREVIATIONS

ACCOBAMS Agreement on the Conservation of Cetaceans of the Black Sea, Mediterranean Sea and contiguous Atlantic area

AI artificial insemination

ALJ administrative law judge

AMMPA Alliance of Marine Mammal Parks and Aquariums

APHIS Animal and Plant Health Inspection Service

AWI Animal Welfare Institute

AZA Association of Zoos and Aquariums

Cal/OSHA California Division of Occupational Safety and Health

CEO chief executive officer

CFR Code of Federal Regulations

CITES Convention on International Trade in Endangered Species of Wild Fauna and Flora

CSG Cetacean Specialist Group

DAT dolphin-assisted therapy

ESA Endangered Species Act

EU European Union

Fed. Reg. Federal Register

FWS Fish and Wildlife Service

IPO initial public offering

IUCN International Union for Conservation of Nature

IWC International Whaling Commission

JAZA Japanese Association of Zoos and Aquariums

MMC Marine Mammal Commission

MMPA Marine Mammal Protection Act

MRSA meticillin (or methicillin)-resistant *Staphylococcus aureus*

NDF non-detriment finding

NMFS National Marine Fisheries Service

OSHA Occupational Safety and Health Administration

SPAW Specially Protected Areas and Wildlife

SWD swim-with-dolphin

TINRO Pacific Fisheries Research Center (in Russian)

US United States

USC United States Code

UST United States Treaty

WAP World Animal Protection

WAZA World Association of Zoos and Aquariums

WDC Whale and Dolphin Conservation

WSPA World Society for the Protection of Animals

OVERVIEW

Over the past decade, since the publication of the 4th edition of this report, the controversy regarding marine mammals in captivity has become more intense, largely due to the 2013 documentary *Blackfish* and the global effect it has had on a large segment of the general public. Nevertheless, the public display industry continues to insist that marine mammal exhibits serve a valuable conservation function, people learn important information from seeing live animals, and captive marine mammals live a good life. Animal protection groups, and a growing number of scientists, counter that the lives of captive marine mammals are impoverished, people do not receive an accurate picture of a species from captive representatives, and the trade in live marine mammals negatively affects populations and habitats. The more we learn of marine mammals, the more evidence there is that the latter views are correct.

Some facilities promote themselves as conservation centers; however, few facilities are involved in substantial conservation efforts. Rather than enhancing populations in the wild, facilities engaged in captive breeding tend merely to create a surplus of animals from non-endangered species who are not intended for release into the wild and are therefore only used to propagate the industry.

Public display facilities often promote themselves as stranding and research centers. However, commercial facilities may limit the number of stranded marine animals they will accept if they do not consider the rescue, rehabilitation, and release of common species to be a priority use for the space they have available. As for whales, dolphins, and porpoises, most do not survive stranding. They frequently die before, during, or soon after rescue; few survive rehabilitation to be released to the wild; many releases are not monitored for success; and some animals, despite their suitability for release, are retained for public display. In addition, with every stranding, the industry takes the opportunity to portray the ocean as a dangerous place full of human hazards, from which it protects the animals in its charge. This portrayal of natural habitat as hopelessly damaged and captivity as safe and comfortable implies to the public that the ocean is a lost cause (which will hardly inspire them to save it) and captivity is the preferred state.

As for research, most studies using marine mammals in public display facilities have been focused on improving captive care and maintenance practices in order to increase animal life spans and reproductive output. Despite a recent research and publication boom by the industry, in an effort to have their actions match their rhetoric, very few studies using marine mammals in public display facilities address crucial conservation questions and even fewer address animal welfare.

Captures of marine mammals from the wild are not a thing of the past. Live captures of whales and dolphins continue in several hotspot locations around the world, in regions where very little is known about the status of populations. Several dolphin species are captured in Japan.

Beluga whales and orcas (also known as killer whales) are being captured in Russia. Some species of seals and sea lions, as well as walruses, also continue to be captured from the wild, especially in the southern hemisphere and the Arctic. For smaller marine mammal populations, live capture operations are a conservation concern. Even for those populations not currently under threat, the lack of scientific assessment or regard for welfare makes these operations an issue of global concern.

With any marine mammal exhibit, the needs of the visiting public come before the needs of the animals. Enclosures are designed to make the animals readily visible, not necessarily comfortable. Public display facilities maintain that they enhance the lives of marine mammals in captivity by protecting them from the rigors of the natural environment. The truth is that marine mammals have evolved physically and behaviorally to survive these rigors. For example, nearly every species of marine mammal, from sea lion to dolphin, travels large distances daily in a search for food. In captivity, space is constricted for these wide-ranging species and natural feeding and foraging patterns are completely lost. Stress-related conditions such as ulcers, stereotypical behaviors such as pacing and self-mutilation, and abnormal aggression within groups frequently develop in predators denied the opportunity to hunt. Other natural behaviors, such as those associated with dominance, mating, and maternal care, are altered in captivity, which can have substantial negative impacts on the animals' welfare.

Wild-caught marine mammals gradually experience the atrophy of many of their natural behaviors and are cut off from the conditions that allow the expression of cultural traits such as specialized vocalizations and unique foraging and hunting techniques. Trainer and visitor interactions do not adequately replace the expression of natural behaviors—whatever "enrichment" these interactions provide is only necessary because the animals are in captivity in the first instance. In addition, viewing captive animals gives the public a false picture of the animals' natural lives. Worse yet, it desensitizes people to captive marine mammals' inherent suffering—for so many captive marine mammals, the world is a tiny enclosure, and life is devoid of naturalness.

The ethical concerns raised by marine mammal captivity are especially marked for cetaceans, as they may well merit the same moral stature as young human children. Although public display proponents will argue that claiming cetaceans have "rights" is based solely on emotion and that these marine mammals are no different from other wildlife species in captivity, in fact the behavioral and psychological literature abounds with examples of the sophisticated cognition of many cetaceans. Their intelligence appears at least to match that of the great apes and perhaps of human toddlers—they are self-aware and capable of abstract thinking.

Fierce debate continues over the issue of marine mammal mortality rates and longevity in captivity, especially of cetaceans. The most conclusive data are for orcas; while their annual mortality rates have improved over the years, they still do not match healthy populations in the

wild and the percentage of captive individuals who achieve important milestones such as sexual maturity and menopause continues to be low compared to the wild. The mortality data related to live captures are more straightforward—capture is undeniably stressful and, in dolphins, results in a six-fold increase in mortality risk during and immediately after capture.

Human–marine mammal interactions such as swim-with-dolphin encounters and feeding sessions do not always allow the animals to choose the levels of interaction and rest they prefer or need. This can elicit submissive behavior toward humans, which can affect the dominance structure within the animals' own social groups. Any interaction that allows the public to feed marine mammals puts the animals at risk of ingesting foreign objects.

The public display industry fosters a benign—albeit mythical—image of marine mammals, particularly dolphins. Yet these species are for the most part carnivores with complex social hierarchies and are perfectly capable of injuring fellow group members, other marine mammals, and humans. The risk of disease transmission in both directions (marine mammal to human and human to marine mammal) is also very real. Marine mammal handlers have reported numerous health problems related to their work.

Zoos and aquaria have asserted for many years that the display of marine mammals serves a necessary educational purpose, for which the animals' welfare need not be compromised. Until 2010, this assertion often went unchallenged. But early in that year, an orca very publicly killed his trainer at a marine theme park in Florida in the United States and a paradigm shift, already underway, accelerated exponentially. Now, as social and traditional media spread news about traumatic captures, barren concrete tanks, high mortality rates, and aberrant—even dangerous—animal behavior, ever-larger numbers of people have changed the way they perceive marine mammals in captivity.

In this report, the Animal Welfare Institute (AWI) and World Animal Protection (WAP) employ scientific and ethical arguments to debunk the myths about marine mammals in captivity. And while humans can subdivide the captive experience and even conclude that one aspect is more or less damaging to the animals than another, the totality of the captive experience for marine mammals is so contrary to their natural experience that it should be rejected outright when its purpose is merely to entertain us. AWI and WAP believe it is wrong to hold marine mammals in captivity for the purpose of public display.

INTRODUCTION

SeaWorld was created as strictly entertainment.
We didn't try to wear this false façade of educational significance.

—George Millay, co-founder of SeaWorld, 1989

When drafting the Marine Mammal Protection Act of 1972 (MMPA),[1] members of the US Congress believed, or were lobbied into promoting, the long-accepted view that the public display of wildlife (at facilities such as zoos and aquaria) serves a necessary educational and conservation purpose. Subsequently, many domestic statutes and regional and international agreements incorporated a similar viewpoint, and wherever "take"—such as capture—was prohibited, an exemption for public display was often included.[2] Many of these domestic laws and international agreements include specific provisions that support the holding of marine mammals in captivity for the purpose of public display because it is viewed as educational and assumed to support conservation.

This assumption became established policy without the benefit of research to support it. In fact, it has only been in recent years that research efforts have caught up with and begun to debunk the claims made by those who are marketing and making a profit from captive marine mammals. With a greater understanding of the needs of marine mammals and the conditions of their captivity, the public has become skeptical of assertions that the display of captive marine mammals, particularly cetaceans (the taxonomic group that includes all whales, dolphins, and porpoises),[3] fosters an understanding of these species. People have begun to ask if facilities are able to meet even the most basic needs of these complex, wide-ranging, aquatic mammals. Indeed, many believe that commercial public display is no more than exploitation of captive wildlife and that traumatic captures, concrete tanks, and forced confinement are inhumane. Rather than having a positive effect on education and conservation, some consider the overall effect of marine mammal displays on public perceptions of these species to be misleading and negative. AWI and WAP agree.

US records chart a history of disturbing causes of death, high mortality rates, and low birth rates in marine mammals.

The MMPA requires the US Department of Commerce's National Marine Fisheries Service (NMFS) to maintain life history records on most marine mammals held in dolphinaria—facilities that use captive marine mammals primarily in shows—and aquaria—facilities that use captive marine mammals primarily in exhibits—in the United States and in foreign facilities that trade with US facilities.[4] These records chart a history of disturbing causes of death, high mortality rates, and low birth rates. The public display industry claimed for decades that this history reflects the learning curve involved in understanding marine mammal care[5] and that future scientific analyses of life history parameters would show an improvement in these statistics. While improvement in survivorship has occurred for some species, the overall picture remains grim (see Chapter 9, "Mortality and Birth Rates"). AWI, WAP, and other animal protection groups maintain that this history and the current situation clearly indicate that marine mammals, especially cetaceans and Arctic species (such as polar bears and walruses), do not cope well with captivity.

Marine mammals, especially cetaceans and Arctic species (such as polar bears and walruses), do not cope well with captivity.

Internationally, there is disturbingly little information on life history parameters of captive marine mammals, as there are no international oversight mechanisms, and very few countries have adequate requirements for maintaining veterinary records and virtually none for making them readily available to outside researchers. The public display industry itself is not transparent about these data and publishes very few welfare-related studies in the scientific literature,[6] despite having direct access to the relevant data. Marine mammals, including a wide variety of cetacean species, are held in a growing number of countries in the developing world, where money, technology, and expertise are often lacking.[7] The information that is available suggests that survival of captive marine mammals outside North America and Europe is very poor indeed.

For years, the campaign among non-profit animal protection groups to improve the welfare of captive marine mammals and the effort to end their display altogether was considered a "fringe" effort—dolphinaria, established in the modern era in 1938,[8] were categorized with mainstream zoos, and their staff were considered the world's experts on these species. Previous editions of this report were written when the "anti-captivity" position was the minority view, although it was gaining ground. But in 2010, a trainer was killed by a captive orca (*Orcinus orca*) and in 2013 a documentary film, *Blackfish*, was released, focusing on this incident and the lives of captive orcas (see Chapter 12, "The *Blackfish* Legacy"). Few films can claim to be world-changing, but on this topic, *Blackfish* certainly can. The campaign to end the display of captive orcas—and by association, other marine mammals—has gained momentum and can now be said to be solidly mainstream.

Those who are interested in the debate on whether marine mammals are uniquely unsuited to be confined in relatively small enclosures must first determine whether public display of marine mammals is accurately educating people about these animals. Second, they must determine whether public display fosters or actually impedes conservation efforts. And third, they must determine whether marine mammals' lives are merely different in captivity from those they lead in the wild or worse from a welfare perspective. The public display industry maintains that people learn valuable information from seeing live animals, dolphinaria and aquaria serve a vital conservation function, and captive marine mammals live good lives. However, animal protection groups, and a growing number of scientists, say that people do not receive an accurate picture of a species from captive representatives; the trade in live marine mammals negatively impacts populations and habitat; and the lives of captive marine mammals are impoverished, their welfare compromised. The more we learn of marine mammals, in the wild and in captivity, the more evidence there is that the latter views are correct.

CHAPTER 1

EDUCATION

Education is one of the most important methods of ensuring the humane treatment and conservation of the myriad other species with which we share the planet. Despite the public display industry being under a legal obligation in several countries to provide an educational component in exhibits,[9] there is little objective evidence to indicate that it is furthering the public's knowledge of marine mammals and their habitats.[10] While some zoos and aquaria among the more than 2,500 licensed animal exhibitors operating in the United States, as well as several zoos and aquaria internationally, are involved in serious education and conservation efforts, the main purpose of the vast majority of marine theme parks and dolphinaria is to display animals for entertainment rather than to convey information.[11] In fact, some surveys have found that zoo and aquarium visitors generally want to be entertained, with those seeking an education being in the minority.[12] Simply from a common-sense perspective, the performance format of the majority of cetacean and pinniped displays, with their spectacular choreography and loud music, is clearly more akin to amusement park or circus entertainment than modern zoo or museum education.

Whether marine theme parks and dolphinaria actually provide an educational benefit was the focus of an oversight hearing held by the US Congress in 2010.[13] This hearing highlighted that NMFS, the US agency responsible for managing free-ranging[14] marine mammals and some aspects of captive marine mammals under the MMPA, had not developed any standards or processes to evaluate conservation or education programs at public display facilities.[15] In essence, the public display industry was policing itself as to the accuracy of its education content. In addition, representatives from marine theme parks and dolphinaria testified that seeing marine animals in their facilities was essential for promoting public concern for marine conservation.[16] Author Rose, who was a witness at this hearing, pointed out the logical flaw in this claim; several countries that have a very strong marine conservation ethos, arguably one greater than that of the United States (for example, the United Kingdom, New Zealand, and Costa Rica), have very few captive marine mammals and no captive cetaceans at all. In contrast, one nation with numerous marine theme parks and dolphinaria and many captive marine mammals, Japan, continues to kill cetaceans for commercial and scientific purposes.[17]

In a 1999 survey of US citizens by researchers from Yale University, respondents overwhelmingly preferred to see captive marine mammals expressing natural behaviors rather than performing tricks and stunts.[18] Sixteen years later, a survey of millennials (people born between 1981 and 1999) in the United States found that they had a high level of concern for animal welfare, with 32 percent being "involved" in animal welfare activities (such as volunteering at a shelter or being a member of an animal protection group).[19] Concern for charismatic species and ocean impacts was also noted. Therefore, the welfare impacts of captivity on cetaceans is likely to be a concern for this generation. Interestingly this latter survey noted that from 22 to 41 percent of respondents had recently been whale watching, which suggests this activity may be more appealing to this generation than viewing marine mammals in captive settings.

Four-fifths of the public in the 1999 survey stated that marine mammals should not be kept in captivity unless there are major educational or scientific benefits. A 2007 survey found that only a third of the US public believed marine mammal public display had these benefits.[20] A 2003 survey of Canadians found that three-quarters of respondents thought that the best way to learn about the natural behaviors of whales and dolphins was by viewing them in the wild, either directly through whale watching tours or indirectly through television and film or on the internet.[21] Only 14 percent felt that viewing cetaceans in captivity was educational. In 2014, a US poll found that more than half of respondents opposed keeping orcas in captivity.[22] A 2014 survey of Britons found that 86 percent of respondents would not visit a captive whale or dolphin facility when on holiday.[23] A 2018 study of tourists in the Turks and Caicos Islands found that 60 percent were opposed to visiting captive orca exhibits, while three-quarters of these identified welfare concerns as the basis for their opposition.[24] About a fifth of respondents indicated that watching either the documentary *Blackfish* (see Chapter 12, "The *Blackfish* Legacy") or other media had influenced their views. Of those who were interested in attending an orca show and explained why, none mentioned education; all identified "entertainment" as the basis for their interest.

In a 1999 survey, four-fifths of the respondents stated that marine mammals should not be kept in captivity unless there are major educational or scientific benefits.

Orcas have good vision in air and underwater. These orcas are not only looking at these tourists, but also thinking about them.

Survey respondents in 2018 who supported holding cetaceans in captivity were significantly more likely to believe cetacean conservation was not important, which is not consistent with the public display industry's argument that their facilities promote public concern for conservation.

An international survey published in 2018 echoed these results, with respondents being significantly more likely to oppose, rather than support, displaying cetaceans in marine theme parks and dolphinaria.[25] Only 5 percent of US respondents strongly supported holding cetaceans in marine theme parks and dolphinaria. Moreover, less than a fifth of respondents indicated approval for dolphins performing "tricks" for entertainment. Interestingly, respondents who supported holding cetaceans in captivity were significantly more likely to believe cetacean conservation was not important, which is not consistent with the public display industry's argument that their facilities promote public concern for conservation. The study also found that, generally, the public would prefer to watch free-ranging cetaceans on commercial whale watching trips, for example, rather than in captive facilities, a preference exhibited by respondents from several countries.[26]

Over the years, dolphinaria have shared very little during marine mammal shows about natural behaviors, ecology, demographics, or population distribution.[27] Indeed, shows have tended to emphasize unnatural behaviors, such as dolphins "tail-walking" or sea lions doing handstands. Any natural behaviors, such as "porpoising" (leaping out of the water and reentering it headfirst), are typically greatly exaggerated. SeaWorld, a marine theme park company in the United States with three locations (San Diego, California; San Antonio, Texas; Orlando, Florida) held 20 orcas as of the end of January 2019. Its orca show "Believe," which ran from 2006 to 2011, focused more on emotional showmanship and the bond between the animal and her trainer than the biology of orcas.

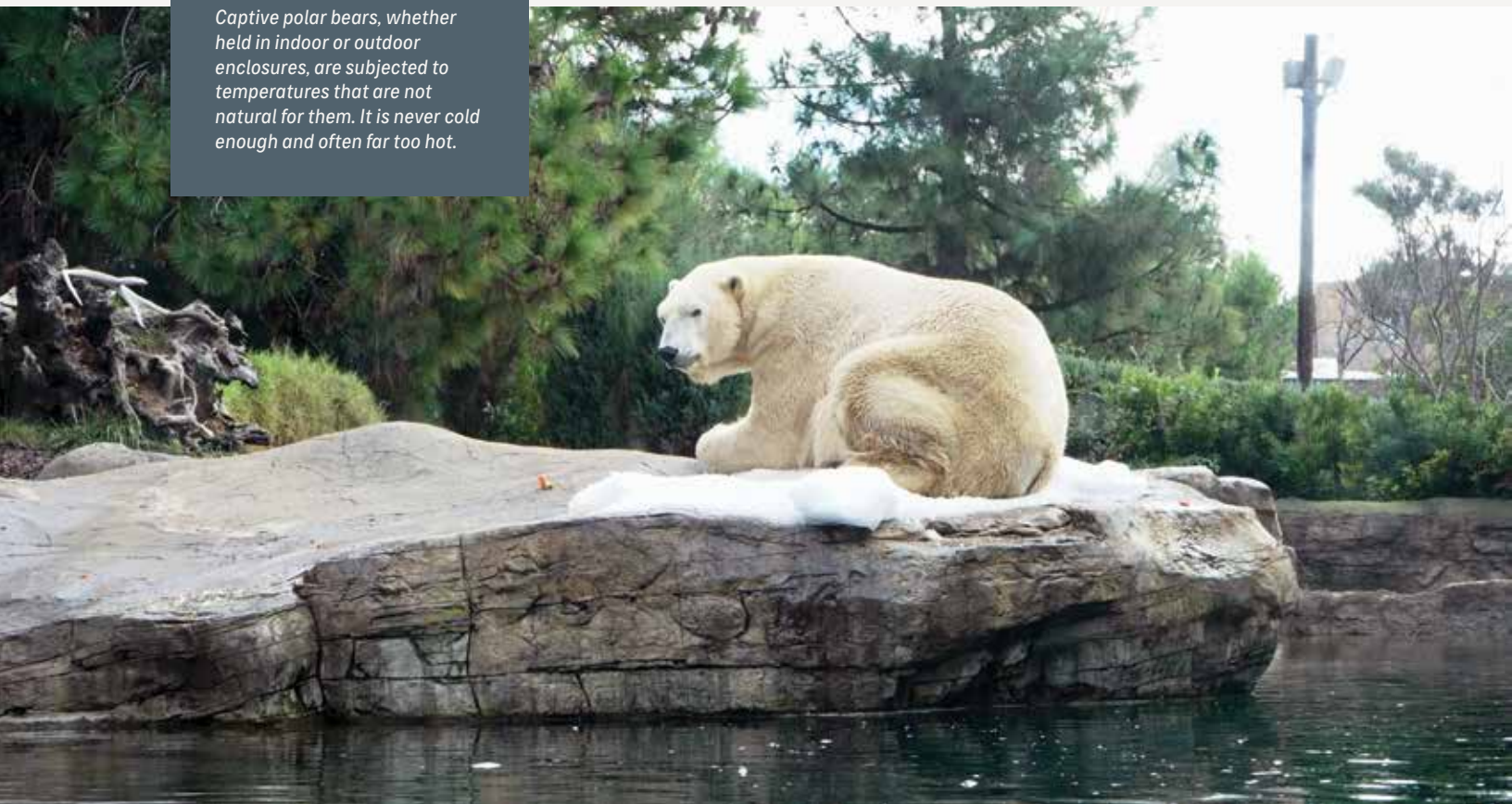
Indeed, many marine mammal public display facilities have consistently avoided providing in-depth information concerning marine mammal natural history or how the animals live and behave in their natural habitats.[28] Furthermore, some of the information dolphinaria present is simply scientifically incorrect or distorted to

portray a facility in a better light.[29] Examples of the deliberate distortion—or ignoring—of current scientific knowledge include SeaWorld's directive to staff in the 1990s not to use the word "evolve," as many visitors consider the theory of evolution to be controversial;[30] its historical explanation of the "drooping fin" syndrome, which the company claimed was "normal";[31] and its current description of the life spans of captive orcas, which it claims match those in the wild.[32]

Traditional zoo dogma states that the display of live animals is required to educate people about a species (and therefore to care about the species and its habitat).[33] Many species are doomed to extinction if this is true, as they are not exhibited in zoos or aquaria; regardless, evidence does not support this view, as many people, especially children, are fascinated by (as one example) dinosaurs, yet have never seen a living one. Clearly, books, animatronics (robots), DVDs, IMAX films, interactive and traditional museum-type displays,[34] and virtual reality simulations could and should replace dolphin and sea lion shows and, in many cases, live wildlife exhibits altogether.[35]

It is true that people may respond on a basic emotional level to seeing a live animal on display, and performances may also reinforce the bond with an individual animal felt by members of the audience. However, because of the nature of these performances, the perceived bond is not with an actual animal but with an idea of that animal that has been crafted by the facility. This idea is often highly anthropomorphic, with sea lions wearing costumes or solving arithmetic problems and dolphins painting pictures. Yet it is the public display industry that frequently accuses activists of projecting human emotions onto marine mammals in their campaigns.[36] We would argue that it is the industry—with these cartoonish portrayals of wildlife in performances and in outreach to potential customers—that relies on anthropomorphism, both to entertain and to appeal to the public in its quest to remain societally relevant.

Evaluation of most performances' scripts and settings, as well as observation of the audiences' reactions, reveal that a captive marine mammal performance is not an educational vehicle but an entertainment



Captive polar bears, whether held in indoor or outdoor enclosures, are subjected to temperatures that are not natural for them. It is never cold enough and often far too hot.

AWI and WAP maintain that exposure to captive marine mammals does exactly the opposite of what public display industry rhetoric claims; instead of sensitizing visitors to marine mammals and their habitat, it desensitizes people to the suffering inherent in removing these animals from their natural habitats and holding them captive.

spectacle in which miseducation (in the form of inaccurate representation of such things as normal behavior, life span, appearance, and social structure) occurs more often than not.[37] To illustrate, many actions performed by dolphins in shows or observed being directed toward visitors or trainers that are portrayed as "play" or "fun"—such as the rapid opening and closing of the mouth and the slapping of the water surface with the tail flukes or flippers—are actually displays that in free-ranging animals would usually be considered aggressive or a sign of disturbance,[38] akin to a dog growling or yelping.

When public display facilities assert their educational effectiveness, they frequently cite annual attendance figures, apparently convinced that visitors learn about marine mammals simply by walking through a turnstile. In fact, the actual provision of educational materials is often limited. One study found that less than half of dolphinaria exhibiting orcas provided any information on conservation. More worrying is that less than half provided educational materials for children or teachers.[39]

The assumption is that mere exposure to live captive animals translates into heightened environmental awareness, or increased public conservation action, but there are few or no data to support this. Rather, data suggest the opposite, as there are several studies showing that visits to zoos lead to minimal, if any, actual change in visitor behavior when it comes to conservation.[40] Some in the public display industry have recognized this for some time; fully 30 years ago, the president of the Zoological Society of Philadelphia stated in a welcoming speech to a conference on education: "The surveys we have conducted … show that the overwhelming majority of our visitors leave us without increasing either their knowledge of the natural world or their empathy for it. There are even times when I wonder if we don't make things worse by reinforcing the idea that man is only an observer of nature and not a part of it."[41]

AWI and WAP maintain that exposure to captive marine mammals does exactly the opposite of what the industry rhetoric claims; instead of sensitizing visitors to marine mammals and their habitat, it desensitizes people to the suffering inherent in removing these animals from their natural habitats and holding them captive.[42] Repeated exposure to a dolphin swimming circles in a tank or a polar bear (*Ursus maritimus*) pacing in a glassed-in enclosure encourages people to consider wildlife as isolated objects or as servants to human needs and desires[43] rather than as integral elements of an ecosystem with their own intrinsic value.[44]

CHAPTER 2

THE CONSERVATION/ RESEARCH FALLACY

Public display facilities have promoted themselves as conservation centers since the "Save the Whales" movement began in the 1970s, in some cases changing their names to reinforce this image.[45] Through skillful marketing and public relations, they miss no opportunity to emphasize their role as modern arks, hedges against the extinction of endangered species in the wild. Most marine mammal display facilities, however, do no more than produce multiple generations of a limited group of species and do not maintain true conservation programs at all.

While several zoos have programs to breed endangered (terrestrial) species in captivity with the intention that these animals be used in restocking depleted populations in the wild,[46] these zoos are small in number, and their contribution to restocking depleted populations is minor.[47] None currently engage in captive breeding to restore depleted cetacean populations. Until 2018, only one public display facility had attempted a captive breeding program for an endangered cetacean, the baiji, or Yangtze river dolphin (*Lipotes vexillifer*),[48] and no calf was even born, let alone released to the wild. This species became the first cetacean to be declared extinct in the modern era.[49] In fact, only one member of the Alliance of Marine Mammal Parks and Aquariums (AMMPA)—an

The claim that conservation is a primary purpose of the public display industry as a whole is highly misleading at best. Fewer than 5 to 10 percent of zoos, dolphinaria, and aquaria are involved in substantial conservation programs either in natural habitat or in captive settings, and the amount spent on these programs is a mere fraction (often less than 1 percent) of the income generated by the facilities.

industry association that represents selected dolphinaria—routinely provides funding or grants to promote the *in situ* (in natural habitat) conservation of critically endangered river dolphin species.[50]

The public display industry's response to the critically endangered vaquita (*Phocoena sinus*), a small porpoise found only in the Gulf of California, Mexico,[51] has also been criticized for being lackluster.[52] Captive facilities contributed a substantial amount of funding only after receiving considerable public criticism for their lack of support. However, by the time this funding materialized, the vaquita population had dropped well below 100 individuals due to entanglement in fishing gear—making this contribution likely too late. The species could be extinct by 2021 unless gillnets are completely removed from vaquita habitat.

Public display facilities with the financial resources, staff capability, and commitment to engage in or support meaningful conservation programs for any animal species have always been few in number.[53] The requirements of providing the public with a satisfying recreational experience are often incompatible with those of operating a research or breeding facility (this is the reason for the development of the off-premises breeding facilities associated with a handful of zoos).[54] Therefore, the claim that conservation is a primary purpose of zoos and aquaria as a whole is misleading, at best. Fewer than 5 to 10 percent of zoos, dolphinaria, and aquaria are involved in substantial conservation programs either *in situ* or *ex situ* (in captive settings, including in natural but netted-off reserves), and the amount spent on these programs is a mere fraction (often less than 1 percent) of the income generated by the facilities.[55]

Many dolphinaria and aquaria state that they are actively involved in conservation and use this as a marketing tool or as a way to justify imports of animals.[56] However, these conservation claims rarely stand up to scrutiny. The portrayal of captive breeding of marine mammals to meet conservation objectives is misleading at best[57] (and false at worst); the overwhelming majority of marine mammal species currently being bred in captivity are neither threatened nor endangered.[58]

What is worse is that many dolphinaria and aquaria, particularly in Asia and Russia, including facilities that actively market themselves as centers for conservation, are actually depleting cetacean populations in their natural habitats. Many facilities worldwide still acquire several marine mammal species directly from the wild.[59] Contrary to

The overwhelming majority of marine mammal species currently being bred in captivity are neither threatened nor endangered.

A typical sea lion enclosure—small pools with little or no shade. Socially, this highly gregarious species tends to be held in small groups.

conservation principles, little serious work has been done to ascertain what effect these captures have on the populations from which these animals are taken[60] or on the individuals who may be captured but then immediately released because they are deemed unsuitable. The US government requires environmental impact analyses before captures are permitted, but historically the analyses have been inadequate from a scientific standpoint,[61] and the same restrictions are rarely required by wildlife agencies in other countries. If dolphinaria and aquaria were truly concerned about conserving species in the wild, they would be dedicated to determining the effects of their capture activities on the animals left behind and to improving disruptive and stressful capture techniques (see Chapter 3, "Live Captures"). They would also willingly submit to strict national and international regulations. They do none of these things.

In fact, the public display industry has actively lobbied to prevent the International Whaling Commission (IWC) from adopting measures to regulate directed hunts of small cetaceans. The IWC was originally established to regulate hunting of "great" whales (which comprise the sperm whale, *Physeter macrocephalus*, and the baleen whale species). Currently there are only a few international agreements protecting small cetaceans, species that are vulnerable and, in some areas, heavily exploited; many animal protection groups, scientists, and politicians believe that the IWC should regulate the hunts and fisheries involving small cetaceans.[62] However, the public display industry in the West has historically opposed this extension of IWC authority, apparently because this much-needed oversight would have interfered with its ability to capture animals for its collections in various locations around the world.[63]

SPECIES ENHANCEMENT PROGRAMS

Another way dolphinaria and aquaria seek to justify their existence is by claiming that they are aiding in the conservation of species through species enhancement programs; that is, breeding endangered species in captivity to someday supplement depleted populations in the wild.[64] Species enhancement programs have become the focus of a number of zoos in the developed world; zoos in Europe are legally required to undertake conservation efforts, including enhancement programs "where appropriate," with the aim of releasing captive-bred individuals of endangered species back into the wild.[65]

If species enhancement programs were truly a primary purpose of dolphinaria, they would be targeting species that are at risk in the wild or are from depleted populations.[66] However, the only attempts to save critically endangered cetacean species involving dolphinaria and a potential species enhancement/captive breeding program involved the baiji and the vaquita (see above),[67] neither of which was successful, and the Yangtze River finless porpoise (*Neophocaena asiaeorientalis*),[68] the outcome of which remains to be seen. Aquaria and research facilities attempted a pilot project to capture and breed Hawaiian monk seals (*Neomonachus schauinslandi*)[69]—this is the only endangered pinniped breeding project we could identify. While some threatened and endangered small cetacean species have been held in captivity, such as the South Asian river dolphin (*Platanista gangetica*), the Amazon river dolphin (*Inia geoffrensis*) and the Irrawaddy river dolphin (*Orcaella brevirostris*), mortality rates during, and immediately after, capture were typically very high.[70] Indeed, some scientists have noted that, for numerous logistical reasons, captive breeding is not a viable option for the conservation of threatened and endangered cetaceans.[71]

While some populations of belugas (*Delphinapterus leucas*), orcas, and common bottlenose dolphins (*Tursiops truncatus*) are depleted or endangered, this status may be due in part to removals by the public display industry.[72] These species typically breed readily in the wild—their numbers are not limited in natural habitat by low reproductive rates but by habitat loss and other factors. There is a notable lack of conservation-priority cetacean species being bred in dolphinaria; thus, the facts do not support that these captive breeding programs are "appropriate" from a conservation perspective or the industry's claim that its captive breeding programs are for conservation purposes.

If dolphinaria were to seriously attempt breeding a captive cetacean population for conservation purposes, it has been estimated that, to maintain the appropriate amount of genetic diversity, they would need many more individuals of most species than they typically hold.[73] Rather than for conservation, cetaceans are bred merely to provide replacement animals for public display[74]—an ongoing need given the high rate of mortality in captivity (see Chapter 9, "Mortality and Birth Rates").[75]

Finally, the core of any successful species enhancement program is the ability to reintroduce captive-bred progeny (offspring) into the wild,[76] an action that has actually had limited success in the recovery of any threatened species[77] and is especially unlikely to be effective for cetaceans.[78] Indeed, the efforts of the public display industry to prevent captive cetaceans from being returned to the wild[79] (see below, "The Public Display Industry Double Standard") expose their conservation claims as hypocritical self-promotion. The industry appears to be attempting to produce a "captivity adapted" or domesticated population of cetaceans that would over time become unfit for release into the wild.[80]

As the capture and import of animals have become problematic from economic, logistical, and image standpoints, dolphinaria and aquaria, at least in the West, have made captive breeding a central objective. However, if captive dolphin facilities were serious about trying to conserve the species that they possess, they would be focusing on protecting the habitats of populations in the wild and would actively

Rather than for conservation, captive cetaceans are bred merely to provide replacement animals for public display—an ongoing need given the high rate of mortality in captivity.

be trying to ensure that their captive-bred animals could be reintroduced, and survive, in the wild.[81]

MIXED BREEDING AND HYBRIDS

Contrary to the conservation myth proffered by the public display industry, the captive birth of a marine mammal does not necessarily enhance its species' prospects for survival. For example, the birth of an orca of mixed Atlantic and Pacific genetic background is an event that has virtually no connection to the conservation of orcas or their habitat, because, among other things, the animal is genetically mixed and cannot be released into either population, due to concerns about introducing maladaptive genes to a population. Individuals from populations that could not breed together in the wild due to geographic separation regularly have offspring in captivity. Even worse, marine mammals belonging to completely different species have been bred together to produce hybrids,[82] which could not be released and have absolutely no value in terms of species conservation. Most captive-breeding programs simply ensure a supply of animals for display or trade, creating in many cases a growing number of surplus animals of questionable genetic backgrounds. These animals are poor candidates for release into the wild or, for that matter, future breeding efforts, and face uncertain futures at best.

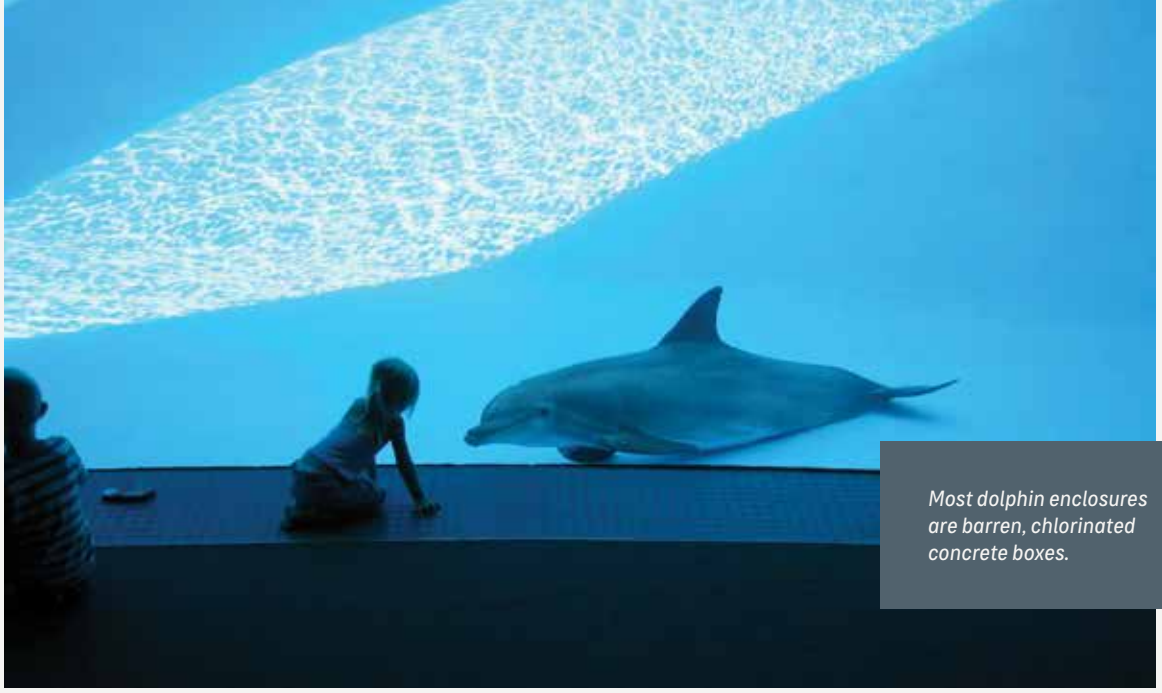
CAPTIVE CETACEANS AND CULTURE

It is becoming increasingly clear that culture exists within many marine mammal populations, particularly small cetaceans. By "culture," we mean specialized behaviors that are taught to, and learned by, animals within the group or population, within and across generations. Many of these behaviors are important for the survival of the animals in the wild, such as specialized foraging techniques that allow successful prey capture in a particular ecosystem and unique vocalizations—dialects, in effect—that apparently serve to enhance group cohesion, identity, and recognition.[83] Research has highlighted the importance of culture in the conservation of cetaceans, calling it a source of fundamental survival skills.[84] It has long been known that many marine mammals learn essential life skills from their mothers and also other group members. This is one of the reasons that cetaceans, in particular, but also other marine mammal species such as walruses (*Odobenus rosmarus*) stay so long with their mothers, learning, for example, how and when to forage.[85]

Despite the importance of culture in cetaceans, captive facilities do not take this into account in the husbandry (care and maintenance practices) of their animals. This fact yet again refutes the arguments that captive facilities are breeding marine mammals for conservation purposes. If animals cannot learn or maintain these essential survival skills and social norms, they have little or no hope of being released into the wild.[86] Also, because the skills and norms are passed from adults to young, the animals' offspring will also be doomed to lifetimes in captivity.

Unfortunately, dolphinaria have routinely separated cetacean calves from their mothers and moved them to other facilities or enclosures long before they would acquire the skills and knowledge necessary to fend for themselves in the wild. For example, Sumar, a male orca born at SeaWorld Orlando, was separated from his mother at only 6 months of age and was moved to California when he was less than 10 months old. Similar cases have been recorded for other orcas.[87]

Most captive-breeding programs simply ensure a supply of animals for display or trade, creating in many cases a growing number of surplus animals of questionable genetic backgrounds.



Most dolphin enclosures are barren, chlorinated concrete boxes.

Unfortunately, captive facilities have routinely separated cetacean calves from their mothers and moved them to other facilities or enclosures long before they would acquire the skills necessary to fend for themselves in the wild.

There are several instances where captive cetaceans have acquired abnormal behaviors, which would not be seen in the wild, because of their cultural transmission of behaviors and skills. Keiko—the orca made famous by the movie *Free Willy*, and later part of an attempt to be returned to the wild[88]—mimicked the calls of his bottlenose dolphin companion and other non-natural sounds he could hear in his tank.[89] Even the public display industry has reported this abnormal cultural transmission, with researchers studying SeaWorld cetaceans reporting that three orcas kept with bottlenose dolphins eventually produced the latter's calls.[90]

Bottlenose dolphins in captivity have been reported to adopt and produce sounds such as their trainers' whistles.[91] This is a clear example of their natural culture (calls) being supplanted by an artificial one. The development of such aberrant behaviors may preclude these animals, or their offspring, from ever being returned to the wild. At a minimum, it makes their rehabilitation more challenging. If captive facilities were serious about the concept of species enhancement programs, they would isolate whales and dolphins who are potential candidates for reintroduction to the wild from other cetaceans who are not from the same population or area and would not expose them to human-made sounds. Such individuals would also be isolated, to the greatest extent practicable, from human contact. Most wildlife veterinarians and biologists agree that animals to be rehabilitated or reintroduced to the wild should have minimal contact with humans and should live in an environment as close to their native habitat as possible.[92] Clearly, this also means they should not be trained to perform tricks, which are at best exaggerated versions of natural behaviors and are often completely unnatural.

Another problem with this loss of culture in captive cetaceans is the associated increase in mortality. Female cetaceans learn essential maternal skills from their mothers and also from other females in their population. Separating calves from their

Separating cetacean calves from their mothers or other females from their population at an early age, or forcing animals to become pregnant when too young to have acquired essential skills or the maturity to rear a calf, can lead to high levels of infant mortality.

This Indo-Pacific bottlenose dolphin was returned to the wild in 2013, after several years performing in a small tank in Seoul, South Korea. Top: In a pre-release holding pen, wearing a tracking tag designed to fall off after a short time. Bottom: Several days after his release, with a freeze-branded "1" on his dorsal fin. He was most recently seen in summer 2018.

mothers or other females from their population at an early age, or forcing animals to become pregnant when too young to have acquired essential skills or the maturity level needed to rear a calf,[93] can lead to high levels of infant mortality.[94]

THE PUBLIC DISPLAY INDUSTRY DOUBLE STANDARD

While the public display industry publicly represents its captive breeding programs as "species enhancement" and a major reason for its continued existence, its actions (as illustrated above) and words refute this argument. Many members of the public display industry have consistently maintained that wild-caught cetaceans held in captivity long-term, let alone captive-bred progeny, cannot be rehabilitated and returned to the wild.[95] They claim that husbandry and training methods and the constant exposure of the animals to humans lessen animals' chances of being released—a self-fulfilling prophecy.

To put marine mammal facility actions in this regard into context, an inter-zoo species enhancement program for a small primate, the golden lion tamarin, resulted in a nearly 20 percent increase of the wild tamarin population within the first 10 years of the program. Thus, by the early 1990s, a total of 16 percent of all free-ranging golden lion tamarins were reintroduced captive-born animals or their descendants and that percentage has no doubt increased since.[96] However, through the decades that bottlenose dolphins have been kept in captivity, very few captive-bred animals have been released into the wild by the public display industry. In fact, we were able to document only six: four as part of a larger Australian release project in 1992,[97] and

two animals released in the Black Sea in 2004. However, the release of these latter two animals was controversial, due to several factors, including poor post-release monitoring.[98]

Few captive whales and dolphins originally captured in the wild have been deliberately rehabilitated and released after long-term captivity either.[99] In several countries, animals have been released after the closure of facilities, sometimes by the facilities, sometimes by the authorities, sometimes by animal protection groups. These include one bottlenose dolphin in Brazil,[100] three bottlenose dolphins from UK facilities,[101] nine dolphins in Australia (see above),[102] two dolphins in Guatemala,[103] two dolphins in Nicaragua,[104] and two dolphins in Turkey.[105] Seven dolphins were released in Korea, as the result of a court case that determined they were acquired illegally.[106] In the United States, four bottlenose dolphins have been released from captive research facilities,[107] with one of the releases involving a considerable and successful effort to monitor the fate of the animals after their release. This latter effort, as well as the Korean releases, demonstrated scientifically that wild-caught dolphins kept in concrete tanks for two to six years can be successfully returned to the wild. Probably the best-known effort to return a wild-caught captive cetacean to the wild was Keiko, the orca from *Free Willy*.[108]

However, the releases above have primarily been from research facilities or as the result of the closure of public facilities, with the majority of the cost of rehabilitation and release being funded by academic institutions and animal protection groups rather than public display facilities. The lack of industry-backed rehabilitation and release programs for captive cetaceans or industry funding for the development of such is marked.

In fact, the public display industry has actively hindered the efforts of those who wish to conduct the work necessary to determine successful and safe methods for returning captive cetaceans to the wild.[109] If the industry's principal justification for captive breeding is to develop successful *ex situ* enhancement programs for current or future endangered or threatened cetacean species, then the industry should foster rehabilitation and reintroduction research rather than oppose it.

There is, however, an economic motive for the industry's opposition to the rehabilitation and release of captive cetaceans. Research might prove that cetaceans who have been captives for longer than six years can be successfully rehabilitated, returned to the wild, and reintegrated into a social group—even into the families from which they were removed. If so, for humane reasons, the general public might object even more strongly to the maintenance in captivity of these intelligent, long-lived species and may advocate for the release of all eligible candidates.

Two typical arguments the industry makes against subjecting captive cetaceans to the admitted risks of reintroduction[110] are that (1) it would be unethical, inhumane, and unfair to the individual animals chosen, and (2) reintroduction has never been done before with systematic and scientific methodology and monitoring,[111] so it is foolhardy to try it. Neither of these arguments stands up to scrutiny.

The first argument is hypocritical (the double standard); the industry did not show the same

If the industry's principal justification for captive breeding is to develop successful enhancement programs for current or future endangered or threatened cetacean species, then the industry should foster rehabilitation and reintroduction research rather than oppose it.

It seems clear that what the public display industry says and what it does are two entirely different things. "Captive breeding" and "conservation" are simply buzzwords used to gain the approval of the public.

reluctance when, for example, dozens of orcas were originally brought into captivity decades ago. Those animals were exposed to unknown (and in many cases fatal) risks, treated as subjects in an ongoing trial-and-error experiment. The second argument, aside from being factually incorrect (see above), implies an industry position against all new scientific research that poses health or survival risks to living animals, even when there may be substantial benefits to the individual or to the species. On the contrary, however, the industry promotes a pro-research position (on most topics other than this one), even when there are risks, arguing the benefits outweigh the costs. So once again, there is a double standard.

In the case of marine mammals, and cetaceans in particular, the behavior of the public display industry makes a mockery of alleged intentions to foster the conservation of species through species enhancement programs and captive breeding. It seems clear that what the public display industry says and what it does are two different things in this regard. "Captive breeding" and "conservation" are simply buzzwords used to describe a business activity, in order to gain the approval of the public.

ETHICS AND CAPTIVE BREEDING

Along with the substantive arguments outlined above, one must also weigh the ethical considerations of captive breeding programs. Taking an individual from the wild for captive breeding purposes obviously raises ethical concerns. Individuals are denied freedom and exposed to stressors and other risks in order to preserve an entire species. To make such programs morally justifiable, the animals being placed in captivity should be better off, or no worse, than they would be in the wild.[112] This is not possible with regard to captive marine mammals.

If habitat is being destroyed and no viable options are available for a natural migration to a protected area, then there may be an ethical justification for bringing animals into captivity.[113] However, this again is not the case with marine mammals. Little—if any—research is conducted on the habitats from which marine mammals are removed, so it is difficult to impossible to determine their status. In addition, most marine mammals currently in captivity are, or descend from, animals from relatively undisturbed or protected habitats (for example, the waters around Iceland in the case of orcas, or US coastal waters in which marine mammals enjoy a variety of legal protections such as those provided by the MMPA). So, the argument that species enhancement programs are ultimately for the benefit of marine mammals as a whole fails in practice, as well as on moral and ethical grounds.

STRANDING PROGRAMS

The one area of activity in which dolphinaria and aquaria can legitimately claim to serve a conservation function is work involving the rescue, rehabilitation, and release of stranded marine animals. Indeed, there are some very good stranding networks globally (although not all involve public display facilities); for example, the SEA LIFE Trust in the United Kingdom takes pains to rehabilitate stranded young seals, teaching them to forage for live fish, while minimizing direct exposure to humans. The seals are eventually released back into the areas where they were originally found (or as close to these areas as possible).[114]

But even stranding programs, as they are now conducted, give cause for concern. Some marine theme parks have been known to limit the number of rescued animals they will accept (such as sea turtles, pinnipeds, and seabirds) under various circumstances. For example, cold snaps in temperate and tropical regions can cause a large influx of shore-cast sea turtles needing veterinary intervention. However, the bulk of the rescue work may be done by small, non-profit rescue organizations rather than the larger, commercial facilities, who apparently do not prioritize space or funding for such species,[115] and thus limit the number of individuals they will take in.

Often the rescue efforts of the industry seem motivated by the desire to create better public relations. By saving injured manatees (*Trichechus manatus*) or by rehabilitating stranded dolphins, often spending many thousands of dollars in the process,[116] facilities persuade the public that they are altruistic and that they care for marine mammals in the wild—a public relations benefit worth the large investment of funds. While rescues are frequently heavily advertised in the media and releases even more so, failed rescues (when an animal dies while in a facility's care or soon after release) are played down.

A more subtle facet of the issue is that the public display industry takes every opportunity to use a stranding as proof that marine mammals' natural habitat is a dangerous place full of human-caused and natural hazards.[117] The public receives a skewed picture in which an animal's natural environment is hostile and captivity is a benign alternative, a picture that is implicitly contrary to both conservation and welfare principles.[118]

Two dolphins who died after stranding. Stranded cetaceans who do not die on the beach or are not pushed back into the ocean alive may be taken into captivity for rehabilitation, where survival is uncertain.

Also disturbing is the fact that public display facilities that rescue stranded animals appear to evaluate each animal in terms of display potential. Species that are highly desirable, such as orcas,[119] or rarely observed in captivity, such as spotted dolphins (*Stenella frontalis*) or pilot whales (*Globicephala* spp.), may be determined to be unsuitable for release;[120] these determinations are made with little oversight from either independent or government agencies. By rescuing these animals, a facility acquires an exotic exhibit at little cost, either financial or in terms of public relations.[121]

RESEARCH

As mentioned previously, the majority of the Western public, as evidenced in opinion polls such as those conducted in the United States and Canada, believes that marine mammals should not be kept in captivity

The public receives a skewed picture in which an animal's natural environment is hostile and captivity is a benign alternative, a picture that is implicitly contrary to both conservation and welfare principles.

unless there are major educational or scientific benefits.[122] As a result, dolphinaria and aquaria often claim that they foster research and scientific study of marine mammals, thereby contributing to both education and conservation. However, much of what can be learned from captive marine mammals has in fact already been learned. Reproductive physiology, such as length of gestation, and general physiology, such as visual acuity, have already been examined in some detail for several species. Furthermore, using reproductive information from captive marine mammals may actually be detrimental to conservation and management, due to unnatural and atypical breeding behavior in the artificial groupings of captive animals.[123]

There may be some research questions that the study of captive marine mammals can answer most directly (such as questions regarding cognition or the impacts of human-caused sound on hearing), but research programs that are not part of the entertainment industry could address those questions. Indeed, due to advancements in technology, such as biopsy darts, satellite tags, drones, and underwater remotely operated vehicles, as well as improvements in capture and release techniques,[124] in-depth study of the behavior and physiology of free-ranging marine mammals is now possible, adding to the redundancy of captive animals as research subjects.

One of the most famous critics of using the behavior of cetaceans in captivity as a model for animals in the wild was the environmentalist and filmmaker Jacques Cousteau, who said, "There is about as much educational benefit to be gained in studying dolphins in captivity as there would be studying mankind by only observing prisoners held in solitary confinement." Keeping marine mammals in captivity can answer few of the many questions scientists have about natural social interactions. Most of the current behavioral research using captive animals relates to husbandry concerns,[125] does little to benefit free-ranging animals,[126] and can provide some dubious results.[127]

Behavioral ecologists do not in general look to public display facilities to conduct their studies. The future in behavioral research lies indisputably in the wild. In fact, captive studies have been known to give erroneous and misleading information, not borne out by comparative studies on free-ranging animals,[128] and researchers using captive animals have admitted that the constraints put on cetaceans, such as small tank sizes limiting natural behaviors, lead to biases in their results.[129]

Captive studies have been known to give erroneous and misleading information, not borne out by comparative studies on free-ranging animals, and researchers using captive animals have admitted that the constraints put on marine mammals, such as small tank sizes limiting natural behaviors, lead to biases in their results.

SeaWorld in particular has claimed to be a significant contributor to scientific research that is invaluable for the conservation of free-ranging marine mammals,[130] but in reality their research output on cetaceans, particularly orcas, has been limited.[131] Some public display facilities actually market themselves as research organizations and gain non-profit tax status, although their primary

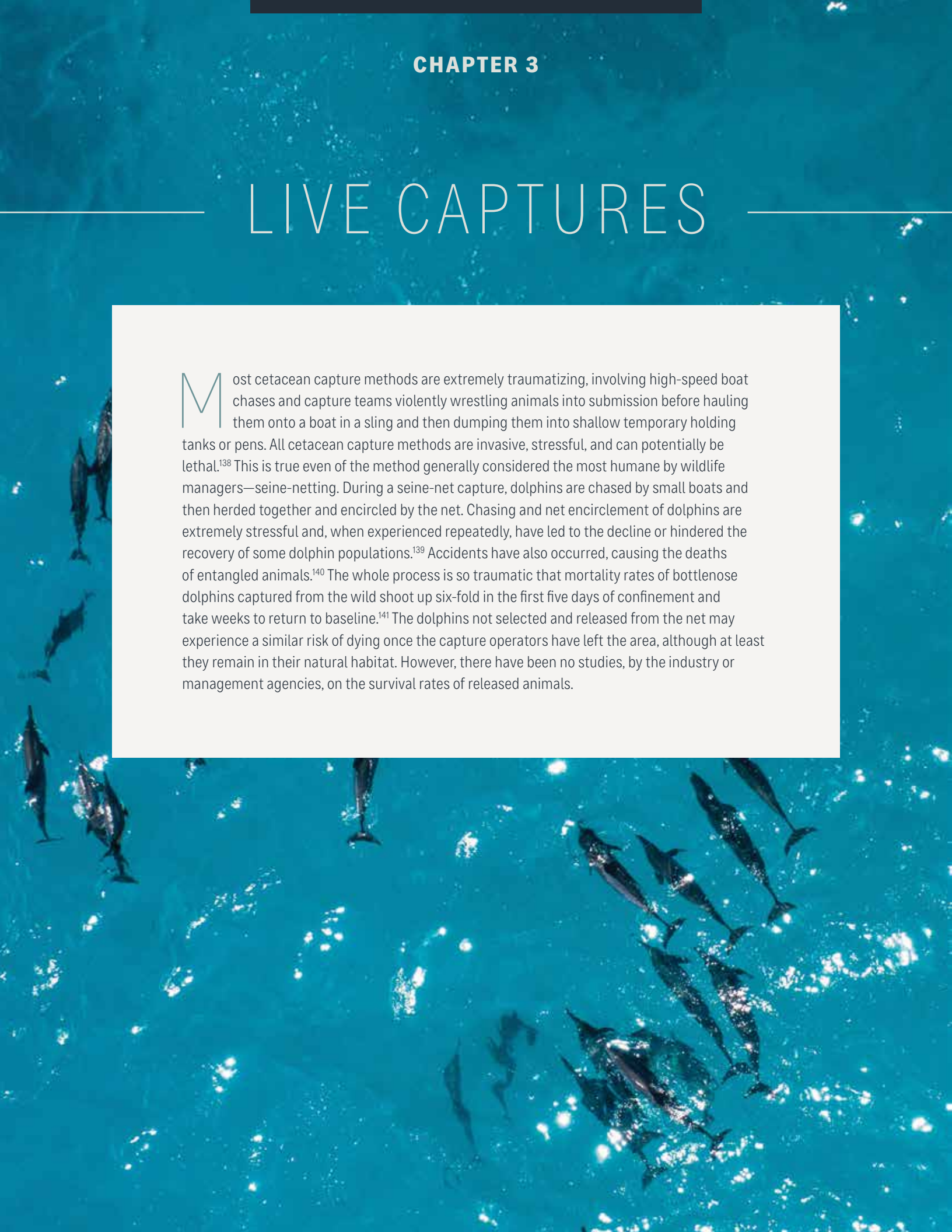
function is to provide entertainment and serve as tourist attractions. The Dolphin Research Center in the Florida Keys calls itself an education and research facility and in fiscal year 2016 it brought in US$7.1 million, US$4.9 million of which came from admissions fees and interactive programs with dolphins.[132] Despite having an annual income that would rival some marine laboratories, the actual research conducted here has been minimal.[133]

To illustrate the relative paucity of marine mammal research contributed by public display facilities, we assessed the number of presentations related to research on captive cetaceans and pinnipeds given at the foremost international conference on marine mammal biology (the Biennial Conference on the Biology of Marine Mammals, sponsored by the Society for Marine Mammalogy, the world's largest marine mammal research society).[134] Before the release of the documentary *The Cove*, and then *Blackfish*, brought major public attention to the public display of cetaceans, only about 5 percent of the conference presentations were related to research done on captive cetaceans. Of these few studies, more than a third were conducted through research institutions that are not open to the public. In 2007, there were only two abstracts submitted by SeaWorld, the largest holder of captive marine mammals in the world.[135] At several previous Biennial Conferences, no major North American facility made a presentation at all. In 2010, researchers studying captive cetaceans found similar results, reporting that only 1.2 percent of scientific articles on orcas involved captive animals.[136] At the 2017 Biennial Conference, the percentage of presentations that was related to research in a captive setting using marine mammals of all species was only 6.2 percent; thus, the contribution by public display facilities to the field of marine mammal science had not increased appreciably in a decade.

AWI and WAP believe that research on captive animals can only be justified in circumstances where it is necessary to resolve critical questions to benefit the animals themselves or animals in the wild. It should be conducted whenever possible through research-sabbatical programs, in which animals are held only for brief periods or through non-invasive research using marine mammals maintained in seaside sanctuaries (see Chapter 12, "The *Blackfish* Legacy"). Sabbatical programs have been pioneered successfully by several marine mammal researchers.[137] Commercial facilities are not essential to continued research on captive marine mammals.

CHAPTER 3

LIVE CAPTURES



Most cetacean capture methods are extremely traumatizing, involving high-speed boat chases and capture teams violently wrestling animals into submission before hauling them onto a boat in a sling and then dumping them into shallow temporary holding tanks or pens. All cetacean capture methods are invasive, stressful, and can potentially be lethal.[138] This is true even of the method generally considered the most humane by wildlife managers—seine-netting. During a seine-net capture, dolphins are chased by small boats and then herded together and encircled by the net. Chasing and net encirclement of dolphins are extremely stressful and, when experienced repeatedly, have led to the decline or hindered the recovery of some dolphin populations.[139] Accidents have also occurred, causing the deaths of entangled animals.[140] The whole process is so traumatic that mortality rates of bottlenose dolphins captured from the wild shoot up six-fold in the first five days of confinement and take weeks to return to baseline.[141] The dolphins not selected and released from the net may experience a similar risk of dying once the capture operators have left the area, although at least they remain in their natural habitat. However, there have been no studies, by the industry or management agencies, on the survival rates of released animals.

A capture method once commonly used on oceanic cetaceans, such as Pacific white-sided dolphins (*Lagenorhynchus obliquidens*), is "hoop netting." This method took advantage of the species' tendency to "bowride," or swim at the front of boats. The captor lowered a pole attached to a collar from the front of the capture vessel over the head of a swimming dolphin. This collar was attached to a break-away net, and as the dolphin swam away, the animal became entangled. The dolphin was pulled to the side of the vessel and then hoisted aboard.

The most violent and cruel method of collecting cetaceans for dolphinaria is the drive fishery, currently used only in Taiji, Japan. This hunt involves a flotilla of small boats that—through producing loud noises when the crews bang on hulls or clang metal pipes together underwater—herd cetacean groups into shallow water. Some of the animals are set aside for sale to public display facilities, while the rest are killed and butchered for human and pet food and other products;[142] occasionally some are released, to an unknown fate. The drives in Japan achieved international infamy as the result of the Academy Award–winning documentary *The Cove*,[143] which highlighted both the hunt and the trade in dolphins to aquaria.[144] In the 2017–2018 season, 613 small cetaceans were killed in Taiji and 107 were live captured for dolphinaria (Table 1).[145]

Each dolphin slaughtered in these hunts is worth only a few hundred US dollars as meat (and this market has been affected due to the concerns over the high pollutant levels in these animals)[146] or fertilizer, but live animals fetch up to tens of thousands of dollars[147]—the large profits from the few live animals sold from each hunt help to subsidize and maintain the drives.[148]

Many drive-caught animals, of several species, are found in Japanese and other Asian dolphinaria—the fastest expanding market is mainland China.[149] At least 105 facilities in 20 countries have sourced Taiji dolphins for public display over the years.[150] When Hong Kong was still governed by the United Kingdom, its Ocean Park facility obtained animals from drive fisheries in Japan.[151] Ocean Adventures, a facility in Subic, Philippines, received a shipment of false killer

TABLE 1. The number of small cetaceans driven, killed, and captured in Taiji (2017–2018).

SPECIES	NUMBER DRIVEN	NUMBER KILLED	LIVE CAPTURES	RELEASED	TOTAL TAKES
Pacific white-sided dolphin	24	0	19	5	19
Striped dolphin	288	284	4	0	288
Bottlenose dolphin	52	0	25	27	25
Risso's dolphin	187	157	24	6	181
Short-finned pilot whale	80	32	3	45	35
Rough-toothed dolphin	94	4	24	66	28
Melon-headed whale	191	136	8	47	144
Pygmy killer whale	10	0	0	10	0
TOTAL	926	613	107	206	720

During a drive hunt, bottlenose dolphins panic and thrash in their own blood, as snorkelers search for young, uninjured animals for sale to dolphinaria.

whales (*Pseudorca crassidens*) from a Taiji drive in March 2004. The person who procured these animals for Ocean Adventures was an American.[152] The problem has not been confined to Asia—there was an attempt in 2006 to import 12 Taiji-caught bottlenose dolphins into the Dominican Republic, although the trade was canceled due to public opposition.[153] At least 20 false killer whales caught in Japanese drives were imported into the United States prior to 1993; however, since then no permits have been issued to US facilities to import cetaceans collected from Japanese drive fisheries.[154]

Although drive-caught animals have not been directly imported into the United States for more than 25 years, the US government has allowed the exporting of marine mammals caught in its waters to facilities in Japan that hold drive-caught animals.[155] In addition, it considered a research permit request by SeaWorld to collect reproductive and other tissues from animals captured and killed in drive fisheries.[156]

However, the Taiji drive fishery has become so infamous and public pressure so great that in 2004 the Association of Zoos and Aquariums (AZA) and the World Association of Zoos and Aquariums (WAZA) issued statements condemning the hunts,[157] and in 2015 the Japanese Association of Zoos and Aquariums (JAZA) prohibited its members from sourcing their animals from these hunts.[158] Despite this, transfers continue to non-JAZA facilities in Japan and exports have occurred to non-WAZA facilities in countries such as China,[159] Taiwan,[160] and the United Arab Emirates.[161]

Aside from humane considerations, removal of individuals from populations in the wild can have a substantial negative impact on the animals left behind. Research on bottlenose dolphins and modeling of orca societies show that certain individuals play a crucial role in holding communities together. If these individuals are removed, by natural causes, hunts, or captures, the group might lose cohesion and disperse.[162] This dispersal could have serious survival implications for the remaining animals, as having a well-organized group is crucial when dolphins and orcas forage for food or have to defend themselves against predators or competitors.

In addition, if a relatively small population of cetaceans is persistently targeted by capture operators, a large proportion of an entire generation (the juveniles preferred for capture, as they are more easily transported, better able to adjust to confinement, and make the transition to eating dead fish more readily) may be removed. Depletion at the time will be obvious, but at some time in the future, these animals will also not be available to the population as breeders. This means it is not just the "first wave" of removals that will hit targeted populations, but a "second wave" may strike years after captures end, manifesting as a decline in birth rate and harmful inbreeding.[163]

In the survey of international public attitudes published in 2018, almost 80 percent of respondents objected to capturing free-ranging dolphins and whales for display in zoos and aquaria.[164] In the 2007 survey of the US public, almost 90 percent of respondents found capturing wild dolphins for

More and more facilities are opening in China, which is now the main market for wild-caught marine mammals. There are currently at least 76 operational dolphinaria and marine theme parks in China, but at least 25 more are planned for construction over the next few years. As of January 2019, approximately 954 cetaceans, of at least 12 species, were being displayed in China, with most of these originally captured from the wild and imported, primarily from Japan and Russia.

display unacceptable.[165] Even the broader zoo and aquarium community discourages live capture,[166] yet is able to provide little evidence of action to stop the practice. Captures of non-cetacean marine mammals occur only rarely today, as these species either breed relatively well in captivity (for example, California sea lions, *Zalophus californianus*) or are acquired when dependent young are orphaned in hunts or through strandings (for example, polar bears). However, some pinniped species, particularly from the Southern Hemisphere for Asian facilities, are still taken from the wild.[167]

Thus, deliberately organized live captures for public display remain a serious conservation and welfare problem, primarily for cetaceans—a problem that is increasing as more and more facilities are opening in China, which is now the main market for wild-caught marine mammals. As of January 2019, there were at least 76 operational dolphinaria and marine theme parks in China, but at least 25 more are planned for construction over the next few years. Approximately 954 cetaceans, of at least 12 species, are currently displayed in China, with most of these originally captured from the wild and imported, primarily from Japan and Russia.[168]

The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), the treaty that governs international trade in wildlife species, requires an exporting country to make a "non-detriment finding" (NDF) to support trade involving certain species (including all cetaceans).[169] An NDF is supposed to demonstrate that "export will not be detrimental to the survival of that species" and is meant to be based on scientific studies of the abundance and status of the natural population from which animals are taken, as well as a scientific assessment that shows that trading in these animals will not harm the survival of the species.

Despite this requirement, cetaceans have been captured from the wild for public display facilities accompanied by NDFs that are not scientifically substantiated and do not satisfy the intent of CITES in requiring NDFs.[170] These captures are always controversial, in part because no consideration has been given to the impact of these removals on populations in the wild. This is now considered a critical conservation issue; the International Union for Conservation of Nature (IUCN) *Conservation Action Plan for the World's Cetaceans* states

> *As a general principle, dolphins should not be captured or removed from a wild population unless that specific population has been assessed and it has been determined that a certain amount of culling*

can be allowed without reducing the population's long-term viability or compromising its role in the ecosystem. Such an assessment, including delineation of stock boundaries, abundance, reproductive potential, mortality, and status (trend) cannot be achieved quickly or inexpensively, and the results should be reviewed by an independent group of scientists before any captures are made. Responsible operators (at both the capturing end and the receiving end) must show a willingness to invest substantial resources in assuring that proposed removals are ecologically sustainable.[171]

The Small Cetaceans Sub-Committee of the IWC's Scientific Committee has expressed similar concerns.[172] Virtually everywhere cetacean live captures for public display are happening today, no such investment has occurred.

This is one of the glaring loopholes of the current CITES permitting process—no CITES violation occurs as long as the exporting country certifies that the trade will not be detrimental to the survival of that species, that the animal will be prepared and shipped humanely, and that the removal from the wild was legal. Although CITES provides guidelines for parties to the treaty making NDFs, it has no process to objectively verify the validity of an NDF that has already been made.[173] For many commercially valuable species, there is insufficient information on their status and the threats they face to justify a particular level of removals for trade, rendering the NDFs that have been issued for them questionable—just one of the reasons to oppose this trade.

Bottlenose dolphins in makeshift pens in Solomon Islands. While once a major source for dolphinaria world-wide, public outcry forced the end of captures there.

Several wild-caught juvenile beluga whales languish in holding pens as they await the outcome of policy deliberations on their fate. This area of the Russian Far East coast freezes in winter—the ice must constantly be broken up so the animals can surface to breathe.

BOTTLENOSE DOLPHINS

Cuba has long been a hotspot for bottlenose dolphin captures.[174] These captures have been for both domestic and international trade.[175] Exports include six dolphins sent in 2007 to the Dolphin Academy on the Caribbean island of Curaçao (five of whom still survive)[176] and nine animals sent to Venezuela in 2011 and 2013.[177] To date, there have been no publicly reported population estimates or completed assessments of the cetaceans in the coastal waters of Cuba. There have been no studies to determine whether these removals were or are sustainable or what, if any, impact they have had on these dolphin populations.[178] Captured Cuban dolphins have often been sold to other facilities in the Caribbean,[179] as with the Dolphin Academy, while others have been exported to Europe and Mexico.[180] Given that Cuban NDFs to support these trades have not been science-based, these exports should not have been allowed under CITES.[181]

The Cuban dolphin captures raised concerns at the IWC, where the Scientific Committee stated that "there is currently no basis for assessing the sustainability of these takes as no abundance data were available for Cuba."[182] The number of dolphins captured for domestic use is unknown.[183]

Similar concerns about lack of scientific information and the sustainability of captures were also voiced for captures of coastal bottlenose dolphins in Mexican waters in the Gulf of Mexico, although these captures have now been prohibited under Mexican law.[184] The IUCN Cetacean Specialist Group has recommended that, at a minimum, 50 genetic samples (through biopsy darting) should be taken and at least three complete population surveys (using appropriate scientific methods) should be conducted before the status of a dolphin population can be determined, and therefore before any captures should even be considered.[185]

Bottlenose dolphin captures have occurred in other parts of the world as well (see Table 1 for the data on captures in Japan of bottlenose dolphins and other species). Examples include another capture in Mexico, in December 2000, when eight bottlenose dolphins were captured off the Pacific coast of Baja California.[186] They were then transported to the Dolphin Learning Center dolphinarium at the La Concha Beach Resort in La Paz, Mexico, on the peninsula's Gulf of California side.

In another incident, in August 2002, eight bottlenose dolphins were captured from the coastal waters of

These juvenile orcas, captured from a mammal-eating population and held at the same Russian Far East facility shown on page 31 (although held in separate pens), face an uncertain future.

the Parque Nacional del Este (National Park of the East) in the Dominican Republic and sent to a local facility, Manatí Park.[187] This capture was illegal under both national and international law.[188] By 2006, only three of these dolphins were known to be still alive; by 2009, there were only two.[189] Action by the Dominican government prevented further captures from occurring, effectively saving this population, as a scientific analysis determined that, had the capture of young female dolphins from this population continued, the Dominican population would have quickly been wiped out.[190]

Another capture, in the South Pacific, occurred over several months in 2003.[191] Entrepreneurs in Solomon Islands took advantage of a period of governmental instability and caught a minimum of 94 Indo-Pacific bottlenose dolphins (*Tursiops aduncus*) for international trade to dolphinaria (there were at that time no public display facilities in Solomon Islands).[192] There was a subsequent capture from the same area in summer 2007. The government issued capture permits to several operators and established a capture/export quota of 100 dolphins per year, and despite a lack of science to ascertain the sustainability of these removals,[193] many animals were exported internationally.[194] After international outcry, however, Solomon Islands banned further dolphin captures and trade in 2015. Despite this ban, there was an attempt to capture and export 30 animals in 2016, although the captured dolphins were discovered and released.[195]

Other bottlenose dolphin captures in the Caribbean include eight taken in Haiti (six survivors were released almost immediately, after public protest) and 10–14 captured in Guyana, both in 2004.[196] In 2006, the Small Cetaceans Sub-Committee of the IWC's Scientific Committee reported illegal trade and capture activities involving 12 dolphins in the Gulf of Paria, Venezuela, in May 2004[197] and 15 dolphins in March 2005 near Roatán Island, Honduras. The ultimate disposition of these 27 animals (released, died, retained, or exported) was not reported.[198] The sustainability of these captures was not assessed before they took place.[199]

Even African waters have been targeted by the trade. A wildlife trading company in Guinea-Bissau approached the government for permission to capture and export bottlenose dolphins in 2007.[200]

Its representatives claimed that there were over 10,000 dolphins in the country's waters, without any scientific basis for this claim; the actual population was more likely to be just a few hundred animals. Given the various threats to dolphins in this region, any additional losses from live captures would likely have had a substantial impact on this population.

Many members of the general public continue to believe captures of free-ranging cetaceans are a thing of the past, encouraged in this mistaken belief by the public display industry. Indeed, in the United States there have been no captures of bottlenose dolphins from the wild since 1989.[201] However, even members of the public display industry have expressed their concerns about the capture and trade in wild-caught dolphins. For example, the director of the Dolphin Academy in Curaçao (see above) expressed outrage when the import of six Cuban dolphins was proposed.[202] She called the import "immoral" and worried that these captures would bring her facility into disrepute. However, the imports went ahead, with one dolphin dying soon after transfer; the director was reportedly fired for speaking out against the trade.[203]

On a more positive note, at the 2002 meeting of the Conference of the Parties to CITES (CITES parties meet every three to four years), the nation of Georgia managed to get a zero quota adopted for the commercial export of wild-caught Black Sea bottlenose dolphins.[204] Between 1990 and 2001, about 120 live Black Sea bottlenose dolphins were traded across national borders for public display, with Russia being the main exporter. This was in addition to an estimated 25 to 50 animals who were caught every year to supply local dolphinaria and aquaria in countries bordering the Black Sea. Georgia's motivation for introducing this proposal was a growing concern about the impact of this trade on a dolphin population that had been depleted by historical culling, current high levels of pollution, and other human activities. Because exports of wild-caught animals for the lucrative international live trade are now effectively prohibited (although enforcement of the zero quota continues to be an issue), one threat to this declining population has been reduced.

ORCAS

The detrimental impacts of removing animals from a population might be most clearly seen in the case of orcas in Washington in the United States. From 1962 until it was made illegal under state law in 1976, at least 53 orcas were taken from the "Southern Resident" population in Washington. At least 12 animals died during capture, and the survivors were shipped to aquaria and dolphinaria, of which only one animal is currently alive.[205] The current population is believed to have been more than halved by these removals[206] and was listed as endangered under the US Endangered Species Act (ESA) in November 2005, partially because of the impacts of these removals.[207]

Historically, another hotspot for orca captures was Iceland—dozens of orcas were captured for international trade that was sanctioned by the Icelandic government in the 1970s and 1980s. These captures stopped in the late 1980s, when the controversy surrounding live orca captures increased. They also occurred historically in the waters off Japan but ended due to local depletions in the late 1980s. Orcas had not been seen off

Many members of the general public continue to believe captures of free-ranging cetaceans are a thing of the past, encouraged in this mistaken belief by the public display industry.

Wakayama Prefecture in Japan for 10 years when a pod was sighted in February 1997. Ten animals were captured by fishermen from Taiji, of which five, all juveniles or sub-adults, were sold to dolphinaria and aquaria and the remainder released.[208] All five of these young animals were dead by late 2008, in less than 12 years; this outcome is appalling in a species capable of living as long as humans do (see Chapter 9, "Mortality and Birth Rates").

In Russia, authorities issued quotas for live captures off Kamchatka starting in 2001—these annual quotas ranged from six to 10 animals. Although initial attempts at captures failed, in September 2003, a young female was successfully captured, initially for transfer to a Russian dolphinarium's holding facility. One juvenile drowned during the capture; the female died 23 days later.[209] Between 2005 and 2010, several failed attempts were made to capture orcas in the northern Sea of Okhotsk.[210] In 2010, one orca was captured in the western Sea of Okhotsk, but the animal apparently escaped from the holding pen. However, Russian government fisheries scientists reported the capture of a total of six animals in Russian waters during the period 2003–2010, although details have only ever been released on the three noted above; what happened to the other three animals is unknown.[211]

In the western Sea of Okhotsk, one successful capture occurred in 2012 and three in 2013, for a total of seven whales taken. The fate of three of these is unknown; of the remaining four, two were exported to China and two were sent to Moscow's brand-new Moskvarium.[212] In 2014, eight more orcas were captured (under a permit that allowed for only six); five of these were shipped to China and a sixth to the Moskvarium.[213] Another orca was also observed in captivity, after allegedly being bycaught in fishing gear. This animal was supposedly released, although the animal was discovered on a cargo boat, with two other young orcas, later in the year.[214] Eight more animals were captured in 2015, and a further four were believed to have been taken in 2016, of which six were reported to have been exported to China (two in 2015 and four in 2016).[215] Officially none of these animals was reported to have died, although there is a distinct lack of oversight of these captures, so this cannot be confirmed.

In late 2015, the quasi-governmental agency responsible for establishing the total allowable catch levels for beluga whales and orcas in the Sea of Okhotsk, the Pacific Fisheries Research Center (the acronym is TINRO in Russian), faced investigation and eventually a fine, after it was determined that it was issuing capture permits for educational, cultural, or research purposes that were being used for commercial purposes (public display and performance).[216] Officially, all captures in 2016 and 2017 were suspended, although some captures still seem to have occurred in 2016 (see above, although the four exported animals in 2016 may have been captured in 2015 and "held over" until the next year). Unfortunately, despite this promising development in bringing the unsustainable and essentially unregulated trade in live orcas (and belugas, see below) under control in Russia, permit issuances and captures began again in summer 2018, with a total allowable catch of 13 whales. In August 2018, two more orcas were reported to have been captured in the Sea of Okhotsk, with a third orca apparently being killed during the capture process.[217]

In November 2018, drone footage of 11 orcas and 90 belugas being held in holding pens in Srednyaya Bay, Nakhodka (about 40 km (25 miles) from Vladivostok in the Far East of Russia), was released on social media, and quickly went viral.[218] The public backlash, in addition to lobbying pressure from Russian and international animal groups, and a letter of concern from a group of international scientists,[219] led Russian authorities to review the situation.[220]

A law was amended earlier in 2018 such that cetaceans captured under permit for cultural and

educational purposes (that is, public display) must be retained within the Russian Federation.[221] It is thus illegal to export them, and yet these capture operators were expressly capturing the majority of the belugas and all of the orcas for export to China. The age of the animals was another concern—none had reached sexual maturity and 15 of the belugas were almost certainly less than a year old (their teeth had not erupted), which violated Russian regulations. Subsequent to this investigation, it was announced that no captures of cetaceans for any purpose other than science would be permitted in 2019;[222] this ban on captures in Russian waters for public display may (or may not) become permanent.

There is a major international collaborative project being conducted to ascertain, among other things, how many orcas inhabit the Sea of Okhotsk, but at present, there is still no definitive estimate of population size.[223] The impact of the captures since 2012 is therefore currently unknown and the fate of the 100-plus whales in Srednyaya Bay was uncertain as of January 2019.

BELUGAS

From 1999 to 2005, Canada's Marineland, in Niagara Falls, Ontario, imported 10 wild-caught Black Sea bottlenose dolphins (a practice now prohibited—see above) and 28 wild-caught beluga whales from Russia,[224] for a total of 38 wild-caught cetaceans in just six years.[225] Eight more wild-caught belugas from Russia, all females, were imported in December 2008.[226] As with other live captures, appropriate scientific surveys to assess the impact of these removals were not conducted, and the taking of so many females is a special cause for concern.

Marineland was still importing live-caught cetaceans during a time when the practice of keeping

Belugas have been captured in Russia for the live dolphinarium trade for several decades. Their survival after this rough handling is poor; facilities in China in particular come back again and again to buy more as the belugas purchased earlier die.

Marineland in Ontario, Canada, was still importing live-caught cetaceans during a time when the practice of keeping cetaceans in captivity there was increasingly controversial.

cetaceans in captivity in Canada was increasingly controversial. In a 2003 poll, approximately two-thirds of those surveyed did not support the captivity of whales and dolphins and thought that the use of captive whales and dolphins for commercial purposes in Canada should be stopped. In addition, more than half of those interviewed said they would support laws that prohibit the import of live whales and dolphins into Canada.[227]

In 2012, Georgia Aquarium in Atlanta, Georgia, in the United States provoked controversy when it announced a plan to import 18 wild-caught beluga whales from Russia (captured between 2006 and 2011 in the Sea of Okhotsk), to supply itself, SeaWorld, Mystic Aquarium in Mystic, Connecticut, and the John G. Shedd Aquarium in Chicago, Illinois. In its import permit application, Georgia Aquarium admitted the North American beluga breeding program had been a failure, thus "necessitating" an influx of new breeding stock from the wild.[228] This would have been the first import into the United States of wild-caught cetaceans in 20 years.[229] However, NMFS denied the permit application in July 2013, as the beluga whales came from a likely depleted population.[230] Georgia Aquarium sued to overturn this denial in 2013, but a 2015 court ruling upheld NMFS' original decision.[231] The aquarium announced seven weeks later that it would not appeal and in 2016 announced it would no longer seek to acquire additional belugas. These decisions came after a series of beluga deaths at the aquarium[232] and the resulting adverse publicity arising from these deaths, the permit application, and the subsequent legal proceedings.

Belugas have also been imported (primarily from Russia) by China, Thailand, Egypt, Taiwan, Bahrain, and Turkey.[233] Most of these countries do not have facilities capable of keeping this Arctic species at an appropriate temperature. As with Cuba and its bottlenose dolphins, Russia saw its belugas as a resource for generating hard currency—the sustainability of its capture program and the welfare of the animals were and are distant considerations at best. In 2014, animal protection groups submitted a petition to designate the Sakhalin Bay–Amur River population of belugas as depleted under the MMPA. NMFS concurred with their reasoning and designated these whales as depleted in 2016. The MMPA prohibits imports of animals from a depleted stock, meaning the United States will now never become a trading partner in live belugas with Russia.[234] However, after the release of drone footage of pens holding 90 belugas and a subsequent investigation of their capture by Russian authorities (see above), it seems likely that the live trade in Russian belugas has ended with all countries, at least temporarily.

CHAPTER 4

THE PHYSICAL AND SOCIAL ENVIRONMENT

The discussion in Chapters 1 and 2 illustrates the fallacies and inconsistencies in various arguments and rationales used to justify the holding of marine mammals in captivity for public display. In the discussion that follows, physical, environmental, and behavioral factors, as well as life history parameters, are examined and compared, where possible, for marine mammals living in captivity and in the wild to illustrate systematically the fundamental welfare concerns related to holding these species in confinement. No marine mammal can *thrive* in captivity.[235]

CONCRETE ENCLOSURES

In any design of a dolphinarium or aquarium, satisfying the needs of the visiting public and the facility's budget comes before meeting the needs of the animals. If every measure were taken to create comfortable, safe, and appropriate conditions, then the size, depth, shape, surroundings, props, colors, and textures of concrete enclosures would be different from those seen now. In

addition, noisy and disruptive activities and structures (such as fireworks displays, musical events, and roller coasters), all too commonly placed adjacent to or near marine mammal enclosures at marine theme parks, would be relocated to avoid disruption to marine mammals exposed to them daily and in some cases intermittently throughout the day.[236]

The tanks speak for themselves. Their overall size, shape, and depth are determined by the need for maximum visibility from the surrounding bleachers and underwater viewing windows.[237] High water clarity, for similar reasons, is achieved via water treatment methods such as filtration, ozonation, and chlorination, which are also needed to maintain hygiene for animal health purposes.[238] The acoustic properties of concrete tanks are problematic for species that rely predominantly on sound and hearing to perceive and navigate through their underwater surroundings. Persistent noise from water pumps and filtration machinery, if not dampened sufficiently, and any activity nearby that transmits vibrations through a tank's walls, such as construction or traffic, can increase stress and harm the welfare of these acoustically sensitive species. Any sharp angles in a tank's configuration can cause reverberation and echoes—even of the animals' own vocalizations—that are unnatural and potentially stressful.[239] Economics also influences design; it becomes prohibitively expensive to build larger enclosures.[240] Management concerns play their role as well; the strict control of large, dangerous animals necessary for show training becomes more difficult as the space allotted to them increases. Finally, efficiency of maintenance and disinfection dictates slick surfaces as opposed to naturalistic textures and substrates.

In sharp contrast to guidelines and regulations that do exist, particularly from professional associations such as the AMMPA and WAZA, some facilities are not specifically designed to hold these species at all. The husbandry requirements for captive marine mammals, particularly cetaceans, are considered to be among the most highly specialized of all wildlife. Nevertheless, in some parts of the world, swimming pools meant for people, both concrete in-ground and plastic above-ground, have been repurposed to hold dolphins, belugas, and other marine mammals, permanently in some locations and temporarily in others.[241] These enclosures can in no way accommodate the biological needs or waste products of these species.[242]

In addition, unlike many other species kept at zoos and aquaria, captive marine mammals often have no provision to go "off display" (to retire to an area away

The St. Petersburg Dolphinarium in Russia—considered a "premiere" facility—is merely a training pool from the 1980 Olympics. This swimming pool holds several dolphins, belugas, walruses, and sea lions in cages at the shallow end. They perform at the deep end.

from the main exhibit area, out of view of the public) or avoid/escape from other animals in the tank at will; if such retreat space exists, they can only access it when handlers open gates or doors. This absence of retreat space has led to serious aggressive interactions between animals, in at least some cases resulting in serious injury and even death.[243]

Interestingly, the public display industry often maintains that keeping marine mammals in tanks shields them from human-caused hazards in the ocean, such as climate change, pollution, marine debris, and shipping noise. In short, they claim that the animals in their charge are safer in captivity than they would be out in the increasingly dangerous wild, a modern-day "Noah's Ark" argument.[244] But this is hardly a compelling conservation message; it implies, in fact, that the increasingly damaged marine environment is a lost cause, threatening the lives of every miserable marine mammal who is forced to live in it. Why sacrifice to save the wild when captivity is the safest—and easiest—option? This makes a mockery of the industry's self-portrayal as a champion of conservation.

SEA PENS

Sea pens are enclosures that are fenced- or netted-off portions of open seawater or lagoons, and are generally thought from a welfare perspective to be preferable to a tank (a small number of freshwater river dolphins are maintained in river pens). The animals are held in natural seawater, as opposed to chemically treated, filtered, and/or artificial seawater. The surroundings are often more "natural" or complex and thus more "interesting" for the marine mammals than a typically featureless tank. The enclosure's acoustic characteristics are more natural.

However, sea pen facilities have their own unique problems and their conditions can compromise the health of, and even lead to the death of, marine mammals kept within them. Dolphinaria select sites for sea pen enclosures that maximize tourism traffic

This sea pen was built here to be accessible from the aquarium on shore, not because it is a good place for captive dolphins to live. The water in this bay is typically as blue and clear as the water just around the point, but after a heavy storm the runoff turns it into brown sludge, unfit for human swimmers—or dolphins.

rather than cetacean well-being. For example, pens may be close to sources of pollution (such as runoff from roads, sewage outfalls, or water leached from land-based septic tanks).[245] Also, the animals may be exposed to high levels of sound, which can cause distress or hearing damage. Noise from boat traffic and coastal development may echo off the seabed if it is too shallow, creating sound levels well above those in the open ocean. Sea pens are also generally more accessible to the public (dolphinaria do not necessarily give sufficient attention to security) than tanks on land, increasing the risk that vandals may injure or even kill the animals or that others (perhaps with the best intentions) may cut through the barrier net and release them, without any preparation for a return to the wild.[246]

Many sea pen dolphinaria are also in areas subject to hurricanes or typhoons. Penned animals cannot escape storms, and facilities frequently do not evacuate animals (and contingency plans are often wholly inadequate). The aftermath of a hurricane can leave sea pens clogged with debris and contaminants, with dolphins suffering severe injuries,

becoming ill, and even dying.[247] Hurricanes can also lead to animals escaping from the enclosures.[248] This may seem like Mother Nature giving the animals their freedom, but releasing non-native species into foreign waters is generally believed to amount to a death sentence for the animals and could harm local ecosystems as well.[249] Probably the best known incident involving captive marine mammals and hurricane impacts was when Hurricane Katrina hit Mississippi in the United States in 2005. Eight dolphins were left behind in Marine Life Oceanarium in the town of Gulfport. All were carried out into the Gulf of Mississippi in the storm surge, which led to a rescue that cost at least tens if not hundreds of thousands of US tax dollars.[250] Hurricane Wilma hit the Yucatán Peninsula only a few weeks later and devastated several dolphinaria in Cancún and Cozumel.[251] The 2017 hurricane season, which included Hurricanes Irma and Maria, devastated several dolphinaria in the Caribbean, including Dolphin Discovery in Tortola, British Virgin Islands.[252]

Another issue with respect to sea pens is their impact on "natural barriers." Natural barriers are physical structures such as barrier islands, or biological structures such as mangrove stands and coral reefs, which help to buffer and shield coastal areas from the impact of storms, hurricanes, or tsunamis. Removal of these barriers by coastal development has been blamed for increasing the damage and destruction caused by hurricanes and other natural disasters, such as the 2004 Asian tsunami.[253] Concern has been raised about the impact of dolphin sea pens on natural barriers, through the dredging and physical removal of barriers to make space for them. In addition, the pollution from coastal dolphin enclosures, such as fecal waste and the detritus from decomposing, uneaten fish (as well as waste from associated tourist infrastructure, such as toilets) can have a significant impact on coral reefs in particular.[254] The widespread expansion of dolphin sea pens in the Caribbean is a particular cause for concern, as these further diminish natural barriers that have already been degraded by high levels of coastal development; moreover, the Caribbean is considered to be an area particularly at risk from hurricanes and tsunamis.[255]

In the South Pacific, another area frequently impacted by tsunamis, construction of dolphin sea pens has been a major cause of mangrove destruction, joining coastal shrimp ponds and other aquaculture projects. This also means that sea pens are often in close proximity to aquaculture sites, which are frequently dosed with pesticides and pharmaceutical treatments, producing sewage as well as waste effluent. These would pose toxic risks to the health of cetaceans penned nearby.[256]

PINNIPEDS

Many pinnipeds are migratory. Although they tend to be relatively sedentary on land, they have evolved to make journeys of hundreds or thousands of kilometers through the oceans. Even for species that are not migratory, as is the case with most harbor seals (*Phoca vitulina*), the coastal environments that pinnipeds inhabit are rich in biodiversity.[257] Public display facilities that house pinnipeds generally provide them with only a small tank filled with

The widespread expansion of dolphin sea pens in the Caribbean is a particular cause for concern, as these further diminish natural barriers that have already been degraded by high levels of coastal development; moreover, the Caribbean is considered to be an area particularly at risk from hurricanes and tsunamis.

No facility can simulate the vast reaches of the ocean that these animals traverse when they migrate, or can include in the enclosure oceanic flora and fauna. In short, in physical terms, the captive environment of these animals is profoundly limited and impoverished.

chlorinated freshwater.[258] Chlorine precludes live plants and fish in the tank and can cause skin and eye complications for marine mammals.[259] The small "land" area of the enclosure, provided to allow the animals to "haul-out" (come out of the water to rest), is usually a flat concrete area or a simulation of bare rock or simply a wooden deck.

Most facilities provide disproportionately for the land portion of these amphibious species' existence (where the public can easily see them) and not enough for the animals' aquatic needs. One or two facilities, rich in financial resources, have designed saltwater enclosures with wave machines to simulate the rhythm of tides and waves. This superficial advance, which most facilities cannot afford, does provide enrichment, but serves more to appeal to the sense of propriety among the viewers than to benefit the captive animals. It also highlights the fact that no facility can simulate the vast reaches of the ocean that these animals traverse when they migrate, nor can they include oceanic flora and fauna in the enclosure. In short, in physical terms, the captive environment of these animals is profoundly limited and impoverished.

Most pinnipeds form large social groups. California sea lions congregate in groups of dozens of animals when on land, occasionally achieving aggregations of hundreds of individuals. When in the water, they often float together in large "rafts" to regulate their body temperatures. Walruses also form herds of hundreds of individuals, entirely covering small islets with their bodies. Many pinniped species are territorial or maintain dominance hierarchies; relationships

Most marine mammal exhibits do not have an "off-view" area to which the animals can retreat when they wish a respite from people watching them.

with conspecifics (members of the same species) are often very complex and can take years to develop.[260] In captivity these gregarious species are forced to exist in small groups, sometimes of no more than two or three individuals. Thus, in social terms, too, the captive environment is barren and artificial.

POLAR BEARS

Polar bears are the perfect example of a species whose habitat and range cannot be even remotely simulated in captivity. They live in the demanding Arctic ecosystem and are physiologically, anatomically, and behaviorally adapted for this harsh

habitat. These animals can cover a home range of tens of thousands of square kilometers of land in their hunt for food; they can also swim for hundreds of kilometers between ice floes.[261]

Scientific analyses[262] show that wide-ranging predators more frequently exhibit poor health, stereotypical behavior,[263] and high infant mortality rates in captivity. Polar bears are among those species that react poorly to captivity, showing signs of stress and physiological dysfunction. The authors of these analyses suggested, as one way to address this problem, that zoos might consider no longer exhibiting wide-ranging carnivores such as polar bears. However, polar bears are not the only wide-ranging marine mammals to show stereotypical behaviors when kept in captivity; some pinnipeds and most cetaceans also commonly respond to captivity with such behaviors.[264]

Aquaria and zoos that display polar bears argue that their facilities provide less rigorous living conditions and are therefore better for the bears; they claim that providing freely available and plentiful food eliminates the bears' need for a large area in which to roam (they say the same generally for all the large, wide-ranging species they display, including orcas).[265] This demonstrates an abiding ignorance of evolution and natural selection, disturbing to see from entities that present themselves as educational institutions. The fallacy of this argument becomes obvious simply by applying it to the human health arena. Medical science has clearly demonstrated that, because of our evolution as hunter-gatherers, a sedentary lifestyle is bad for our health. We develop heart and blood pressure disorders, diabetes, and other serious health conditions if we are not active enough. It is physiologically irrelevant that the evolutionary cause of our body's adaptations was a hunter-gatherer ecology and that in the developed world, we no longer need to be this active to acquire resources. The simple fact is that today, our health suffers if our activity levels are not sufficient to engage or activate these adaptations. The same is true for any wide-ranging, dynamically active species, including most marine mammals.

Aside from basic evolutionary biology, however, to use the rigors of the wild as a justification for the conditions of captivity is misleading and disingenuous. This argument implies that the natural state is an evil to be avoided and that the captive environment is the preferred state. The suggestion is that animals must be protected from the very surroundings that sustain them. This misrepresentation of the natural environment as threatening to the health of these animals will certainly not encourage people to protect, respect,

To use the rigors of the wild as a justification for the conditions of captivity is misleading and disingenuous. This argument implies that the natural state is an evil to be avoided and that the captive environment is the preferred state. The suggestion is that animals must be protected from the very surroundings that sustain them. This misrepresentation of the natural environment as threatening to the health of these animals will certainly not encourage people to protect, respect, or understand the animals' natural habitat.

This "bear park" in Japan keeps two polar bears in completely inadequate conditions.

or understand the animals' natural habitat. Moreover, to suggest that the lives of captive polar bears are better than those of polar bears in the wild because they have been spared—or in truth prevented—from having to do exactly what evolution has adapted them to do is absurd.

The specialized needs and reproductive behavior of polar bear mothers and cubs—such as denning, in which female polar bears build dens out of ice and snow in which to give birth and protect their young for the first few months of their lives—are difficult to accommodate in captivity. Polar bears are routinely maintained in small concrete enclosures with tiny freshwater tanks.[266] Having to endure hot, temperate-clime summers and sharing the same space with the same few bears for life expose polar bears to a set of physical and social stressors with which they are poorly equipped to cope—an issue that even the public display industry recognizes.[267] Moreover, as mentioned above, stereotypical behaviors often develop in these large carnivores when in captivity. The conditions in which captive polar bears are maintained around the world are often woefully inadequate.[268]

Historically, the Manitoba government in Canada was involved in a controversial trade in wild-caught adult polar bears and cubs, primarily from Manitoba, to (inadequate) captive facilities worldwide.[269] This brought international attention to a government department that was found to have traded more than 30 polar bears to a number of zoos. The animals traded were primarily adult "nuisance" bears—bears who repeatedly came close to the town of Churchill and vicinity—and bear cubs orphaned when their mothers were shot in hunts, in self-defense, or for causing a nuisance in areas of human habitation.[270]

As a result of the controversy over the polar bear trade, the Manitoba Wildlife Branch and its Polar Bear Facility Standards Advisory Committee examined the polar bear export program and introduced recommendations in late 1997 to address some of the problems. Not surprisingly, these recommendations had many flaws, including weak guidelines for enclosure temperatures and no recommendation for bears to be placed in facilities with improved enclosure sizes and soft-substrate floor space.[271] Finally, in 2002 Manitoba's Polar Bear Protection Act was passed.[272] The act restricted the capture of polar bears to orphaned cubs only (i.e., no "nuisance" adults) and then only under certain conditions.[273]

MANATEES, DUGONGS, AND SEA OTTERS

Manatees and dugongs (*Dugong dugon*) (collectively known as sirenians, from their taxonomic order Sirenia) are the only marine mammals who sometimes are displayed in enclosures that simulate their natural habitat.[274] Because sirenians are warm-

An overturned washtub is considered "enrichment" for this sea otter. Getting underneath it may also be the only way the animal can retreat from view.

water herbivores and have slower metabolisms, it appears to be easier to keep their enclosures hygienic without resorting to sanitation methods that kill vegetation and fish. Manatees in particular are also generally physically slow and, for wholly aquatic animals, relatively sedentary, which appears to mitigate to some degree the restrictiveness of the small tanks in which they are usually held.

Sirenians are a special case: relatively few are held in captivity (most of the permanent captives are animals who have been injured and deemed unable to be returned to the wild).[275] They are herbivorous marine mammals and they are endangered throughout their range; therefore, their treatment has been unique. In fact, there are probably fewer than 10 dugongs held in captivity globally.[276] In many ways the treatment of manatees in the United States exemplifies how dolphinaria and aquaria should treat all species of marine mammals worldwide, whether or not they are endangered or threatened. Only beached, injured, or rescued individuals should be held (pending release), only those who cannot be released should be displayed (without the requirement of performing or enduring interactions with the public), and every effort should be made to create enclosures that are as close to natural habitats as possible.

Sea otters (*Enhydra lutris*) should logically be even easier to keep in captivity under conditions that simulate the natural environment, given their small size and similarly "sedentary" habits. However, most sea otter exhibits are very small and cannot provide features that simulate natural habitat.[277] In addition, sea otters are known to be particularly vulnerable to fatal shock as the result of handling and during transportation.[278]

Mortality rates of sea otters in US facilities have not received as much attention as those of cetaceans and pinnipeds, but these rates, particularly for pups, have been very high.[279] The majority of captive sea otters are currently being held in Japan (there were over 120 animals at one time, although the number may now be closer to 20),[280] where there is no reliable information on survival rates. Japanese aquaria and zoos have stated that there has been poor success in captive breeding—resulting in requests for permits to capture sea otters in Alaska.[281] A program in California to rescue orphaned pups of the threatened southern sea otter population has increased its success at returning these animals to the wild by minimizing human interaction with them.[282]

CETACEANS

The cetaceans typically held in captivity, such as bottlenose dolphins and orcas, are wholly aquatic, wide-ranging, fast-moving, deep-diving predators. In the wild they travel between 60 and 225 km (35 to 140 miles) in a day, reach speeds as high as 50 km (30 miles) an hour, and dive from 500 to 1,000 m (1,640 to 3,280 ft) deep. These cetaceans are highly intelligent and socially and behaviorally complex.[283] Their perception of the world is largely acoustic, a difference in mode of perception that makes it virtually impossible for humans to imagine what they "see."

Pacific white-sided dolphins performing in a Japanese marine theme park. These oceanic dolphins have never been common in captivity.

These holding tanks at a facility in Taiwan are not connected, so the dolphins must be removed from the tanks in stretchers whenever social groups are rearranged to meet management needs. Modern facilities have interconnected tanks, with gates separating animals.

Dolphinaria and aquaria cannot even begin to simulate the natural habitats of these species, any more than they can that of the polar bear.[284] The water in their tanks is often chemically treated and filtered to prevent the animals from swimming in their own waste. Smooth concrete walls usually surround these sound-sensitive animals and inhibit or discourage the natural use of their acoustic abilities.[285] As in pinniped enclosures, most water treatments mean live plants and fish cannot be placed in the tanks. Nothing is further in composition from natural cetacean habitat in the coastal environments of Florida, Hudson Bay, or Iceland—with their algae, invertebrates, fish, storms, rocks, sand, ice, and mud—than the small, empty, chlorinated, smooth-sided tanks of many dolphinaria and aquaria. The natural activity levels, sociality, hunting behaviors, acoustic perceptions, and indeed the very texture of cetaceans' natural environments are all severely compromised or completely erased by the circumstances of captivity. As noted earlier, sea pen dolphinaria, while providing natural seawater, avoiding the use of chemicals, and offering more natural acoustic properties, are in many ways no better than tanks due to their own drawbacks, generally as a result of their size and where they are located.

Bottlenose dolphins often have home ranges exceeding 100 square km (40 square miles)—it is impossible for captive facilities to provide space even remotely comparable to that utilized by these animals in the wild. The difficulty faced by captive bottlenose dolphins in expressing their natural behavior was illustrated in a 1996 study conducted at Long Marine Laboratory in California, in the United States.[286] At the time of this study (and still today), the legal minimum horizontal dimensions in the United States for tanks holding two bottlenose dolphins were 7.32 m (24 ft) for length and 1.83 m (6 ft) for depth.[287] The researchers looked at the behavior of two common bottlenose dolphins in two tanks, one that was roughly 9.5 m (31 ft) in diameter and a second that was approximately 16 m (52 ft) in diameter (the tanks were not perfectly circular). The dolphins' behavior in the larger tank more closely resembled (while still not matching) natural behavior, whereas the animals were more often inactive in the smaller tank.[288]

There are similar concerns for orcas. For example, US regulations state that two orcas can be kept in a tank that is twice as wide as an average orca is long and half an average orca's length deep.[289] When one considers that orcas routinely swim multiple kilometers in straight lines, and are capable of travelling as many as 225 km (140 miles) a day for up to 30–40 days without rest,[290] while routinely diving to depths of 100–500 m (325–1,640 feet),[291] an enclosure this size is truly tiny from their perspective.

Even in the largest facilities, a cetacean's room to move is decreased enormously, allowing the animal access to less than one ten-thousandth of 1 percent of its normal habitat size.

It is widely known in the public display industry that larger tanks decrease aggression and increase breeding success,[292] yet the industry continues to lobby against any regulatory revisions that would increase the minimum space requirements.[293] However, even in the largest facilities, a cetacean's room to move is decreased enormously, allowing the animal access to less than one ten-thousandth of 1 percent of its normal habitat size. In an attempt to

deflect attention from this fact, dolphinaria argue that captivity, with its reliable and plentiful food supply, eliminates cetaceans' need to range over large distances daily.[294]

However, the behavior of orcas in British Columbia's Johnstone Strait, a small, salmon-rich section of Canada's Inside Passage that orcas frequent during the summer months, refutes this claim. Orcas leave Johnstone Strait daily, often traveling 40 km (25 miles) north or south of this area in one night.[295] It may be that at one point in their evolutionary history these whales traveled such distances only for foraging purposes, but their physiology has adapted to this level of activity, and now, regardless of the availability of food, they require this amount of exercise for good health and good welfare.[296] Clearly, whatever the evolutionary or even proximate purpose for their ranging patterns, confining cetaceans in a tank that is at best only a few times their body length guarantees a lack of aerobic conditioning and no doubt brings on the endless circling and stereotypical behaviors[297] seen in other wide-ranging carnivores in captivity. Such confinement is inhumane at a nearly inconceivable level.

The situation is equally unacceptable and perhaps even worse in regard to the social environment provided for these animals in captivity. Small cetaceans are not merely gregarious; they form a complex society that is frequently based on kinship. Certain cetacean species are known to retain family bonds for life. In many orca populations, males spend their entire lives with their mothers, and in some populations, family ties are so persistent and well defined that all family members are usually within a 4 km (2.5 mile) radius of each other at all times.[298]

Captive facilities, with their logistical constraints, economic considerations, and space limitations, cannot provide conditions that allow natural social structures to form. In captivity, social groups are not natural.[299] Facilities mix animals from Atlantic and Pacific populations, unrelated animals, and, in the case of orcas, ecotypes (reproductively isolated populations distinguished by cultural differences, such as prey preferences, foraging techniques, and dialects; subtle differences in appearance, including size and eye patch types; and other genetic

The orca Lolita's tank at the Miami Seaquarium may be the smallest for this species in the world—she is longer than half the width of the main tank, and cannot enter the area to the right of the central platform unless gates at either end of it are open.

differences). As noted earlier, calves are typically removed from their mothers to separate quarters after only three or four years, if not sooner.[300]

The inappropriateness of captive cetacean conditions was embodied by Dolphinella, a dolphinarium in Sharm el Sheikh, Egypt. This facility once held three bottlenose dolphins and two beluga whales. Belugas are an Arctic species, adapted to living much of the year in freezing waters. Yet in Sharm el Sheikh they were being kept in an outdoor facility on the edge of a desert. In addition, the facility had two tanks; the three dolphins were held in the larger tank, while the two larger belugas[301] were held in a tiny medical tank and were never allowed into the bigger tank. A campaign by animal protection groups persuaded the owners to transfer the belugas to a larger enclosure in Cairo, although these polar animals still languished in desert heat, until one of the animals died, and the other was exported back to Russia.[302]

SUMMARY

Creating adequate captive enclosures for terrestrial mammals is a persistent challenge. This difficulty is amplified where captive enclosures for marine mammals are concerned, where it is frequently impossible to recreate or simulate natural habitat in microcosm. If provided with a large enclosure with naturalistic substrate features, most pinnipeds, even those that are migratory, do not find their need to haul out specifically compromised by captivity. What is compromised, however, is the opportunity for the intense physical activity, expression of natural foraging behaviors, and crucial interactions with conspecifics that typify pinnipeds when mating or at sea. The social environment is not re-created; it is artificially reconfigured. In many cases, species such as Atlantic gray seals (*Halichoerus grypus*) and Pacific California sea lions, who, living in their separate oceans, would never interact in the wild, are housed together. Certain marine mammal species that are from remote, specialized habitats, such as polar bears, are severely compromised physiologically and can suffer immensely.

Cetaceans are in all ways severely compromised by captivity. The reduction in their horizon represented by a tank, even a large one, is extreme. Neither their physical nor their social environment can be simulated or re-created. Tanks are typically barren—effectively concrete boxes—and social bonds are artificial. Life for captive cetaceans is indeed "different," as many facilities admit. Given that this different life has nothing in common with the life for which cetaceans have evolved and for which they are adapted, it can only be regarded as worse than life in the wild.

CHAPTER 5

ANIMAL HEALTH ISSUES AND VETERINARY CARE

Many captive marine mammals receive regular vitamin and mineral supplements in their ration of fish. This indicates that their diet of a limited variety of frozen fish is deficient in some manner, and the nutritional quality of frozen fish is, in fact, markedly lower than that of living fish.[303] The constant administration of supplements is often referred to as a benefit of captivity; the fact that free-ranging animals do not require such supplements is ignored. The limited choices offered to captive marine mammals in regard to food and its methods of provision are cause for concern. The lack of behavioral and physical stimulation (when foraging is eliminated from the behavioral repertoire) and the lack of dietary variety may contribute to behavioral disturbances and health problems.

Medical isolation enclosures are frequently much smaller than primary enclosures; facilities claim that medical tanks are only temporary quarters and insist this distinction makes their restrictiveness acceptable and even necessary, so animals can be controlled during veterinary examinations.[304] However, some animals, such as sexually mature males, calves being hand-reared, or aggressive individuals of either sex, are often sequestered in these tiny tanks on a routine basis.[305] In some facilities, animals are frequently held in such secondary enclosures during tank-cleaning procedures.

Dolphinaria and aquaria routinely administer prophylactic antibiotics and anti-fungal and ulcer medications to captive cetaceans.[306] Benzodiazepines (such as Valium) are sometimes administered to calm individuals during handling and transport, and when transferred animals must acclimate to a new enclosure and/or social group.[307] Bacterial and viral infections are a common cause of death in these animals; despite this, US federal regulations do not require monitoring of water quality for any potential bacterial or viral pathogens (or other possible sources of disease), other than general "coliforms" (rod-shaped bacteria such as *E. coli* normally present in the digestive system of most mammals).[308] Pneumonia, which is generally a secondary condition occurring as a result of some other initial condition, such as stress or a compromised immune system,[309] is the most commonly cited cause of death in the NMFS *National Inventory of Marine Mammals*. Rarely do necropsy (animal autopsy) reports identify the cause of the pneumonia.[310] Furthermore, the overuse of antibiotics is a concern generally in medical and veterinary circles, as it can lead to bacterial resistance to antibiotics, making treatment of infections all the more difficult.[311]

Approximately 10 to 20 percent of captive marine mammal deaths are reported as from undetermined causes. Cetaceans are difficult to diagnose;[312] their lack of mobile facial expressions[313] and body language with which humans can empathize (such as shivering or cowering) make it difficult to recognize developing health problems.[314] An all-too-common pattern is for facility personnel to find an animal lacking in appetite and for that animal to die within one or two days of this discovery—long before any treatment program can be determined, let alone administered.[315] Veterinary care for cetaceans is still developing and some procedures common in terrestrial mammals are still rare for them; for example, although it has become possible to administer anesthesia to cetaceans, it is risky, and requires considerable expertise, personnel support, and specialized equipment for successful application.[316]

In addition, there are diseases that afflict captive marine mammals more frequently or more intensely

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than their free-ranging counterparts. For example, in bottlenose dolphins, hemochromatosis, a disease resulting from excess accumulation of iron in the body, occurs at a much higher rate in captivity than in the wild,[317] possibly because of factors associated with diet or altered activity patterns in captivity.[318] Kidney stones are also seen more frequently in captive versus free-ranging dolphins.[319] "Tattoo-lesions"[320] are also very common in captive bottlenose dolphins;[321] in free-ranging dolphins, such lesions are considered to be an indicator of poor health and immune system suppression.[322]

At least two captive dolphins are known to have died due to infections after being raked by another dolphin in the same enclosure.[323] This particularly violent level of aggression has also been seen in captive orcas,[324] and is likely a result of animals being kept in small enclosures and the inability of animals to escape from dominant, aggressive individuals.[325] Again, this is largely the result of the artificial environment in which captive cetaceans are maintained.[326] Even more concerning, some marine mammals suffer and even die due to self-injury.[327]

At least two captive orcas have died from mosquito-borne illness.[328] Mosquitoes are almost certainly not a disease vector (pathway for transmission) for free-ranging cetaceans, who are always moving, spending most of their time below the water's surface. Because captive cetaceans, especially orcas, spend a great deal of time sedentary, floating at the surface like logs (this behavior is in fact called "logging"), they are at a much higher risk of being bitten by mosquitoes than free-ranging animals and thus being exposed to any pathogens transferred by mosquito bite.[329]

Because tanks are often painted a light or bright blue color (to increase visibility of the animals to spectators), and because enclosures typically lack shade,[330] light is often reflected back at marine mammals in captivity (versus in the wild, where natural surfaces are rarely highly reflective). This results in captive marine mammals being exposed to higher levels of ultraviolet (UV) light than in nature. In addition, most marine mammals are fed by trainers standing at the side of their tanks, with the animals looking up (into the sun) for fish to drop into their mouths. This "stationing" posture is uniquely

Eye lesions and opacities (such as cataracts) are common in captive pinnipeds, as seen in this walrus and this harbor seal.

The teeth in this orca's lower jaw are severely damaged, with several worn to the gum line, some broken, and others drilled open.

associated with captivity. As a result, captive marine mammals may suffer from eye lesions and infections and premature cataracts.[331]

Meticillin-resistant *Staphylococcus aureus* (MRSA; meticillin, also called methicillin, is an antibiotic) was reported in captive dolphins in two Italian facilities. One dolphin in each facility died from MRSA-linked septicemia. MRSA originating in animals is potentially transmissible to humans and vice versa.[332]

Also unique to captive marine mammals is the frequency with which they suffer from dental problems. Cetaceans and pinnipeds often wear down and/or break their teeth because they persistently and stereotypically grind their teeth on the concrete walls of their tanks and/or "pop" their jaws on the metal gates between their enclosures.[333] This is classic self-mutilating stereotypy. Captive orcas, due to their size, intelligence, and social complexity, may be more frustrated and bored than other species when held captive and therefore unsurprisingly appear to exhibit this problem to the greatest extent among captive marine mammals.

Captive orcas can wear down their teeth to such an extent that the pulp and nerves are exposed, and veterinarians must then drill the teeth out. Drilling the teeth empties the pulp cavity, removing some of the living tissue that is highly prone to infection and clearing the cavity for disinfection. This leaves open holes, as the aquatic environment precludes using amalgam fillings.[334] These holes can trap food particles and bacteria and are entry points for pathogens and infections, so they must be regularly cleaned and flushed out by trainers. This pattern of tooth wear and breakage is not seen in the wild. If teeth do wear down in free-ranging orcas, it is due to prey type or feeding method[335] and generally occurs over a lifetime (rather than within a few years, as in captivity).

Dead fish are dropped directly into the open mouths of captive orcas, meaning food rarely if ever contacts the teeth. Therefore, one would expect very little tooth wear at all, similar to the near-pristine teeth seen in salmon-eating resident orcas in the northeast Pacific, for example.[336] Yet this is not the case. Therefore, the public display industry's claim that tooth wear and breakage in captive orcas is "normal" and the result of routine manipulation of objects in their enclosures,[337] is simply false. This degree of damage to the teeth is not normal and may be a factor in the shortened life spans of captive orcas[338] (see Chapter 9, "Mortality and Birth Rates").

CHAPTER 6

BEHAVIOR

The natural foraging behaviors of most predators in captivity are severely compromised.[339] While all species of marine mammals held in captivity (with the exception of sirenians) are predators, none are allowed to exercise that part of their behavioral repertoire that is related to hunting and foraging. For all captive marine mammals, this means boredom is a serious concern, but for display-only animals, such as polar bears and most seals, boredom can be unremitting. Stereotyped behaviors, severe aggression toward conspecifics and humans, and other behavioral problems frequently arise in predators denied their natural foraging behavior.[340]

Facilities often provide marine mammals with objects in their enclosures—ranging from plastic balls to nylon rope (for hygiene and health reasons, natural items are rarely if ever provided)—as "enrichment."[341] The animals are meant to play with these objects (with or without the involvement of caretakers), in an effort to engage their interest and maintain a healthy activity level. While the animals may interact intermittently with these objects, they often ignore them

and there are virtually no studies examining whether these interactions improve marine mammal welfare or even activity level. One type of inanimate, floating toy must frequently be replaced with another, different kind, or these intelligent species soon lose interest.[342] Clearly what constitutes "enrichment" from a human caretaker's point of view may not constitute enrichment from the point of view of a marine mammal, especially in the barren environment of a concrete tank.

Public display facilities claim that, for those marine mammals who perform in shows, training adequately replaces the stimulation of hunting and indeed serves as a form of enrichment. They may also say that interacting with the public is enrichment. These claims are without logic, however. Performing animals are trained to demonstrate a series of conditioned behaviors. Some of these behaviors are also naturally occurring behaviors, but many are merely based on natural behaviors that are performed out of context and exaggerated and altered almost beyond recognition. The repetitive nature of these conditioned behaviors differs fundamentally from the spontaneous expression of behaviors in nature, where the animals choose what they do (they are being told what to do when being trained for performance or interaction with visitors). Interacting with the public is wholly unnatural; indeed, many marine mammal species, cetaceans in particular, rarely encounter conspecifics they do not know, making the constant exposure to strange people more likely a source of stress than enrichment.

Polar bears are wide-ranging, covering hundreds and even thousands of square miles in the Arctic wilderness over the course of a year. As a result, they are among the marine mammal species that fare most poorly in confinement.

The most common training method, called operant conditioning, uses food as a primary positive reinforcer. For some animals, this means that satisfaction of hunger is dependent on performing tricks; for others, hunger is deliberately induced so the reinforcer will be effective. This is not food deprivation *per se*, for a complete food portion is ultimately provided each day, but the use of food as a reinforcer reduces some animals to little more than beggars. Their lives obsessively revolve around the food presented during shows and training

Performing animals are trained to demonstrate a series of conditioned behaviors. Some of these behaviors are also naturally occurring behaviors, but many are merely based on natural behaviors that are performed out of context and exaggerated and altered almost beyond recognition.

Natural behaviors and interactions, such as those associated with mating, maternal care, weaning, and dominance, are altered significantly in captivity. In most cases, these behaviors are strictly controlled by the needs of the facility and the availability of space. The needs of the animals are considered secondary.

sessions. Patrons of any captive marine mammal show can easily observe the animals' attention fixed on the buckets of food. For these animals, natural feeding and foraging rhythms and cycles, as well as independence of any kind, are lost. It is difficult to accept the self-serving argument put forward by the public display industry that training provides an adequate substitute for the stimulation and variation of natural foraging behavior or the other actions exhibited by free-ranging animals.

Most pinniped shows are entertainment spectacles in which animals perform in a burlesque, exhibiting a series of wholly artificial tricks, such as "handstands" and balancing a ball on their snout, in the context of a cartoon story in which raucous music is played and jokes are told. Many dolphin and whale shows incorporate circus tricks such as trainers propelled into the air by an animal's rostrum (the beak-like projection, forming the mouth, at the front of the head) or animals taking fish held by a trainer. The animals are presented as clowns or acrobats, and almost no effort is made to educate the audience about their natural behavior.

Natural behaviors and social interactions, such as those associated with mating, maternal care, weaning, and dominance, are altered significantly in captivity. In most cases, these behaviors are strictly controlled by the needs of the facility and

In many marine theme parks, walruses are trained to do "sit-ups" as a trick—this behavior is demeaning and obviously wholly unnatural.

the availability of space.[343] The needs of the animals are considered secondary. For instance, weaning is timed to suit the needs of the facility, as opposed to the needs of the pup, cub, or calf, because the offspring may be disruptive to the social group or because space is limited. Dominance interactions can be aberrant and abnormally violent,[344] as the animals must adjust their behaviors in response to the small living space and the artificial age and sex composition of the captive social group.

Wild-caught captive marine mammals gradually experience the atrophy of many of their natural behaviors. Many are caught too young to have been properly socialized or form normal relationships. Captive-born marine mammals are confined from the time of birth in physically constrained and relatively sensory-deprived environments, which could have detrimental impacts on their proper physical, psychological, and social development. Often these young animals are subject to chronically stressful social circumstances and may even be born to mothers whose natural maternal behaviors are thwarted by improper early-life development and socialization. For sea lions and cetaceans in particular, socialization and learned behaviors and skills are undoubtedly crucial to normal and natural behavioral and social development.

This pile of inanimate plastic and rubber junk is considered "enrichment" for intelligent, socially complex orcas (killer whales).

CHAPTER 7

STRESS

Stress[345] has been recognized and discussed in this report as a factor that can severely affect the health of captive wildlife,[346] including marine mammals.[347] Stress in mammals can manifest in many ways, including weight loss, lack of appetite, anti-social behavior, reduced calving and reproductive success, arteriosclerosis (hardening of the arteries), stomach ulcers, changes in blood cell counts, increased susceptibility to diseases (reduced immune response), and even death.[348] Short-term acute stress will occur as the result of pursuit, confinement, sudden loss or change in social relationships, and physical handling[349] experienced during capture or the transport process.[350] Long-term chronic stress would result once an animal is permanently confined in captivity.[351]

The pursuit, handling, and disturbance marine mammals endure when first captured from the wild and, in some species, whenever they are being transported from one location to another, are

Orcas can become bored and depressed in captivity and perform neurotic, repetitive behaviors (stereotypies), such as rubbing their chins obsessively on the walls of their tanks, leading to raw abrasions.

highly traumatic.[352] Studies have noted significant physiological impacts from pursuit and handling, particularly in cetaceans.[353] A strong piece of evidence showing that dolphins never become accustomed to these causes of stress is seen in the greatly increased mortality rate they demonstrate immediately after a capture from the wild *and* every transport. The risk of dying increases six-fold in bottlenose dolphins during the first five days after a capture (see Chapter 9, "Mortality and Birth Rates"), and a similar mortality spike is seen after every transport between facilities.[354] In other words, every transport is as traumatic to a dolphin as a capture from the wild. They never get used to being restrained and moved between enclosures, and the stress considerably increases their risk of dying.[355]

It is notable that when some researchers have calculated mortality rates for marine mammals in captivity, this period of sharply increased mortality has been excluded from their calculations, resulting in an overall captive survival rate that is artificially inflated, i.e., mortality rates from captive samples—which should include periods associated with transports, which are a routine element of public display—appear lower than they are in reality.[356]

Confinement exacerbates stressful situations for marine mammals in many ways. Just the physical nature of confinement can have an effect—for example, dolphins who were kept in sea pens were less likely to spend time logging, displayed fewer stereotypical behaviors, and had lower biochemical

The risk of dying increases six-fold in bottlenose dolphins during the first five days after a capture, and a similar mortality spike is seen after every transport between facilities. In other words, every transport is as traumatic to a dolphin as a capture from the wild.

indicators of stress than dolphins in concrete tanks.[357] Moreover, captive animals are in artificial social groupings determined by humans, within small restricted areas, and the social pressures and stress they experience can escalate when they have no avenue for escape. In dolphins, for example, adding new members to a captive group—such as young animals reaching maturity—or placing incompatible animals into groups can upset the group's social dynamics and dominance hierarchies, as can isolating individual animals or separating them from their preferred associates.[358] These circumstances can lead to increased aggression, illness, poor success in calf rearing, and even death.

The effects of socially inflicted stress in captivity were well illustrated in a study that described how seemingly innocuous changes in dolphin groupings and associations could actually cause extreme stress, leading to chronic illness and death.[359] In an attempt to mitigate these problems, the researchers suggested that dolphin enclosures should be expanded to allow less restricted movement of animals.[360] This recommendation was particularly important for one animal, who had exhibited chronic illness believed to be stress related and had been subjected to considerable aggression by other dolphins. In a larger enclosure, this individual's symptoms subsided to some degree, as she could more easily avoid aggressors.

Similar stress is suffered by other social marine mammal species, such as most pinnipeds, but also more solitary species, such as polar bears. In captivity, polar bears are often placed in highly unnatural groupings—in the wild, they are usually solitary except when breeding or with young (and in some locations when waiting for ice to form).[361] The forced intimacy faced by three or four (or more) polar bears in a small zoo enclosure inevitably leads to stress.

This sea lion, performing a silly anthropomorphic trick, has a serious skin condition and should be under a veterinarian's care, not entertaining a crowd.

CHAPTER 8

CETACEAN INTELLIGENCE

One of the primary foundations for the moral and ethical arguments against keeping cetaceans in captivity is that they are intelligent. Ironically, it is their intelligence that has made these animals desirable for public display—their ability to understand human commands and learn complex behaviors or tricks has been exploited to provide humans with entertainment. Likewise, their intelligence increases people's rapport with and interest in these animals. But exactly how intelligent are cetaceans?

A researcher named Paul Manger ignited a debate on this topic when he postulated that the dolphin's large brain could have evolved for physiological reasons having to do with body temperature regulation.[362] In his paper, he offered what he considered substantial evidence that dolphins were no more intelligent than many terrestrial ungulates (to which cetaceans are evolutionarily related). However, a rebuttal to this hypothesis from several prominent cetacean biologists summarized far more thoroughly the large and growing body of literature examining the intelligence and social sophistication of small cetaceans.[363] In addition, these

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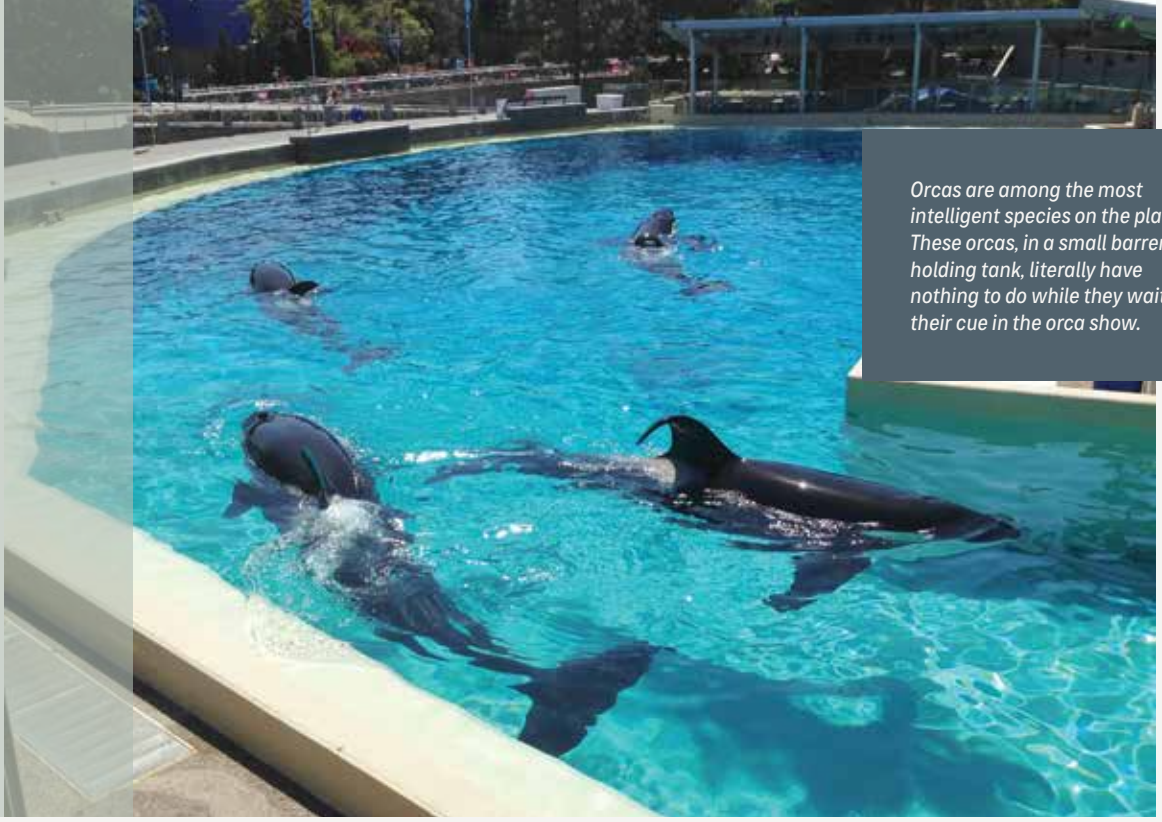
researchers noted the temperature regulation hypothesis required a series of geologic events during the dolphin's evolution that did not match the paleontological record. Essentially Manger's hypothesis requires either misinterpreting or ignoring a considerable body of evidence addressing cetacean intelligence and evolution, reducing its legitimacy.

Another researcher, Justin Gregg, wrote a book in which he suggested that toothed cetaceans (small cetaceans, as well as the sperm whale) may not be as intelligent as the public believes.[364] He dismissed observations of complex behaviors in free-ranging dolphins as "anecdotal." He also used examples of intelligent-seeming behavior in other species as a way to dismiss the significance of dolphin cognitive abilities (rather than acknowledging that other species, in addition to cetaceans, have cognitive abilities that are more sophisticated than most people, including scientists, acknowledge). Gregg stated that one of his aims in publishing the book was "to determine if the scientific evidence of dolphin intelligence was strong enough to form the basis for both legal and philosophical arguments for personhood in dolphins."[365]

He concludes that "unless we discover that dolphins are building launch pads under the waves ready to send dolphin-astronauts into near-earth orbit, we will probably never reach a stage when we should consider dolphin intelligence as rivalling the intellectual abilities of an adult human."[366] This ignores that until very recently in human evolutionary history, we were unable to do the same. For the majority of humanity's 2 million years of existence, we had levels of tool use equivalent to that of sea otters.[367] The book was widely reported in the press; however, Gregg's assertions were criticized by several scientists for employing faulty logic, ignoring studies that undermined his hypotheses, and otherwise being biased.[368] Indeed, it is telling that the only cetacean researchers who are actively arguing that cetaceans are less cognitively sophisticated than is generally believed—and indeed, less intelligent than even dolphinaria typically claim—are those who work primarily with captive cetaceans (rather than free-ranging animals). This seems less because their intimate association with these species in captivity has somehow revealed secrets to which field biologists are not privy and more because they seek to ethically justify their use of these animals as captive research subjects.

Most studies demonstrating cetacean intelligence have in fact been conducted on captive animals, albeit primarily in dedicated research facilities or non-profit public display facilities. Yet as these captive animals increasingly provide information about their sentience and intelligence, the ethical and moral arguments opposing cetacean captivity become increasingly convincing.

Several studies have tried to assess marine mammal intelligence by looking at the ratio between the size of the brain and the mass of the animal.[369] Although dolphins have smaller brains relative to their size than modern humans have, they would be at least as intelligent as prehistoric humans according to this measure. However, this measure does not take into account several issues, one being that the



Orcas are among the most intelligent species on the planet. These orcas, in a small barren holding tank, literally have nothing to do while they wait for their cue in the orca show.

structure of the dolphin brain is very different from that of humans. If anything, those parts that deal with sophisticated thought and cognition are more complex and have a relatively greater volume than similar tissues in humans.[370] Another issue is that these calculations do not take into account the high proportion of a cetacean's mass that is blubber, a tissue that needs no brain mass dedicated to its maintenance. Upon consideration of these factors, the potential for intelligence in dolphins then becomes far more comparable to that of humans.

The behavioral ecology of cetaceans also implies high intelligence; for example, bottlenose dolphins are widely believed to possess individual, or signature, whistles,[371] which are thought to be important for individual recognition or keeping groups together.[372] Animals in the wild will make their specific whistles, which will be copied by nearby dolphins. This is an example of dolphins "addressing each other individually,"[373] i.e., using the whistles in a way similar to humans using names. Dolphins are the only non-human animals known to communicate in such a way, which in itself is believed to have been a key step in the evolution of human language.[374] Similar calls, although not as obviously specific to individuals, have also been reported in comparable contexts in orcas.[375]

The complexity of cetacean communication has often been used as a potential indicator of intelligence, and a study examining the complexity of cetacean vocalizations discovered that the "communication capacity," or the ability to carry information, of dolphin whistles is similar to many human languages.[376] This suggests that cetaceans have the potential to be speaking their own language, which, as far as we currently know, would make them the only animals besides humans to do so. In addition, research has shown that cetaceans have the capacity for vocal learning.[377] Other research has demonstrated that bottlenose dolphins can be taught to imitate computer-generated sounds and to use these sounds to label or "name" objects.[378]

One of the most successful and illuminating cetacean linguistic studies was conducted by Louis Herman,[379] who taught bottlenose dolphins a simple sign language and a computer-generated sound language.[380] This study determined that, using

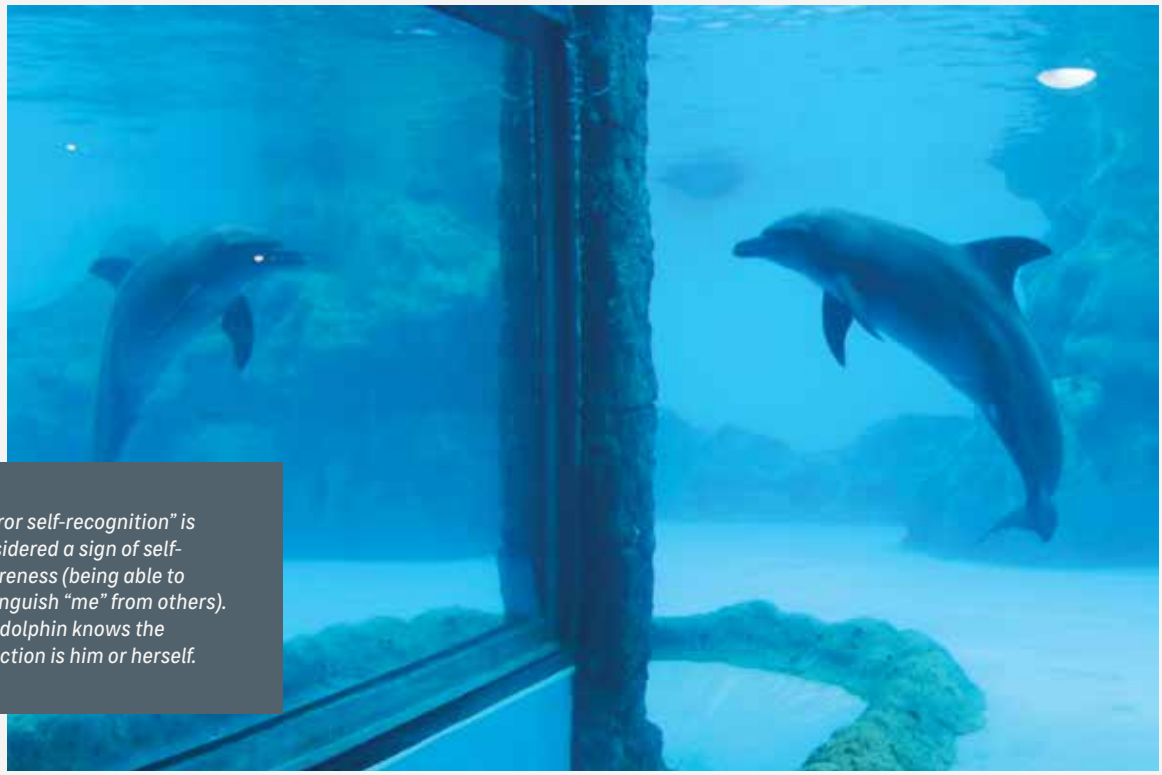
these artificial symbolic languages, dolphins could understand simple sentences and novel combinations of words, but most importantly that cetaceans comprehended sentence structure (syntax)—an advanced linguistic concept. Interestingly, while we have been able to teach dolphins relatively sophisticated artificial languages, we have been unable to decode their many vocalizations, which may very well be a language. This raises the question of which species is "smarter"—dolphins, who can learn and understand what people want of them, or humans, who have yet to learn or understand what dolphins might be telling us.

Scientists have also shown that cetaceans have distinct personalities,[381] similar to many higher primates,[382] and they are able to grasp abstract concepts.[383] Orcas have been observed mimicking novel behaviors of other orcas, another sophisticated behavior.[384] But one of the most intriguing discoveries is that dolphins are able to discriminate between numbers of objects. Initial tests showed that dolphins can, at the very least, distinguish between a "few" and "many" objects[385] and numerically "less."[386] Being able to distinguish between numbers of items is believed to be a uniquely human attribute that is possibly linked to the possession of a complex language.[387]

Perhaps the most compelling evidence for a high level of intelligence in cetaceans is the demonstration that cetaceans are self-aware.[388] These studies include those demonstrating that cetaceans recognize their image in a mirror and, in addition, use that image to investigate their body.[389] Researchers marked bottlenose dolphins with zinc oxide cream or marker pens in locations the dolphins could see only with a reflection, and the dolphins immediately swam to inspect themselves in a mirror placed in their tank. This showed that the dolphins were able to deduce that the images they saw in the mirror were actually of themselves and not simply another dolphin (or nothing relevant to "real life" at all, for that matter—some species have no reaction to two-dimensional mirror reflections). The dolphins used the mirrors as tools to view themselves, positioning themselves so that they could use the mirror to view the parts of their body that had been marked. These are all indicators of self-awareness.

In addition to bottlenose dolphins, orcas and false killer whales have also displayed behavior highly suggestive of self-recognition.[390] Previously, only the great apes had demonstrated self-recognition, and these results were not consistent for all subjects.[391] In humans the ability to recognize one's own image in a mirror does not appear before 2 years of age.[392] Therefore, it can be argued that bottlenose dolphins have a cognitive level comparable to that of a 2-year-old child,[393] although the linguistic skills of cetaceans hint at intelligence far more developed (see above). Locking two or three young children in a small room 24 hours a day—even one with a window and a dog for a companion during the day—would

In his book The Ethics of Science*, David Resnik highlights eight factors potentially possessed by animals. The more of these factors a species possesses, the more it should be considered morally and ethically equivalent to humans. It could be argued that bottlenose dolphins have demonstrated—or have demonstrated the potential for—at least seven of these eight factors, more than any other animal species.*



"Mirror self-recognition" is considered a sign of self-awareness (being able to distinguish "me" from others). This dolphin knows the reflection is him or herself.

be considered child abuse. Yet confining dolphins in an equivalent space for their lifetime—with a human caretaker to interact with during business hours—is standard practice for dolphinaria and aquaria.

In his book *The Ethics of Science*, David Resnik highlights eight factors—ranging from the ability to feel pain to the ability to understand and follow moral rules—potentially possessed by animals.[394] The more of these factors a species possesses, the more it should be considered morally and ethically equivalent to humans. It could be argued that bottlenose dolphins have demonstrated—or have demonstrated the potential for—at least seven of these eight factors, more than any other non-human animal species. Therefore, actions that would be considered unethical, immoral, illegal, or inappropriate for humans should be considered unethical to a similar extent for bottlenose dolphins (at a minimum) as well.

It should be noted that dolphins are held in captivity not only for entertainment and research purposes, but also for military use. The US Navy has maintained a marine mammal program, at one time holding more than 100 dolphins, some belugas and orcas, and dozens of pinnipeds, since the 1960s. The present program holds 70–75 dolphins and about 25 sea lions. Initially held to study their streamlined body shape—in an effort to improve hydrodynamics of Navy torpedoes—and echolocation, eventually the dolphins and sea lions were trained to perform tasks otherwise considered difficult, impossible, or unsafe for human divers, such as retrieving objects from deep water or placing location beacons on mines.[395] These animals have been deployed around the world, during combat conditions (in Vietnam and the Persian Gulf) and during peacetime maneuvers and exercises. As with public display, it is the dolphins' intelligence that makes them desirable to the military, but their reliability as soldiers is questionable.[396] More to the point, the ethical questions raised by using animals who may merit the moral stature of human toddlers for military purposes are profound. Human divers choose their profession and know they are in danger in combat zones; dolphins do neither.

CHAPTER 9

MORTALITY AND BIRTH RATES

Animals die, in captivity and in the wild. The simple fact that an animal dies in a zoo or aquarium is not notable in itself. The questions to ask are: What was the cause of death? How old was he or she? Many animal activists who oppose captive display of marine mammals believe every death demonstrates that captivity kills, but this is overly simplistic. On the opposite end of the spectrum, dolphinarium officials often label every death "natural." The truth is obviously somewhere in between, but the public display industry, with its proprietary access to the relevant data,[397] has been lax in defining where that truth lies. Veterinary record-keeping and research into causes of death for most of the time that marine mammals have been kept in captivity have lagged behind the public's interest in the welfare of captive marine mammals.[398]

Animals are also born, in captivity and in the wild. However, the relative success of a captive breeding program should not be considered evidence of good welfare.[399] Most animals, even those held in suboptimal conditions, will breed if given the chance (the existence of puppy mills, where dogs are kept in often fetid kennels and substandard cages to produce puppies for pet stores, attests to this). While unsuccessful attempts at breeding may indicate that a species is not adjusting to captivity,[400] successful breeding in itself does not indicate the opposite. A species that does reproduce in a zoo or aquarium is not necessarily thriving or even being provided a minimally adequate environment. In addition, research has found that captive-bred animals generally have lower reproductive success than wild-caught captive animals, regardless of facility or species.[401]

NON-CETACEANS

The annual mortality rates of seals and sea lions in captivity have been calculated to range from 2.2 percent for Steller sea lions (*Eumetopias jubatus*) to 11.6 percent for northern fur seals (*Callorhinus ursinus*).[402] There is little information from the wild with which to compare the mortality rates of captive seals and sea lions, but from limited data, captive Steller sea lions seem to show mortality rates similar to or lower than their wild counterparts.[403] Two-thirds of captive South American sea lions (*Otaria byronia*) and northern fur seals die in their first year,[404] a rate that may be higher than in the wild. Comparatively, captive sea otters appear to fare well in terms of life expectancy, although how this compares to populations in the wild is unknown.[405] It should also be noted that long life is no more equivalent to good welfare than successful reproduction or even good health. Animals can have no clinical signs of illness and live to an old age, all while suffering poor welfare.

Few, if any, of the pinniped species typically held in dolphinaria, aquaria, and zoos in the West (notably harbor seals and California sea lions) are captured from the wild anymore, although in the East, particularly China, sourcing from the wild may still occur fairly frequently.[406] Mortality rates of these species' captive-born pups may be lower than in the wild.[407] Surplus captive-bred animals, in fact, have now become a problem in many cases, and facilities are concerned with reducing the fecundity of these species.[408] Some of the currently available methods used to control reproduction may have long-term detrimental effects, and further research is needed to develop less harmful contraceptive methods.[409]

Most aquaria and zoos currently obtain polar bears from captive-bred stock, although cubs orphaned in hunts, both subsistence and trophy, may go to zoos.[410] However, sea otters, walruses, manatees, and a handful of other pinniped species, such as northern elephant seals (*Mirounga angustirostris*) and Steller sea lions, are still acquired from the wild for the most part. All of these species have had relatively small populations in captivity, and data on their life history parameters in zoos and aquaria are limited.

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BOTTLENOSE DOLPHINS

Some studies indicate that captive bottlenose dolphins in dolphinaria live as long and have the same mortality rates as their counterparts in the wild.[411] Other studies, however, continue to indicate a higher year-to-year mortality rate for cetaceans in captivity than for those in the wild.

The failure of captive dolphins in dolphinaria to definitively exhibit a higher survival rate than in the wild, despite 80-plus years of maintaining this species in captivity, disputes the public display industry's oft-stated contention that captivity enhances survival by keeping animals safe from predators, parasites, and pollution and by providing animals with regular feeding and ever-improving veterinary care. A recent study on dolphins held in sea pens, by researchers with the US Navy marine mammal program, found that mortality rates for this group of captive dolphins have improved in recent years.[412] No similar comparative study has been published in the peer-reviewed literature for bottlenose dolphins in concrete tanks or commercial dolphinaria.

A recent evaluation by an animal protection group of bottlenose dolphins currently held in captivity in 67 facilities (mostly in the United States and Europe) found that the average survival time in captivity (for all bottlenose dolphin individuals who lived more than one year) was 12.75 years,[413] which is lower than that of most populations of free-ranging dolphins where this parameter has been calculated.[414]

The reproductive history of bottlenose dolphins shows a similar pattern. Although calves are now born routinely in captivity, captive-born infant mortality rates are little better than rates estimated for free-ranging populations.[415] As predation—a significant source of infant mortality in the wild—is not a risk factor in captivity and veterinary supervision is intensive when a calf is born, this failure to demonstrate higher calf survivorship is disturbing. Causes of death for captive-born calves include lack of maternal skill or failure to bond properly between mother and newborn, lack of proper fetal development, and abnormal aggression

This false killer whale, shown with two bottlenose dolphins, is underweight. Some facilities have higher mortality rates than others, possibly because they force animals in such apparent poor health to perform.

As predation—a significant source of infant mortality in the wild—is not a risk factor in captivity and veterinary supervision is intensive when a calf is born, this failure to demonstrate higher calf survivorship in captivity is disturbing.

from other animals in artificial social environments and confined spaces.[416]

The evaluation noted above by an animal protection group found that dolphins who were captured from the wild survived longer in captivity than those who were born in captivity, with 52 percent of bottlenose dolphins successfully born in captivity not surviving past one year[417]—which is two to three times the mortality rate seen in the wild.[418] Less than 14 percent of captive-born dolphins survived longer than 10 years, compared to more than 60 percent of free-ranging dolphins in Florida. Even worse, less than 1 percent of captive-born dolphins survived past the age of 30, compared to 22 percent of free-ranging Florida dolphins.

ORCAS

Almost all of the orcas in the United States, and about a third of the captive orcas held worldwide, are owned by SeaWorld Entertainment, Inc. For decades the corporation persistently and erroneously maintained that the maximum life span of orcas was 35 years.[419] In fact, some of its materials still claim that this is the maximum life span for free-ranging orcas in the North Atlantic.[420]

However, male orcas in northeast Pacific populations (for which life history data are most complete) have a maximum estimated life span of 60–70 years and female orcas have a maximum estimated life span of 80–90 years.[421] A long-term study using established methods of photo-identification has identified at least four female orcas in British Columbia who were adult-sized (at least 15 years of age) when the study started in 1973 and were still alive in 2014 (the last year the catalog of all the whales in the population was updated).[422] In contrast, captive orcas of either sex rarely live longer than 30 years, with many dying in their teens and 20s.[423]

Various analytical approaches in the mid-1990s suggested that the overall mortality rate for captive orcas at that time was at least two and a half times as high as that of free-ranging orcas, and age- and sex-specific annual mortality rates ranged from two to six times as high.[424] Researchers did not revisit this issue for two decades. A study published in 2015 used several methods to assess survivorship, including a methodology applied extensively in the medical field to measure the fraction of human patients who survive post-treatment. The work was undertaken by two former orca trainers featured in *Blackfish* who went on to become scientists, and noted that captive orca survival rates had improved in recent years but that "survival to age milestones [was] poor when compared to wild killer whales."[425]

Another article published the same year, by authors affiliated with the public display industry,[426] also found that captive orca survivorship had improved over time. These authors also calculated average life expectancy for captive-born orcas at SeaWorld; the result was 47.7 years, which they claimed demonstrated that captive orca longevity now matched that seen in the wild. However, their use of the equation used to generate this value was invalid;[427] the most obvious evidence that their approach was flawed is that no captive-born whales at SeaWorld have yet exceeded 30 years of age, let alone achieved 48.[428]

The authors of this paper ultimately claimed that captive orcas had survivorship rates equivalent to those of free-ranging populations. However, two of the three free-ranging populations to which they favorably compared the captive group are listed as endangered under the ESA or threatened under the Canadian Species at Risk Act,[429] suggesting captivity has impacts similar to degraded habitat on orca survivorship.

Thirty orcas have died at SeaWorld parks since 1980: Three were 3 months of age or younger, with an additional 14 stillbirths or miscarriages.[430] Of those animals who were older than 3 months when they died, the average age at death was 16 years. Only two of these latter animals, both wild-caught, exceeded 30 years of age, and only seven reached the age of 20. As stated earlier, captivity eliminates the uncertainties of foraging and the pressures of dealing with competitors (orcas do not have predators), pollution, and parasites, while it provides veterinary care. Nevertheless, captive orcas continue to experience a higher risk of dying at any given time in life than do free-ranging orcas, at least those from the northeast Pacific. It is logical to assume that their size and complex physical and social needs cause them to suffer serious negative consequences when they are confined in tanks.

Of the 100 orcas who have been born in captivity globally since 1985, 66 have already died, with 48 dying in their first year.[431] Therefore, orca birth rates and infant mortality rates have been at best the same in captivity as in the wild.[432] This is consistent with the high infant mortality rates observed for other wide-ranging predator species in captivity, a situation that scientists have ascribed to stress and physiological dysfunction.[433]

Female orcas in captivity have been known to reject their offspring, something that is unlikely in the wild.[434] This undoubtedly occurs when a young female is unable to learn essential parenting skills from family members, as free-ranging orcas would do. Such abnormal parental behavior can of course contribute to infant mortality.

The public display industry often states that the high infant mortality rate in captivity is unsurprising, given the similarly high infant mortality rate in the wild, but this position contradicts the industry's argument that captivity shields wildlife from the rigors of the harsh natural environment. Dolphinaria and marine theme parks once again apply a double standard. On the one hand, they claim that captivity is safer than the wild, in which case the mortality rates of captive-born calves (and captive adults, for that matter) should be lower than in the wild. On the other hand, after every failed birth, they state that captive infant mortality rates similar to those in the wild should be expected as "natural" and therefore acceptable.

The display industry once again applies a double standard. On the one hand, it claims that captivity is safer than the wild, in which case the mortality rates of captive-born calves (and captive adults, for that matter) should be lower than in the wild. On the other hand, after every failed birth, it states that captive infant mortality rates similar to those in the wild should be acceptable.

OTHER CETACEAN SPECIES

Several other small cetaceans, larger than bottlenose dolphins but smaller than orcas, are commonly held in captivity. Their average size is mid-range between bottlenose dolphins and orcas, but their mortality rates are more similar to orcas. Beluga whales are the small whales most often seen in captivity; false killer whales are also popular.

Not enough is known about the life history parameters of free-ranging beluga or false killer whales to make a legitimate comparison between wild and captive populations of these species at this time. However, preliminary analysis of the small database for beluga whales available in the late 1990s suggested that this species had higher mortality in captivity.[435] Free-ranging beluga whales are thought to have a maximum life span of 60 or so years,[436] with a mean life expectancy of 20–30 years.[437] The mean life expectancy in captivity may be the same, but again, this raises the question of why it is not better, when captivity supposedly shelters belugas from the threats and rigors of the wild. It should also be noted that no captive beluga has ever come close to the maximum life span,[438] despite the species being displayed in dolphinaria and aquaria since the 1950s.[439]

The captive birth rates for these two species are not impressive either. Almost no false killer whales have been born in captivity and fewer still have survived for long. As for belugas, the principle argument made by Georgia Aquarium, in its 2012–2015 bid to import wild-caught animals from Russia's Sea of Okhotsk (see Chapter 3, "Live Captures"), was that bringing in wild-caught whales was essential to avoid the eventual loss of the captive population, given the poor birth rates for the North American collection of captive belugas.[440]

Other species, such as Pacific and Atlantic white-sided dolphins (*Lagenorhynchus* spp.), common dolphins (*Delphinus delphis*), and pilot whales, have been maintained in captivity with varying levels of success.[441] Most have not been successfully bred. All have comparatively small captive populations, and a significant increase in numbers would be required to support any kind of breeding population. As most of these species are not known to be endangered, it would be biologically inappropriate and unjustified from a conservation standpoint, as well as inhumane, to increase the number in captivity, especially when success at maintaining them in captivity has been inconsistent at best.

SUMMARY

The scientific community continues to be reluctant to draw conclusions about the mortality and birth rates of cetaceans in captivity, despite mounting evidence, increasingly from the public display industry itself,[442] that no species does better regarding these parameters in captivity than in the wild[443] and several do worse. Most scientists maintain that the limited datasets both from wild and captive populations make it impossible to determine definitive differences in mortality, life spans, or reproductive success. The scientific community also invokes differences between facilities, sex- and age-related factors, the differing sources of mortality in the two environments, the limited amount (or complete lack) of data on the first six months of life for most free-ranging cetacean species, and the methods and criteria for recording data, implying that comparing life history parameters from the two environments is comparing apples to oranges.[444]

In fact, it is true that causes of death in dolphinaria are quite different from those in the ocean; however, the mortality data, at least for the better-studied bottlenose dolphins and orcas, indicate that these causes of death in captivity are at least as efficient as (and probably more efficient than) causes in the wild. What replaces, with equal impact, predators, food shortages, diseases, storms, ship strikes, fishing gear entanglement, and other causes of death in the wild once a cetacean is in captivity? One obvious

What replaces, with equal impact, predators, food shortages, diseases, storms, ship strikes, fishing gear entanglement, and other causes of death in the wild once a cetacean is in captivity? One obvious hypothesis is that captive cetaceans suffer a degree and form of stress that is unique to their confined circumstances.

hypothesis is that captive cetaceans at least suffer a degree and form of stress that is unique to their confined circumstances.[445]

In the end, the arguments of the scientific community dismissing life history comparisons between free-ranging and captive marine mammals are in many ways irrelevant. It is a fact that seemingly healthy captive cetaceans die at relatively early ages on a regular basis, usually with little or no warning. It is a fact that all species of cetaceans on public display globally continue to be captured from the wild because captive breeding programs are not sufficient to supply the industry, at least on a global scale. It is a fact that wide-ranging predators, such as polar bears, show many signs of stress from being confined and denied the opportunity to roam widely.

But according to the industry's own arguments, marine mammals should experience vastly improved survivorship profiles, both for adults and young, when subject to modern veterinary care and kept safe from natural and human-caused hazards and threats, *if* their biological needs are adequately accommodated in captivity. Yet very few marine mammal species—and virtually no cetaceans—have done so, even after decades of captive maintenance.

Aggression among cetaceans in captivity can escalate due to the inability to escape a dominant individual. Wounds inflicted by tank-mates are far more serious than anything seen among pod-mates in the wild.

CHAPTER 10

HUMAN–DOLPHIN INTERACTIONS

DOLPHIN-ASSISTED THERAPY

Many public display facilities globally allow tourists to swim with captive dolphins. One of the justifications for such interactions is so-called dolphin-assisted therapy (DAT). DAT is a form of animal-assisted therapy, sometimes directed by a health care professional, where touching or swimming with dolphins is used as a means to motivate or reward a disabled child or adult. The idea behind DAT is that swimming with dolphins can have a variety of health benefits (both mental and physical), an idea that is heavily promoted by several dolphinaria that offer dolphin swims.[446] These purported therapeutic effects do not, however, hold up well under scrutiny, with researchers in a variety of medical and cognitive disciplines, as well as animal protection groups, concluding that studies conducted by facilities were methodologically flawed and questioning the scientific validity of claims for therapeutic effectiveness.[447]

Many people consider swimming with dolphins a thrill of a lifetime, but for the dolphins, it is just a job. As wild animals, they do not want to be with us as much as we want to be with them.

Many new commercial swim-with-dolphin (SWD) facilities around the world claim they are conducting DAT, seeking to put a positive, altruistic spin on a money-making venture. Many of these, however, are staffed by individuals with questionable credentials.[448] In fact, even if DAT does have *some* therapeutic benefits, it appears no more effective than using domesticated animals such as puppies or kittens, and is far more expensive and clearly carries higher risks for the patients (see Chapter 11, "Risks to Human Health"). In fact, the founder of DAT, Dr. Betsy Smith, ultimately concluded that DAT was exploitative of dolphins and people and has discontinued practicing it; she now only works with domesticated animals.[449]

SWIM-WITH-DOLPHIN ATTRACTIONS

Globally, there is little oversight of SWD attractions[450]—even when captive marine mammal care and management regulations exist, they often do not include specific provisions to govern SWD attractions.[451] SWD regulations exist in the United States, although they are currently not enforced.[452] The following section, therefore, focuses on the US regulatory regime for SWD interactions, as it has served as the model for those few countries with SWD regulations and guidelines. It should be emphasized that the conduct of human–dolphin interactions in most countries is largely unregulated, leading to wide variation in their relative quality and safety, for humans and dolphins.

As noted earlier, NMFS is the agency in the US Department of Commerce with authority to implement and enforce the MMPA for certain marine mammal species.[453] In this capacity, NMFS commissioned a study, completed and published as an agency report in April 1994, on the effects of SWD interactions on dolphin behavior.[454] The report identified several areas of concern, including a number of behaviors and situations that were high risk for both the dolphins and the swimmers.[455] The agency report concluded that to ensure the safety of

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dolphins and swimmers, SWD interactions should be strictly controlled.[456]

According to the NMFS study, the short-term risk to dolphins is primarily that under certain uncontrolled circumstances, dolphins routinely behave submissively toward swimmers. This disturbing dynamic has potentially serious implications. It could affect the dominance hierarchy within the dolphins' social group, resulting in bullying or injury to the submissive dolphin; it may also indicate a general and persistent level of stress to which the submissive dolphin is being subjected, which could in turn affect his or her long-term health.

The agency report noted an additional concern regarding the dolphins used in SWD interactions. NMFS required that these dolphins be given some area within the swim enclosure that served as a refuge from swimmers;[457] swimmers were not allowed to enter the area and dolphins were supposed to be free to enter the area whenever they chose. One study found that common dolphins significantly increased their use of such refuge areas when exposed to the public in SWD attractions.[458] However, the NMFS report noted that at one facility the refuge area was neither easily accessible nor attractive to the dolphins, so they would not use it even if they wanted respite from swimmers. At the other facilities, while the refuges were accessible and attractive, the dolphins were routinely recalled from them, thus negating their purpose as a voluntary haven.

From the facilities' point of view, recalling dolphins from the refuges during swims makes sense: customers pay to swim with dolphins, not to watch dolphins avoid them. From the dolphins' point of view, however, being recalled from a refuge means that they are not allowed to choose the level of interaction that they find tolerable. If the dolphins' need for respite is thwarted often enough, it could lead to increased levels of stress[459] and to injurious interactions with swimmers.[460] The case of refuges is an example of the economic basis of the public display industry directly conflicting with the needs of the dolphins.

The agency report also expressed concern for dolphins who are unsuited to SWD interactions. When these attractions proliferate, the number of animals who become unusable in SWD interactions (either because they act aggressively toward or do not readily interact with swimmers) increases

Allowing a small child to be towed in a dinghy around the tank by a dolphin is dangerous. It relies too much on the child to remain calm and not capsize the boat.

Posing like this for a "photo op" with tourists is a completely unnatural behavior for dolphins. This is not education.

accordingly. These dolphins are often males, who are usable in SWD interactions when young, but once sexually mature become unruly and even dangerous. This raises the question, "What becomes of these dolphins?" Given the lack of rehabilitation and release programs, the current absence of "retirement" sanctuaries for marine mammals (see Chapter 12, "The *Blackfish* Legacy"), and the cost of maintaining dolphins in captivity—particularly those who do not "pay their own way"—this question is of concern.

SWD attractions arguably do not educate the public;[461] they exploit both dolphins and people. AWI and WAP believe that SWD attractions should be unconditionally prohibited. However, the relevant authorities in all countries where such facilities operate have allowed their continued operation, in most cases without regulation.[462] Indeed, the industry strongly argues against regulations that would help improve the welfare of cetaceans in SWD facilities.[463]

The growing number of SWD attractions in the Caribbean is a particular concern. There are at least 25 facilities in the region, with one or more in countries such as Jamaica, The Bahamas, Honduras, Cuba, and the Dominican Republic. While expansion of this type of attraction has slowed since the early 2010s, new facilities are proposed for St. Lucia, the Turks and Caicos, Jamaica (which already has four), and St. Thomas (where, in fact, a dolphinarium has been built, but holds no dolphins as of early 2019).[464] Almost none of these jurisdictions have appropriate controls for the health or safety of either the dolphins or human participants in these interactions.[465] At least three Caribbean facilities have been involved in alleged illegal activities.[466] Animal protection groups have submitted comments to various authorities in an effort to ensure the strictest possible standards for these programs to minimize potential hazards for both dolphins and people, but clearly the goal must continue to be the prohibition of these exploitative operations.

PETTING POOLS AND FEEDING SESSIONS

Petting pool attractions were once common; they allowed visitors, more or less *ad libitum*, to feed and/or touch animals (for example, bottlenose dolphins, but also belugas, sea lions, and even orcas) from the side of the enclosure. Dolphinaria argued that such interactions attracted more tourists to their parks, thus enhancing public education about marine mammals, but this was never supported by research.[467] Indeed, the historical existence of petting pools and the continued existence of more controlled, supervised feeding sessions may actually have promoted rather than mitigated conservation problems in natural habitat, as members of the public have assumed that touching and feeding free-ranging marine mammals is acceptable.[468] Allowing the public to feed marine mammals sets a bad example.

Although feeding of dolphins is regulated by law and is only supposed to be done under strict supervision, there have been observations of dolphins in petting pools who were regularly fed popcorn, bread, french fries, sandwiches, and the contents of drink containers. This inappropriate feeding was either not seen by so-called supervisors, or no attempt was made to stop it.

For more than a decade, animal protection groups monitored dolphin petting pools in the United States and the risks they posed to both humans[469] and dolphins.[470] In the summer months, dolphins in petting pools were sometimes exposed to humans for 12 hours a day, every day, with the public often splashing water or slapping the sides of the tank to get the dolphins' attention, adding to an already noisy environment.[471] In addition, although feeding of captive marine mammals is regulated by law in the United States and is only supposed to be done under strict staff supervision,[472] there were repeated observations of dolphins in petting pools being fed popcorn, bread, french fries, sandwiches, and the contents of drink containers. This inappropriate feeding was either not seen by so-called supervisors, or no attempt was made to stop it.[473]

Many petting pool dolphins were also noticeably obese, clearly indicating that supervision of feeding was ineffective and that competition among the animals left some dolphins overfed (and conversely, some possibly underfed). Perhaps most alarming were observations of the public placing non-food items such as glasses, paper, stones, coins, bottle tops, metal souvenirs, and even a baby's pacifier into the mouths of dolphins or offering them wristwatches and even cigarettes.[474] If such objects are swallowed, they could cause gastrointestinal injuries, poisoning, and even death.

In addition, the risk of injury to people from being bitten or hit (see below and Chapter 11, "Risks to Human Health") and of disease transfer from people to captive marine mammals posed by direct contact between the two was (and is) ever present. Although members of the public are requested to wash their hands before touching dolphins or sea lions, this does not always occur, and even this would not be sufficient if someone coughed or sneezed over an animal. Diseases could also be spread to humans;[475] there are a number of pathogens found in marine mammals that can be, and have been, transferred to people (see Chapter 11, "Risks to Human Health").

The number of petting pools has declined, in particular in the United States, Canada, and Europe. This was partly due to the focused campaign by animal protection groups in the early 2000s,[476] but the adverse public attention after the documentary *Blackfish* was released (see Chapter 12, "The *Blackfish* Legacy") may also have played a role. In addition, the numerous problems and logistical difficulties associated with managing these attractions, including the high risk of injury, both to marine mammals and humans, were undoubtedly factors.[477] Unfortunately, many facilities around the world still allow the public to feed marine mammals, either from a greater distance or under trainer supervision—thus the bad example continues, although at less risk to the captive animals and facility visitors.

CHAPTER 11

RISKS TO HUMAN HEALTH

DISEASES

In a 2004 report to the US Marine Mammal Commission (MMC), researchers from the University of California highlighted the potential health risks to which humans are exposed through contact with marine mammals. In an internationally distributed survey of people who come into contact with marine mammals (primarily those who work with these animals), 23 percent of respondents reported contracting a skin rash or similar ailment.[478] Workers in the public display industry are in a high-risk group for infection.[479]

Respiratory diseases were also reported in nearly a fifth of marine mammal workers, including diseases such as tuberculosis.[480] Clearly, exposure to marine mammals can involve a health risk to people working with the animals, but it can also threaten the health of the public.[481] Diseases contracted from marine mammals are difficult to treat and diagnose, as they may be overlooked or even ignored by physicians who are not aware of the risks—or range—of potential infectious

diseases.[482] Several of the diseases that can be transmitted from marine mammals to humans are life-threatening.[483] Facilities that allow direct human contact with marine mammals, such as dolphinaria with "trainer for a day" programs or SWD encounters, are exposing their customers to possible infection and injury.[484] The reverse is also true—such facilities are exposing their animals to possible human diseases or injury as the result of inappropriate behavior by, or lack of screening of, the public.[485]

INJURY AND DEATH

The risks faced by swimmers in SWD attractions are alarming, as is made evident by an examination of the injury reports submitted to NMFS from 1989 to 1994.[486] There were only four SWD attractions in the United States during this period, yet NMFS received more than a dozen reports of injuries to people who participated in these swim sessions, ranging from lacerations to broken bones and shock. One man suffered a cracked sternum when butted by a dolphin, and a woman received a broken arm when similarly rammed. Her injuries were severe enough that surgery was required. Several dolphin biologists have noted that few, if any, dolphin-inflicted human injuries could be truly accidental,[487] yet all the injuries in the then-required SWD injury reports were so labeled. Broken bones and broken face masks were described as the result of "accidental bumps."

Such incidents have happened outside the United States as well; for example, in 2003, a woman was injured after entering the water with dolphins in Wakayama Prefecture, Japan.[488] The woman suffered a broken rib and vertebrae. The injury required hospitalization for six months. In early 2008, three tourists were injured at an SWD facility in Curaçao. The facility tried to downplay this incident and described it to local media as a "bump"; however, a digital recording by a bystander showed the dolphin breaching (a breach is a leap out of the water, with the animal landing on his or her side on the water's surface) in a manner that seemed quite deliberate. The dolphin landed directly on the swimmers, resulting in a serious impact.[489]

It is disturbing that the personnel at SWD attractions claim that almost all injurious human–dolphin interactions are accidents even as experts on dolphin behavior express skepticism about their accidental nature. The public has an image of the dolphin as friendly and gentle, and in several SWD injury reports the victims expressed a feeling of responsibility for the incidents in question. However, marine mammals are clearly capable of inflicting injuries and even killing humans. It seems a wise precaution before the beginning of a swim session to disabuse participants of the myth that dolphins would never deliberately harm a person, yet this does not seem to be occurring.

In fact, at any time during a swim session, especially one that is not controlled,[490] dolphins may inflict minor to serious injuries to swimmers for various reasons, some of which are neither obvious nor predictable. Even in controlled swim sessions, the risk is always present and is potentially lethal. It is

Exposure to marine mammals can involve a health risk to people working with the animals, but it can also threaten the health of the public. Diseases contracted from marine mammals are difficult to treat and diagnose, as they may be overlooked or even ignored by physicians who are not aware of the risks—or range—of potential infectious diseases.

All marine mammals, other than manatees and dugongs, are predators. They can inflict serious bites, causing life-threatening infections, and break people's bones with very little effort.

It is probable that a human will eventually be killed in a swim-with-dolphin attraction, more likely in one of the many new facilities in the developing world being built and operated by entrepreneurs who know little about dolphins but anticipate a large profit from this lucrative tourist activity.

probable that a human will eventually be killed in these attractions, more likely in one of the many new facilities in the developing world being built and operated by entrepreneurs who know little about dolphins but anticipate a large profit from this lucrative tourist activity. This has serious implications for the dolphins as well. Should an animal be involved in an injurious or fatal interaction, he or she would almost certainly no longer be used in encounters and would face an uncertain fate.

Petting pool dolphins also inflicted injuries to members of the public in the past.[491] Teasing by visitors and other inappropriate behavior, such as touching sensitive areas of the dolphin's body, like the eyes or blowhole, increased the likelihood of aggression by the dolphins. These actions are less likely in monitored feeding sessions, such as "trainer for a day" programs, but the risk is not entirely eliminated as long as untrained members of the public are allowed to interact with these wild animals.

Despite their portrayal by the public display industry as happy, friendly, and playful animals, marine mammals are—with the exception of the sirenians—predators. Moreover, in the wild, the behavior they direct toward conspecifics and other marine mammals can be aggressive and sometimes violent. For example, bottlenose dolphins, the most commonly kept cetacean species in captivity, have been regularly reported attacking and killing members of other cetacean species in the wild,[492] and even attacking and killing conspecifics calves.[493] Orcas, another commonly kept cetacean, are well known for their predatory behavior and have been recorded killing a wide variety of marine mammal species.[494]

The MMC survey by University of California researchers discovered that more than half of marine mammal workers had been injured by the animals (251 cases altogether at that time).[495] Those in regular contact with marine mammals or involved with cleaning and repairing enclosures were more

likely to be injured. Trainers and dolphinarium staff are frequently injured, but these incidents are rarely reported publicly.

The aggression and violence of which orcas are capable were clearly witnessed at SeaWorld San Diego in August 1989, when an Icelandic female (Kandu V) rammed a northeast Pacific female (Corky II) during a show. Although trainers tried to keep the show going, blood began to spurt from a severed artery near Kandu's jaw. SeaWorld staff then quickly ushered away the watching crowd. Forty-five minutes after the blow, Kandu died.[496] It should be noted that two orcas from different oceans would never have been in such proximity naturally, nor is there any record of an adult orca being killed in a similarly violent encounter in the wild.

Given their size, strength, and clear ability to be violent, it is hardly surprising that cetaceans have been known to exhibit aggression toward humans in the wild. Most commonly this aggression is exhibited toward humans trying to swim with cetaceans. Such aggressive behavior includes bottlenose dolphins trying to prevent swimmers from leaving the water, especially when the swimmers had also been trying to feed the animals, as well as biting members of the public.[497] In Hawaii, a short-finned pilot whale (*Globicephala macrorhynchus*) grabbed hold of a woman swimming next to the pilot whale group (arguably too close), pulling her 10–12 m (33–40 ft) underwater before letting her go. Although the swimmer was lucky to not have been drowned, she suffered a bite wound that required nine stitches.[498]

There is one record of a bottlenose dolphin killing a human. A solitary free-ranging male in Brazil, named Tiao by locals, had a history of approaching human swimmers, at times inflicting injuries: 29 swimmers had reported injuries, mostly as a result of them "harassing" the dolphin by grabbing his fins or trying to jump on his back. Arguably these people were only trying to do the very things that dolphin trainers are regularly observed doing to and with dolphins at dolphinaria. Eventually, in December 1994, Tiao rammed a man (who was reported to have been attempting to put objects into the dolphin's blowhole), rupturing the man's stomach and causing his death.[499]

Despite the bottlenose dolphin's abilities and propensity for aggression, captive orcas are the marine mammals most associated with human

Dolphins can cause deep lacerations, in people and other dolphins—their teeth can be razor sharp and, even when damaged or worn down, can injure.

Tilikum floats in the medical enclosure at SeaWorld Orlando next to the body of the trainer he killed on 24 February 2010, before authorities arrive.

injuries and deaths. In 1991, three captive orcas killed part-time trainer Keltie Byrne at Sealand of Victoria, in British Columbia, Canada. In front of a shocked audience, the orcas held Byrne underwater until she drowned.[500] More than eight years later, one of those same orcas, Tilikum, was discovered one morning with the dead body of a man named Daniel Dukes draped on his back at SeaWorld Orlando. Dukes had also drowned and suffered a host of injuries incurred both pre- and postmortem, suggesting that Tilikum had once again held a person underwater until he died. Dukes had apparently either snuck into the facility at night or stayed in the park after closing in an attempt to swim with the whale, calling into question the park's security procedures.[501] SeaWorld has consistently maintained that Dukes' death was caused by hypothermia, rather than animal-induced injury; however, the official autopsy report, publicly available under Florida law, clearly shows otherwise.[502]

On Christmas Eve 2009, Keto, a male orca, killed 29-year-old trainer Alexis Martínez at Loro Parque, a zoo in the Canary Islands, a territory of Spain. Keto was owned at the time by SeaWorld, and had been transferred from SeaWorld San Antonio to Loro Parque in February 2006.[503] Interestingly, this incident was not reported publicly at the time, beyond a single, Canary Islands (Spanish) media article, despite its obvious global newsworthiness.

However, the danger that captive orcas have always posed to trainers was tragically and definitively demonstrated by the death of Dawn Brancheau on 24 February 2010 at SeaWorld Orlando (see Chapter 12, "The *Blackfish* Legacy"). Tilikum, the male orca who killed Daniel Dukes 11 years earlier and Keltie Byrne eight years before that, grabbed Brancheau, one of SeaWorld's most experienced orca trainers, pulled her into the water, and ultimately killed her.[504]

There have also been many interactions that, while not resulting in a trainer's death, could easily have done so. For example, a young orca named Kyoquot attacked his trainer, Steve Aibel, at SeaWorld San Antonio in July 2004. During a show, the animal hit Aibel, pushed him underwater, and positioned himself between the trainer and the exit ramp of the tank. Aibel was rescued from the whale by another staff member only after several minutes of being unable to bring the animal under his control.[505] In November

2006, a female orca named Kasatka held trainer Ken Peters underwater by his foot at SeaWorld San Diego, coming close to drowning him.[506]

SeaWorld has maintained an "incident log" of aggressive or potentially aggressive interactions between orcas and trainers or park visitors since 1988. From that year through 2011, 98 incidents had been logged at SeaWorld Orlando alone,[507] a number that underestimates the total number of incidents, as a number of aggressive interactions are known to have not been recorded in the log.[508] In fact, the dangers posed by orca aggression were so well known that the leading marine mammal veterinary handbook (in an edition written before the deaths noted above) called this aggression "a grave concern" and noted that several situations have resulted in "potentially life-threatening incidents."[509]

Because of the risks to trainers posed by captive orcas, the California Division of Occupational Safety and Health (Cal/OSHA) investigated trainer safety after the incident with Kasatka and Ken Peters in 2006 (see above). SeaWorld managers had notified Cal/OSHA of the November incident the next day as a matter of regulatory routine, due to the serious nature of the injury. However, routine is a matter of perspective. SeaWorld saw the incident as a minor employee injury, but after a thorough review of this and other trainer–orca incidents, the state inspector came to a different conclusion: "[I]n the simplest of terms … swimming with captive orcas is inherently dangerous and if someone hasn't been killed already it is only a matter of time before it does happen."[510] This of course turned out to be prophetic, as two trainers were killed by orcas within four years of the state agency issuing this statement.

After Dawn Brancheau's death, the federal Occupational Safety and Health Administration (OSHA) cited SeaWorld for subjecting employees to a workplace that contained "recognized hazards that were causing or likely to cause death or physical harm to employees."[511] Moreover, OSHA stated that "SeaWorld trainers had an extensive history of unexpected and potentially dangerous incidents involving killer whales at its various facilities."[512] SeaWorld was given the maximum possible fine allowed by law.[513]

The high media profile of Brancheau's death coincided with the documentary *The Cove* winning an Academy Award in February 2010.[514] This heightened public awareness of the issues related to captive cetaceans led the House of Representatives of the US Congress to hold an April 2010 oversight hearing to discuss the public display industry, particularly the display of orcas.[515] Although this oversight hearing did not result in legislative action (the House majority party changed in November 2010, shifting legislative focus to other issues), it did set the stage for additional scrutiny by journalists, authors, and filmmakers of the injuries and deaths caused by captive orcas (see Chapter 12, "The *Blackfish* Legacy").

Cetaceans routinely kill mammals in the wild—even members of their own species. Humans are also mammals, equal in size or typically smaller than many of the mammals killed by bottlenose dolphins or orcas. It is extremely foolish to think that somehow the rules do not apply to humans. We are not immune to aggression or injury by cetaceans or indeed other marine mammals. As the number of swim-with-marine-mammal facilities increases,[516] particularly in regions where there are few or no safety regulations, safeguards, or reporting requirements, so the likelihood of more human injuries and deaths also increases.

CHAPTER 12

THE *BLACKFISH* LEGACY[517]

BLACKFISH

In February 2010, Tilikum, a 5,445 kg (12,000 lb) captive male orca, killed his trainer, Dawn Brancheau, at SeaWorld Orlando—the third human fatality with which this whale had been associated[518] (Table 2). Keto, a whale held at Loro Parque in the Canary Islands (and at that time owned by SeaWorld),[519] had killed his trainer only nine weeks earlier.[520] In addition, more than a dozen other captive orcas, male and female, had inflicted serious injuries on trainers over the course of the 45 years during which this species had been displayed at that time.[521] In contrast, historically there have been no substantiated reports of free-ranging orcas ever killing a human being,[522] and only a handful of reports of human injuries,[523] none life-threatening.

OSHA, the US employee safety agency, cited SeaWorld Orlando for a "willful"[524] violation of the US Occupational Safety and Health Act of 1970.[525] SeaWorld challenged this citation, but during the hearing, log books and reports detailing almost 100 incidents of dangerous orca behavior, resulting

TABLE 2. Human fatalities from captive orca attacks.

DATE	VICTIM	LOCATION	WHALE(S) INVOLVED	INJURIES AND/OR CAUSE OF DEATH
24 Feb 2010	Dawn Brancheau	SeaWorld, Orlando, Florida, USA	Tilikum	Blunt force trauma: broken jaw, spine, ribs, dislocated elbow/knee, severed arm, skull exposed (drowning also indicated, but water in sinuses was minimal)
24 Dec 2009	Alexis Martínez	Loro Parque, Canary Islands, Spain	Keto	Blunt force trauma: multiple compression fractures, lacerated internal organs
6 July 1999	Daniel Dukes	SeaWorld, Orlando, Florida, USA	Tilikum	Drowning: body was covered in multiple pre- and post-mortem bruises and abrasions
21 Feb 1991	Keltie Byrne	Sealand of the Pacific, Victoria, British Columbia, Canada	Tilikum Haida 2 Nootka 4	Drowning

in over a dozen serious injuries, were presented to the court. This was determined to be almost certainly an underestimate of the actual number of injuries[526] (see Chapter 11, "Risks to Human Health").

Over time, these two trainer deaths resulted in a number of consequences related to the governing policy, media narrative, and economics of the public display of orcas and other cetaceans. Several books were published about the history of captive orcas, including *Death at SeaWorld: Shamu and the Dark Side of Killer Whales in Captivity*[527] and *Beneath the Surface: Killer Whales, SeaWorld, and the Truth Beyond Blackfish*.[528] These books gained considerable media attention; the authors were interviewed on popular US talk shows, including *Anderson Cooper 360* and *The Daily Show*.[529]

However, it was the release of the documentary *Blackfish* in 2013 that led to a major increase in public awareness of the issues surrounding the public display of orcas. The documentary described the deaths and injuries of orca trainers and others, focusing in particular on the death of Brancheau. The film featured interviews with cetacean biologists, former trainers, and one person who had been involved historically in capturing orcas in the United States, who provided particularly graphic testimony.[530]

Blackfish was screened at the Sundance Film Festival in January 2013. It was released more widely in July by Magnolia Pictures,[531] but was still shown in only a small number of theaters, as is typical for a documentary. However, the film was acquired by the new film division of CNN at Sundance, which aired it on US television in October 2013 and re-broadcast it at least 25 times by the end of the year.

When the film initially aired on CNN, the network packaged it with accompanying media, both television and online, including a debate on its program *Crossfire*, a discussion on a special edition

Each new death of a captive cetacean, each new trainer injury, and indeed any negative incident at any public display facility was noted in the press, with more balance in the views presented than in the past.

of *Anderson Cooper 360* after the broadcast, and simultaneous live Tweeting by scientists and experts who provided supporting facts and details. During this initial showing, the Twitter hashtags #Blackfish and #Blackfishthemovie "trended" nationally.[532] In 2013 alone, 21 million viewers were reported to have watched the documentary on CNN.[533] A DVD was prepared for the end of 2013 and the documentary was made available on Netflix in 2014. The film was nominated for numerous awards,[534] including a British Academy of Film and Television Arts (BAFTA) Award. Although it was also short-listed for a US Academy Award (Oscar) nomination, ultimately it did not make the cut. SeaWorld lobbied against it with the Academy of Motion Picture Arts and Sciences.[535]

Blackfish was produced on a small budget,[536] by a director whose motivation in making the film arose from her inability to reconcile the Shamu she visited with her children with the predator who killed his trainer.[537] Ultimately, the documentary's impact went far beyond her intentions. The public's response on social media was intense, indicating high levels of public engagement, and led to the "*Blackfish* Effect."

THE *BLACKFISH* EFFECT

Because of the high level of interest in the documentary on social media,[538] traditional media quickly realized that the topic of captive cetaceans—especially orcas—was a matter of major public interest. Each new death of a captive cetacean, each new trainer injury, and indeed any negative incident at any public display facility was noted in the press, with more balance in the views presented than in the past. The number of holiday period "puff pieces" about which dolphinaria tourists should visit appeared to decline.

It is common for facilities to use a fire hose to provide tactile stimulation to an orca deemed too dangerous to approach closely.

Initially, SeaWorld ignored the film's debut at Sundance, but made an effort to address what it framed as "dishonesty" when the movie completed the film festival circuit and was more widely released in theaters.[539] Eventually, perhaps galvanized by the massive viewership the film gained through the CNN broadcasts, SeaWorld posted a detailed, time-stamped critique online, noting 69 points of concern in the film.[540] However, these "problems" were, in the end, minor technical issues and were easily rebutted by the filmmakers,[541] who had carefully researched the film's content, supporting it with peer-reviewed science, input from orca experts, and eyewitness statements verified by public records and other forms of evidence.

By early 2014, SeaWorld's websites and social media platforms were deluged with public comments and questions inspired by the film's content. The standard response to members of the public who offered criticism, or even simply asked skeptical questions, on the company's social media was to censor these comments and block those who posted them. The company also made personal, *ad hominem* attacks on critics, rather than substantively responding to the criticisms, and persistently attempted to portray its critics as a small number of emotional, extremist activists.[542] However, opponents of the company's orca policies who came forward in the months after *Blackfish's* debut included cetacean scientists,[543] former orca trainers, professional journalists,[544] and a broad spectrum of the general public. Critics also included a large number of respected environmentalists and highly visible celebrities, including David Attenborough, Jane Goodall, Willie Nelson, and Matt Damon.[545]

Undoubtedly as a result of this growing negative attention, several of SeaWorld's longtime corporate partners ended their relationships with SeaWorld, including Southwest Airlines, the Miami Dolphins, and the Seattle Seahawks.[546] Agreements, endorsements, and events were canceled, including an annual event at SeaWorld involving a number of musical acts.[547] After watching *Blackfish* at a studio event, executives and staff at Pixar Studios decided to change the ending of their then-upcoming animated feature film *Finding Dory*. The movie originally featured the marine animal heroes initially finding respite in a SeaWorld-like aquarium, where many of them remained "happily ever after." Post-*Blackfish*, the rescue facility was changed to a clearly-identified rehabilitation center and eventually many of the characters were successfully returned to the wild.[548] The blockbuster movie *Jurassic World* contained several anti-captivity, anti-corporate messages, including an unsubtle visual gag clearly aimed at SeaWorld.[549] SeaWorld was also targeted by hacker activists who changed SeaWorld's Wikipedia page so that the company was listed as a "prison."[550]

In an effort to combat what was now referred to as the *Blackfish* Effect, SeaWorld introduced a comprehensive publicity campaign called "Ask SeaWorld" in 2015.[551] This campaign operated primarily on social media, including Twitter, where the public was invited to ask "anything"[552] and SeaWorld staff would reply. However, the campaign was not a success. Instead of asking SeaWorld benign questions, many of the social media posts asked critical questions about captive cetacean welfare, including issues raised in *Blackfish*.[553] To counter the Ask SeaWorld campaign, animal protection advocates (including author Rose) developed a website called "SeaWorld Fact Check," which specifically rebutted Ask SeaWorld's responses to the public.[554]

SeaWorld also became the target of satirists, parodists, and comedians. The company had already faced considerable lampooning from the popular satirical magazine *The Onion* after *Blackfish* was released.[555] But in response to the Ask SeaWorld publicity campaign, the magazine dramatically increased the number of articles poking fun at SeaWorld and its practices.[556] Comedians targeted SeaWorld on such shows as *The Colbert Report, Last Week Tonight with John Oliver, The Daily Show with Jon Stewart*, and later *The Daily Show with Trevor*

The room where the public hearing on SeaWorld San Diego's application to build a larger orca enclosure was held was standing room only in October 2015.

Noah.[557] Once a company becomes a widespread object of ridicule in popular media, its image becomes shaped by it, compounding negative impacts.[558]

Unsurprisingly, as a result of this onslaught of negative publicity, attendance at SeaWorld began to drop, with 1 million fewer people visiting SeaWorld in 2014 compared to the previous year.[559] The company also saw its stock value drop.[560] In all, during 2014, SeaWorld lost more than US$80 million in revenue.[561] SeaWorld's chief executive officer (CEO) Jim Atchison announced his resignation in December 2014.[562]

Although SeaWorld had assumed that the effect of the negative publicity from *Blackfish* would quickly fade away, this did not happen.[563] The decline in revenue and visitor numbers continued well into 2017, with the company reporting a third of a million fewer visitors than at the same time in 2016.[564]

THE LEGAL AND LEGISLATIVE IMPACTS OF *BLACKFISH*

In August 2015, the fourth in a series of class-action lawsuits[565] was filed, with evidence of what "attorneys allege[d] to be the misrepresented and undisclosed truth about the conditions and treatment of SeaWorld's captive orcas."[566] This case claimed that SeaWorld had used false advertising and had lied to its customers, thereby violating several laws.[567] A lawsuit was also launched on behalf of SeaWorld's shareholders,[568] which claimed that SeaWorld executives had been downplaying the impact of the documentary upon the company's finances. Documents released during the discovery phase of this case revealed that this perception was indeed correct—SeaWorld executives were secretly tracking revenue lost because of the documentary's impact, but publicly claiming the impact of the film was negligible to non-existent.[569] The shareholder court case was temporarily postponed until 2019,[570] after it was announced that the withholding of information about the financial impacts of *Blackfish* had also led to a criminal investigation into SeaWorld's financial disclosures by the US Department of Justice (DOJ) and the US Securities and Exchange Commission (SEC).[571] The DOJ and SEC case was eventually settled in 2018, with SeaWorld paying investors US$5 million in fines.[572]

In February 2014, California Assembly Member Richard Bloom, who had watched the film,

introduced a bill that would have made it illegal to "hold in captivity, or use, a wild-caught or captive-bred orca for performance or entertainment purposes."[573] The bill did not progress that year, although the chair of the relevant legislative committee expressed support for it and asked staff to conduct an "interim study"[574] on the bill and its potential impacts. The bill was reintroduced in March 2016[575] and ultimately passed the legislature as part of another bill,[576] coming into effect in January 2017.

SeaWorld vigorously opposed the bill in 2014, but withdrew its active opposition in 2016. This change in position was the result of a series of events that took place in 2015, highlighting SeaWorld's controversial orca breeding program and the continued concern the public felt about the treatment of captive orcas.[577] Withdrawing its opposition to the bill—which almost certainly ensured its passage—suggested that SeaWorld felt it was more important to bring a swift close to the controversial and high profile battle over the legislation than to prolong the fight when the odds of the bill eventually passing were good.

Bills similar to the California legislation were introduced in New York[578] and Washington State.[579] A federal bill was also introduced in 2015, the Orca Responsibility and Care Advancement (ORCA) Act.[580] Should this bill eventually pass, it would result in a phase-out of captive orca display in facilities throughout the United States. After a number of years of debate, a bill in the Canadian Parliament, S-203, which would end the display of cetaceans nationally, was poised to pass sometime in 2019.[581]

THE END OF CAPTIVE ORCAS?

SeaWorld announced in March 2016 that it would end its orca breeding program for all of its facilities.[582] Effectively, this means that the company will phase out the display of this species over time, as it will not replace animals as they age and die.[583] The world's leader in cetacean display, which built its brand on the Shamu Show, is now holding its last generation of captive orcas.

The company also pledged that it would change the orca shows and facilities to provide more natural-looking habitats, with a focus on the whales' natural behaviors and with an added emphasis on education and conservation.[584] The company also stated that it would be giving US$50 million in funding to marine conservation projects[585] and a further US$1.5 million for research projects related to the conservation of free-ranging cetaceans.[586] As noted in Chapter 2 ("The Conservation/Research Fallacy"), SeaWorld has been heavily criticized for its lack of funding for free-ranging marine mammal research and conservation, in particular a noticeable lack of funding for endangered populations of free-ranging orcas.[587] This paradigm shift was a direct result of the *Blackfish* Effect, and the culmination of decades of work by animal protection advocates. Within two days of this announcement, SeaWorld's stock went up by 9.5 percent in one day.[588]

SeaWorld announced in March 2016 that it would end its orca breeding program for all of its facilities. Effectively, this means that the company will phase out the display of this species over time, as it will not replace animals as they age and die. The world's leader in cetacean display, which built its brand on the Shamu Show, is now holding its last generation of captive orcas.

This is how cetaceans should live. Seaside sanctuaries are an attempt to return to captive cetaceans as much of their choices and natural environment as possible, while still caring for them and keeping them safe.

This initial uptick did not last in the short term. For the first year after these announcements, it appeared these initiatives may have been too little, too late. SeaWorld revenue continued to decline in 2016, with nearly half a million fewer visitors compared to the previous year.[589] However, later in 2017 SeaWorld began de-emphasizing Shamu and the orca shows in its advertising, focusing instead on amusement park rides it was adding and its rescue and rehabilitation efforts.[590] By late summer 2018, SeaWorld's stock exceeded its IPO share price[591] for the first time since spring 2014.[592] This is strong evidence that SeaWorld, despite its historic reliance on Shamu as its icon, can indeed survive without this signature species on exhibit, by shifting to a new business model that emphasizes its true roots as an amusement park, rather than its questionable claim to be a zoo.

Regardless of the increasingly positive outlook for captive cetaceans in the West, the situation in the East is in flux. The captures that took place in summer 2018 in Russia have garnered worldwide attention and opprobrium. The trade in both belugas and orcas between Russia and China may be ending, but as of early 2019 nothing was definitive (see Chapter 3, "Live Captures").

SEASIDE SANCTUARIES: THE FUTURE FOR CAPTIVE CETACEANS?

Since the release of *Blackfish*, there has been a major shift in public attitudes toward, and perceptions of, captive cetaceans globally, with more members of the public seeing the practice as inhumane and no longer acceptable.[593] In response to these changing views, several tourism companies (including Virgin Holidays and TripAdvisor) announced as early as 2014 that they would stop offering, or would restrict their promotion of, tours to dolphinaria and SWD attractions.[594] The Vancouver Park Board voted to end the public display of cetaceans at Vancouver Aquarium in 2017[595] and several countries, including Vietnam and France, have rejected proposals for new dolphinaria or are considering new policies that will result in the phasing out of cetacean display through breeding bans.[596]

In 2015, a workshop was held at the 21st Biennial Conference on the Biology of Marine Mammals, to investigate the feasibility of "seaside" retirement sanctuaries for captive orcas and belugas.[597] The following year, Munchkin Inc. (a baby product company) announced that it would be financing a

The goal of a seaside sanctuary is to provide the cetacean residents with more natural surroundings, more space, and more choice in their daily lives.

campaign against orcas in captivity, with the CEO pledging US$1 million to help establish a seaside sanctuary for captive orcas. The Whale Sanctuary Project was established in May 2016.[598]

More importantly, some industry representatives have also come to support the concept of seaside sanctuaries.[599] Changfeng Ocean World in Shanghai, China, displays two beluga whales. It was purchased by Merlin Entertainments, which has a policy against holding captive cetaceans. Upon acquiring this Shanghai facility, Merlin pursued plans to develop a sanctuary for the belugas—this will be a large netted-off bay on the island of Heimaey in Iceland—where the animals can live out the rest of their lives in a natural environment, but protected and under the care of sanctuary staff. The sanctuary is being developed by SEA LIFE Trust in partnership with the environmental group Whale and Dolphin Conservation.[600] There are currently no plans to release these beluga whales back to the wild and the sanctuary is scheduled to become operational in 2019. In June 2016, the National Aquarium in Baltimore, Maryland, in the United States announced that it would be closing its dolphin exhibit and building a seaside sanctuary where it would retire its dolphins by 2020.[601] In October 2018, Dolphin Marine Magic in New South Wales, Australia, as part of a settlement agreement after a lawsuit was filed by animal protection groups, agreed to work in partnership with these groups to conduct a feasibility study on establishing a seaside sanctuary for its five dolphins.[602]

These sanctuaries would likely incorporate small-scale tourism, through associated visitor centers and boardwalk viewpoints, and would also have a research and education component. Essentially the animals would be kept in coastal water bodies (for example, bays, coves, lagoons, quarries, fjords, or inlets) that are netted off from the open ocean, with several support buildings for staff, veterinary care, and research labs. The majority of captive cetaceans today have been held for most or all of their lives in captivity and thus would be unlikely to be able to survive in the wild. Therefore, while it may be possible for some individuals consigned to sanctuaries to eventually return to the wild, many of the residents of sanctuaries would not be released and would receive lifetime care. The goal is to provide the animals with more natural surroundings, more space, and more choice in their daily lives. They would be allowed to interact with other sanctuary residents as they wish, rather than strictly under the control of management or per performance schedules. There would be no breeding, and should any sanctuary eventually have no residents, ideally it would continue to serve as a rescue and rehabilitation center for free-ranging marine mammals requiring care due to injury, orphaning, or stranding.[603] With suitable, carefully screened candidates, rehabilitation for release would be pursued.

In the aftermath of the *Blackfish* Effect and with changing public opinion about keeping cetaceans in captivity, society, at least in the West, seems to have passed the tipping point with regard to captive cetaceans. It is now mainstream to oppose the public display of cetaceans rather than the fringe. However, the East, particularly Asia and Russia, is lagging several decades behind, still awaiting its *Blackfish* moment. There is much work yet to do.

CONCLUSION

The phasing out of [captive] cetacean programs is the natural progression of human-kind's evolving view of our non-human animal kin.

—Jane Goodall, Ph.D., DBE, 2014

AWI and WAP believe the tide has turned in the West for captive marine mammals, particularly cetaceans. The following countries do not allow the display of cetaceans for entertainment:[604] Bolivia, Chile, Costa Rica, Croatia, Cyprus, Hungary (achieved through a trade ban),[605] India, Nicaragua, Slovenia, and Switzerland (achieved through a trade ban). States, provinces, counties, and municipalities have done the same, including Barcelona, Spain; Malibu County, California, United States; Maui County, Hawaii, United States; Mexico City, Mexico; Ontario, Canada (orcas only; achieved through a trade and breeding ban);[606] and South Carolina in the United States. Most of these jurisdictions had no dolphinaria to begin with; the two that have a remaining facility (Barcelona and Mexico City) will close them soon.

Other countries have banned or restricted the trade in live cetaceans, including Argentina (imports from the Russian Federation prohibited); Brazil (ban on imports and exports); Canada (administrative policy banning the capture of beluga whales for export—see Chapter 12, "The *Blackfish* Legacy," for information on a pending federal bill in Canada to ban cetacean display); Chile (prohibits the import and export of dolphins for public display); Costa Rica (imports and exports prohibited); Cyprus (imports prohibited); Dominican Republic (orca imports prohibited); Hungary (imports prohibited); India (imports prohibited); Malaysia (no trade); Mexico (trade in wild-caught cetaceans prohibited); Solomon Islands (exports prohibited); Switzerland (imports prohibited); and the United States (imports of wild-caught cetaceans strictly regulated). A number of countries (including several of those above) ban or strictly regulate live captures in their exclusive economic zones.

The government of Antigua and Barbuda, after issuing a permit to a foreign company to capture as many as 12 dolphins annually from local waters, rescinded this permission after activists filed a lawsuit arguing the quota was unsustainable and that it violated regional conservation agreements.[607] In a number of cases, municipal, provincial, and national governments have decided not to allow a dolphinarium or a cetacean exhibit to be built.[608] Furthermore, some countries have implemented strict regulations for the keeping of cetaceans in captivity. Among these are Brazil, Luxembourg, Norway, and the United Kingdom;[609] the United Kingdom used to have as many as 30 dolphinaria and now has none.[610] Italy bans SWD encounters and other human–dolphin interactions.[611]

All of these developments, as well as those from the past five years described in Chapter 12 ("The *Blackfish* Legacy"), suggest that a paradigm shift is well underway, at least in the West. The massive increase in global public awareness resulting from high profile documentaries such as *The Cove* and *Blackfish*[612] has ensured that every new proposal to build a dolphinarium anywhere in the world will receive increased scrutiny and skepticism. The traditional and social media attention on controversial captures, unnecessary deaths, and inhumane transports is having an impact on the global public's perception of marine mammals in captivity. The impression of happy animals performing for fish is giving way to recognition of behind-the-scenes suffering.

In the preceding pages, AWI and WAP have presented the case against capturing and breeding marine mammals and keeping them in captivity for human entertainment. Yet, while humans can separate out and analyze each aspect of the existence of captive marine mammals, one fact must remain paramount: To the marine mammals, the experience of captivity is not a set of aspects that can be perceived separately. Instead, it is a whole, inescapable life. Therefore, while humans can subdivide the captive experience and even conclude that one aspect is more or less damaging to the animals than another, or find shows and performances more acceptable if they include elements of "natural behavior" in them, AWI and WAP believe that the entire captive experience for marine mammals is so impoverished and contrary to even the most basic elements of compassion that it should be rejected outright when its primary purpose is to entertain people. It is unacceptable for marine mammals to be held in captivity for the purpose of public display.

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ENDNOTES

INTRODUCTION

1. US Marine Mammal Protection Act (MMPA), 16 USC §§ 1361–1423h (1972).

2. "Take" refers to actions such as capturing, injuring, killing, and harassing the animals. Examples of international agreements that model their provisions exempting public display from prohibitions on take on the MMPA include the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) (27 UST 1087 (1973)), and the Protocol Concerning Specially Protected Areas and Wildlife to the Convention for the Protection and Development of the Marine Environment of the Wider Caribbean Region (the SPAW Protocol of the Cartagena Convention). The SPAW Protocol was adopted on 18 January 1990, and entered into force on 18 June 2000 (see Krishnarayan *et al.*, 2006; see also, e.g., *80 Fed. Reg.* 42088, 2015).

It is notable that these agreements generally fail to define what is meant by "educational" or specifically how public display furthers conservation. However, the SPAW Protocol has offered guidance on what "educational purposes" encompasses—for example, this guidance notes that "possession for *primarily* commercial purposes should not be accepted as constituting any educational purpose" (emphasis added; Section 4(b) in SPAW, 2017). Nevertheless, the use of the word "primarily" still leaves room for commercial public display to be categorized as for "educational purposes" and indeed there are commercial dolphinaria operating under this exemption in the Wider Caribbean Region.

3. "Small cetacean" refers to species that are generally smaller than about 10 m (33 ft) in adult length and have teeth as opposed to baleen. Baleen is found in all the "great" whales, who are generally larger than approximately 10–12 m (33–39 ft) in adult length, except the sperm whale (*Physeter macrocephalus*). Baleen is made of material similar to human fingernails, hangs from the upper jaw, and filters tiny animals, such as small schooling fish or shrimp-like krill, from the water column or sandy or muddy sea floors. Toothed whales feed on individual fish, squid, and/or other marine mammals.

4. In the United States, life history and administrative data—such as dates of acquisition, birth, death, and transfer—on captive seals, sea lions, whales, dolphins, and porpoises are maintained by the Department of Commerce's National Marine Fisheries Service (NMFS) in its *National Inventory of Marine Mammals*, as required under the MMPA, which is updated periodically. The United States appears to be the only country to require such an inventory. However, US dolphinaria, aquaria, and zoos are not required to submit such information on polar bears (*Ursus maritimus*), sea otters (*Enhydra lutris*), walruses (*Odobenus rosmarus*), or manatees (*Trichechus manatus*); these species are under the authority of the Department of Interior's Fish and Wildlife Service (FWS). Unlike its sister agency NMFS, the FWS has not established an inventory for these latter species.

5. "Husbandry and medical care were learned empirically over the years by trainers and veterinarians" (p. 283 in Couquiaud, 2005). See endnote 237 for more about Couquiaud (2005).

6. The authors of the few peer-reviewed papers available in the scientific literature related to captive marine mammal welfare often comment that there are very few welfare-related studies published (see, e.g., Clark, 2013; Butterworth, 2017; Clegg *et al.*, 2017; Rose *et al.*, 2017).

7. Cetaceans (the taxonomic group that includes all the whales, dolphins, and porpoises) are exhibited in more than 300 facilities in approximately 60 countries (*www.cetabase.org*; Cathy Williamson, personal communication, 2018).

8. Marine Studios began construction in 1937 in St. Augustine, Florida, in the United States and was opened to the public, with a captive dolphin show as a premiere attraction, in summer 1938 (see *https://marineland.net/our-history/*). It is now called Marineland of Florida.

CHAPTER 1 • EDUCATION

9. In 1988, the MMPA was amended to require that permits for possessing marine mammals for public display purposes would be given only to applicants that used the animals in a conservation or education program that both adhered to "professionally recognized standards of the public display community" (16 USC 1374 § 104 (c)(2(A)(i)) and was acceptable to the US secretaries of commerce and the interior. Another amendment in 1994 removed the need for secretarial approval, but the need to adhere to "professionally recognized standards" was maintained. At the time, such standards did not exist in published form; therefore, NMFS asked the American Zoo and Aquarium Association (AZA—now known as the Association of Zoos and Aquariums) and the Alliance of Marine Mammal Parks and Aquariums (AMMPA), two industry associations, to draft such standards.

These standards (see, e.g., Association of Zoos and Aquariums, 2018) emphasize that "programs should be updated with current scientific information, with an educational/conservation message as an integral component" (Section 4.3.1 in Association of Zoos and Aquariums, 2018) and, specifically for cetaceans, "The institution must have education programs about cetaceans to improve public understanding and appreciation for these animals and their ecosystems" and "Education programs about cetaceans must be based on current scientific knowledge" (Sections 2.2.1 and 2.2.2, respectively, in Association of Zoos and Aquariums, 2018). Moreover, education programs should be regularly evaluated and these evaluations "should assess more than participant satisfaction, looking also at program impact (ideally including impact on conservation-related knowledge, attitudes/affect, and behavior)" (Section 4.3.1 in Association of Zoos and Aquariums, 2018). However, many of these standards are ignored by accredited dolphinaria, let alone non-AZA members—in some cases, all are. These AZA standards have been used by associations and facilities in other countries as a "best practice" template for their own *guidelines*—few nations have education program *requirements*.

10. An AZA report noted that little or no research on the impact of zoos and aquaria on visitor knowledge or behavior had been conducted, published, or presented at conferences (Dierking *et al.*, 2001). Another AZA study noted that zoos "have done little to assess [their] impact. … While there is some evidence of zoo experiences resulting in changes in visitors' intention to act, there are few studies demonstrating actual changes in behavior" (p. 5 in Falk *et al.*, 2007). In this latter study, the results suggested that very few zoo visitors (10 percent) increased their conservation-related knowledge base, while only about half were prompted to increase their conservation-related behavior. Over time, far fewer than half of visitors (20-40 percent) could still recall any animals or exhibits they had seen. The study did not examine whether these visitors had increased their conservation-related behavior after their zoo visit.

Khalil and Ardoin (2011) also highlighted that zoos often lack evaluation of education programs. They noted that "[zoo p]ersonnel are most likely to

name a shortage of time, money, and expertise as reasons to skip evaluations" and also stated "the possibility of poor results" (p. 174). That is, zoos were concerned that their educational impact was minimal, which influenced their failure to evaluate their education programs.

Surveys often note that visitors who are questioned say their experiences were "educational," but these surveys do not actually test whether this is indeed the case or ascertain whether anything was actually learned (e.g., Curtin, 2006; Sickler *et al.*, 2006). In fact, Sickler *et al.* (2006) noted that the audience tended to remember "tricks" rather than anything educational. Studies that identified a lack of empirical proof that captive animal exhibits were educational led the AZA to revise their educational standards in 2017, to "assess more than participant satisfaction, looking also at program impact (ideally including impact on conservation-related knowledge, attitudes/affect, and behavior)" (Section 4.3.1 in Association of Zoos and Aquariums, 2018) (see endnote 9).

A study on the educational impacts of a large number of zoos, commissioned by the World Association of Zoos and Aquariums (WAZA) (Moss *et al.*, 2014; a revised version of this study, assessing fewer zoos, was published as Moss *et al.*, 2015), looked at 3,000 visitors to 30 global zoos and aquaria. The study found that 69.8 percent of visitors showed understanding of biodiversity before the visit, while 75.1 percent did so after the visit, a minimal increase. Another study also found less than 10 percent of zoo visitors had a greater understanding of biodiversity after a visit, and only 4.5 percent believed that they were supporting biodiversity by supporting zoos (Bekoff, 2014).

Another study, presented as evidence of the positive educational impact of zoos, examined school children who visited London Zoo on field trips (Jensen, 2014). Forty-one percent of children on educator-guided visits and 34 percent on unguided visits demonstrated "conservation biology–related learning." However, 66 percent of these children actually learned nothing new about animals or environmental conservation after visiting a zoo on a field trip (where the aim was presumably to learn something new). Indeed, the study suggested that children's conservation attitudes actually worsened, as they felt helpless to address conservation problems after their visit to the zoo.

A review of zoo education studies published in 2018 assessed 48 studies and considered 83 percent to be methodologically "weak," i.e., the methodology was flawed, and none were rated as "strong" or methodologically rigorous (Mellish *et al.*, 2018). Marino *et al.* (2010) also found several papers claiming that zoos were educational (e.g., Falk *et al.*, 2007) to be methodologically flawed. Indeed, one researcher noted that "[f]acing mounting criticism from the animal rights camp, wildlife attractions often justify their existence with a mission to educate children and adults about important issues, like biodiversity and conservation challenges. But can they prove that a visit to the zoo adds to the understanding of these issues? Until recently, there was virtually no hard evidence to back up these claims" (Gross, 2015).

In a review of educational materials provided at zoos and aquaria across Europe, Jensen (2012) concluded that this "critical review of public engagement materials developed by zoos and aquaria to enhance pro-conservation outcomes for visitors shows that … the specific methods and techniques of engagement are often flawed or ill-conceived. The wealth of relevant knowledge about communication and psychology does not seem to have been applied in most cases" (p. 105).

11. With respect to whether or not dolphinaria have a genuine educational or conservation impact, a study conducted at a Canadian facility reported that 61 percent of visitors agreed with the statement that "I feel that the staff had good knowledge about marine wildlife." However, only 28 percent agreed with the statement "I have the feeling that aquariums or marine parks provide lots of information on conservation" and a similar percentage agreed with the statement "I have the feeling that aquariums or marine parks portray a real image of marine ecosystems" (Jiang *et al.*, 2008).

Interestingly, almost half (47.4 percent) of visitors disagreed or strongly disagreed with the statement "I have the feeling that dolphins and whales enjoy their life at aquariums or marine parks." Some visitors stated that their visit had made them decide not to go to marine theme parks in the future. The researchers concluded, "The collected data indicate that the majority of people did not become more environmentally sensitive after a marine park visitation. In other words, visitations to marine parks have no effects on visitors' opinions about the importance of conserving the environment and wild animals" (pp. 245–246) and "marine parks do not deliver conservational information about the natural environment properly to the public" (p. 246). Contrary to claims by the public display industry, "visiting a marine park did not help people to know more about conserving the environment and wild animals" (p. 246).

In contrast, another study reported that knowledge and conservation attitudes increased immediately following a visit to facilities with dolphin exhibits (including shows and/or interaction sessions) and levels remained significantly higher three months later (Miller *et al.*, 2013). This was presented as evidence that dolphin shows and interaction sessions have educational and conservation benefits. However, there was no statistically significant difference between those visitors who had actually viewed or interacted with dolphins and those who had not (the control group), in terms of their knowledge, attitudes toward conservation, or conservation intentions. Therefore, being able to view or interact with captive cetaceans apparently did not increase education or conservation-oriented behavior beyond the impact of visiting the park on its own. This suggests that a park's marine theme, rather than its live animals, is at least equally, if not more, influential on visitors.

12. In a study from the 1980s on learning at American zoos, researchers showed that only about a third of visitors specifically went to the zoo to learn about animals and even fewer to learn about wildlife conservation. The majority of visitors stated that they were visiting for entertainment and recreation (Kellert and Dunlap, 1989). Another more recent study found that viewing captive animals and watching marine mammal performances were the main reason people visited a dolphinarium, rather than education (Jiang *et al.*, 2008).

Ong (2017) concluded that the expansion of ocean theme parks in China was, at least in part, to provide a safe and entertaining tourism excursion, rather than an educational experience, for a growing Chinese middle class made up of families with disposable income and most with a single, indulged child. (For several years, China had a controversial one-child population control policy. This policy has recently been relaxed and may soon be repealed altogether (Westcott, 2018).) Ong (2017) noted that exposure to animals in an artificial setting, with the animals "cuteified" to make them more appealing to young children, leads to an unreal portrayal of the animals' behavior and life in the wild; i.e., ocean theme parks are providing miseducation to their visitors. The large number of gift shops and expensive food and drink vendors—often several times more expensive than other local tourism establishments—seek to maximize the profit these facilities can make from these newly affluent young parents.

13. See *Marine Mammals in Captivity: What Constitutes Meaningful Public Education?*, a hearing before the House Committee on Natural Resources Subcommittee on Insular Affairs, Oceans, and Wildlife, 111th Congress (27 April 2010), available at *https://www.c-span.org/video/?293204-1/marine-mammal-education*.

14. We use "free-ranging" as an adjective throughout this report, rather than "wild," when making a contrast between marine mammals in captivity and in the wild, as captive marine mammals are still wild animals. They have not been domesticated (see endnote 80). We use "wild" only as a noun.

15. Although education and conservation programs must meet "professionally recognized standards of the public display community" under the MMPA, the hearing clarified that NMFS makes no effort to ensure that facilities actually meet these standards. In addition, NMFS has not developed any regulations whereby marine mammals might be removed from facilities, or permits for display might be revoked, due to lack of compliance with these standards (Bordallo, 2010). In response, the NMFS representative testifying at the hearing stated that the agency considered the requirement in the MMPA for facilities to meet "professionally recognized standards" to mean that dolphinaria should follow guidelines developed by the AZA and the AMMPA simply as a matter of course (Schwaab, 2010). In short, the agency left captive marine mammal facilities to monitor, evaluate, and regulate themselves on this point, with no governmental oversight.

16. Scardina (2010) and Stone (2010).

17. Rose (2010). In fact, Japan initiated steps in late 2018 to withdraw from the International Whaling Commission (IWC), the treaty organization responsible for governing the hunting of great whales, after being a party since the 1950s. Clearly the connection between exposing the public to "ambassador" marine mammals and championing strong marine conservation is not a simple one.

18. The sample was 1,000 adult Americans (Kellert, 1999).

19. Edge Research (2015).

20. This web-based Harris Interactive survey conducted in 2007 was nation-wide and was commissioned by WAP (then the World Society for the Protection of Animals (WSPA)), with a sample of 2,628 adult Americans.

21. A telephone poll of 350 residents of Vancouver and its surrounding areas was conducted on behalf of Zoocheck Canada (Malatest, 2003).

22. This poll of 1,000 adult Americans was funded by Whale and Dolphin Conservation (WDC) and AWI (Whale and Dolphin Conservation, 2014) and asked the same questions in 2012 and 2014. The proportion of Americans conflicted or uncertain about captivity had decreased from 34 percent in 2012 to 29 percent two years later. In addition, 82 percent stated that the inability of orcas (*Orcinus orca*) to engage in their natural behaviors when kept in captivity was a "convincing" reason to end this practice. Moreover, 72 percent stated that the risk of orcas killing or injuring their trainers was a convincing reason to end their display (versus 66 percent in 2012) and the proportion of respondents who said that captive breeding would help preserve orcas for future generations dropped by a statistically significant 10 percent in those two years.

23. This online survey was of 2,050 people in the United Kingdom and was conducted by the Born Free Foundation. Initially 61 percent indicated that they would not visit a captive cetacean facility. The interviewers then presented respondents with a statement about captive cetaceans, and 64 percent of the remainder changed their minds and also stated they would not visit such a facility.

This was the statement presented to respondents:
"Captive whales and dolphins are kept in marine parks and visited by tourists on vacation. They are highly intelligent, social animals. In the wild, they:

- live in family groups, called pods, of up to 100 individuals;
- have considerably higher life expectancies than their counterparts in captivity;
- can swim the equivalent distance of London to Sheffield (260 km) or more in one day;
- are capable of diving to depths greater than the height of Niagara Falls (60 m) and hunting live fish using sophisticated techniques.

In captivity these animals are confined to tanks, they are fed dead fish and commonly develop problems such as abnormal repetitive behavior and aggression. They are trained to perform tricks and stunts, often to loud music and a cheering crowd."

Of the initial 61 percent who would not visit dolphinaria, 75 percent were of the opinion that it was "wrong to keep whales and dolphins in small tanks" and an additional 19 percent stated that they "don't support or attend any zoos" (Payne, 2014).

24. Wasserman *et al.* (2018).

25. This study showed that 54.4 percent of respondents were opposed to public display and 45.6 percent supported public display; this difference was statistically significant (Naylor and Parsons, 2018). This study used a web-based methodology that allowed participation from international respondents. The majority of participants were from the United States and India. Only 21 percent of Indian participants were strongly supportive of cetaceans in captivity. While the public generally objected to cetaceans being kept for entertainment purposes, 85 percent supported keeping dolphins in captivity when they were sick or injured. The survey also found that almost 80 percent of respondents objected to capturing free-ranging dolphins and whales for display in zoos and aquaria.

26. Six times as many respondents, or 86 percent, preferred to view cetaceans in the wild via whale watching versus in captivity (Naylor and Parsons, 2018). Respondents from the United States were less likely to prefer watching cetaceans in a marine theme park (9 percent) than those from India (26 percent). Similar results were also found in surveys from the Caribbean. Ninety-two percent of people surveyed in the Dominican Republic preferred to see dolphins in the wild versus 2.5 percent who preferred to see them in a dolphinarium (Draheim *et al.*, 2010). In Aruba, 62 percent of tourists surveyed preferred to watch marine mammals in the wild rather than in a dolphinarium (Luksenburg and Parsons, 2013).

27. In her book on SeaWorld's corporate culture, Dr. Susan Davis, then-professor of communications at the University of California, San Diego, noted that "the Shamu show reveals very little actual scientific or natural historical information, and discussions of research goals and discoveries are hazy. True, not much can be packed into a twenty-minute performance, but a look at what is included is revealing. The audience is asked whether Shamu is a fish or a mammal and is told that it is a mammal—but the definition of mammals, or the significance of mammalian status, or the importance of differences between marine mammals and fish is never discussed" (p. 298 in Davis, 1997).

28. As a result of the European Union (EU) Zoos Directive (Council Directive 1999/22/EC), all zoos and captive animal facilities in Europe (including dolphinaria) are legally obligated to provide educational materials on the natural habitats of displayed animals. The Argentinian, Brazilian, and Italian education requirements are also relatively specific about providing accurate information on marine mammal natural history. This specific requirement is not found in laws and regulations governing zoos in North America (including under the MMPA—see endnotes 9 and 15) or in many other parts of the world. The marine mammal performances at Chinese facilities in particular are fundamentally circus-like, with little or no accurate natural history information—pure cartoonish spectacle (Ong, 2017; see also the investigative reports at *www.chinacetaceanalliance.org*).

29. For example, the website for the Indianapolis Zoo in the United States used to state that the average life expectancy for common bottlenose dolphins (*Tursiops truncatus*) in the wild was 37 years. When it was pointed out that none of the facility's animals had to date survived past 21 years of age, the website was changed to report a life expectancy in the wild of only 17 years (Kestin, 2004a).

30. Davis (1997).

31. Cetacean dorsal fins are made of connective and fatty tissue; there is no bone or cartilage maintaining their structure. (Interestingly, SeaWorld veterinarians appear not to be aware of this—see, e.g., *https://www.youtube.com/watch?v=TT0X_n-dVHA*, a video of a debate between SeaWorld representatives and critics of SeaWorld, including author Rose, where Dr. Todd Robeck of SeaWorld San Diego repeatedly states that dorsal fins contain cartilage, starting at time stamp 16:40. This suggests that the topic of "drooping fin" syndrome was such a taboo subject within the company that those who worked there from the start of their adult careers remained ignorant of this basic cetacean anatomy.) Dorsal fins tend to be highly vascularized (containing many blood vessels), making them efficient conductors of body heat for these marine mammals (Parsons *et al.*, 2012). The tall dorsal fin of male orcas is considered to be a secondary sexual characteristic (like a peacock's tail or a stag's antlers); that is, it is a way for females to assess the fitness of a potential mate (Parsons *et al.*, 2012). Full collapse as the norm for this appendage is therefore unlikely from a natural selection perspective. Indeed, most free-ranging male orcas have fully erect fins that can be as tall as 1.8 m (6 ft) (Ford, 2009). Male dorsal fins begin to exceed the height of female fins around the age of sexual maturity (puberty), which is consistent with the hypothesis that they are a secondary sexual characteristic.

All captive adult male orcas have fully or partially collapsed dorsal fins and a large number of captive females have bent or partially collapsed dorsal fins. The animals are born with normal fins, but the appendage begins to "droop" as the animal matures and it grows taller, taking years to reach full

collapse in adult males. It is not actually limp, as the word "droop" or even "collapse" implies—it grows into the final shape it achieves and is relatively stable in this configuration.

Collapsing or collapsed dorsal fins in orcas of either sex are relatively rare in the wild (collapsed or missing dorsal fins are rare for any cetacean species). Less than 5 percent of orcas in British Columbia have collapsing or collapsed fins, with less than 1 percent having collapsed fins in Norway (Ford *et al.*, 1994; Parsons *et al.*, 2012; Ventre and Jett, 2015). The phenomenon appears to occur as the result of injury, exposure to toxins, or disease. In two of three males reported in Alaska with fully collapsed fins, the collapse occurred shortly after the exposure of these animals to the *Exxon Valdez* oil spill (Matkin and Saulitis, 1997). One population in New Zealand, however, was reported to have seven of 30 adult male orcas with bent or wavy dorsal fins (Visser, 1998). This was therefore likely a genetic trait, but the waviness was clearly different in kind, as well as degree, to full collapse. One of these whales did have a fully collapsed fin, but he had suffered an injury as the result of entanglement.

In both captive and free-ranging orcas, only males are observed with fully collapsed fins, which is likely due to the height-to-base-width ratio making the tall fin relatively vulnerable to internal tissue instability. "If a male is in poor condition, injured, or diseased, this might cause a reduction in nutrient intake and blubber thickness and could lead to the bending and collapse of the dorsal fin" (p. 168 in Parsons *et al.*, 2012; see also Baird and Gorgone, 2005). This is consistent with what was seen in Alaska after the oil spill (Matkin and Saulitis, 1997). Such injury or illness-related collapse in the wild tends to occur over a relatively short period of time (on the order of days, weeks, or months, not years), after the animal has matured with an otherwise normal fin to that time.

Nevertheless, in their educational and public materials, talks, and shows, many dolphinaria, especially SeaWorld, suggested over the years that fully collapsed fins, in captivity and the wild, are genetic, heritable traits, like eye color. They avoided mentioning the percentage of fins that are collapsed in the wild and overemphasized the data from New Zealand (which is not full collapse anyway). If the drooping fin syndrome were primarily genetic, one would expect animals in the populations from which the captive orcas were taken or descended to exhibit such fins with relatively high frequency and independent of external factors such as injury, but they do not.

The pattern of affected males—1 to 5 percent in the wild, 100 percent in captivity—strongly suggests that captive conditions themselves cause drooping fin syndrome in captive orcas, not genes or injury. Given that the fin has an internal structure vulnerable to destabilization and would normally be underwater for much of a growing orca's life, it is logical to conclude that the fin is susceptible to gravity's pull when a whale spends most of his or her life at the surface, as cetaceans do in captivity.

Sometime after SeaWorld ended its orca breeding program in 2016 (see endnote 577), the company's online explanation for dorsal fin collapse became more consistent with available data. It now states, "It is not fully understood why wild killer whale populations develop abnormal dorsal fins or why the observed killer whale males around New Zealand had such a high rate of dorsal fin abnormalities compared to other studied populations. Researcher theories include these observed abnormalities may be attributed to age, stress, and/or attacks from other killer whales. However, as killer whales at SeaWorld tend to spend more time at the surface working with their trainers, and many of the males have slumped or bent dorsal fins, *it seems probable that time spent at the surface may be a contributing factor"* (emphasis added; see *https://seaworld.org/animals/ask-shamu/faq/*).

Note that the reason the phenomenon is "not fully understood" in captivity is because the public display industry has done *no* research on it. The gravity hypothesis is therefore based only on logic, not data.

32. SeaWorld maintained for many years in its educational materials that free-ranging orcas live no more than 35 years. For example, in its *Killer Whale Animal InfoBook*, SeaWorld states "that killer whales in the North Atlantic may live to 35 years" (*http://seaworld.org/animal-info/info-books/killer-whale/longevity.htm*). However, scientific research indicates a maximum estimated life span of about 80 years for female orcas and 60 years for males (Olesiuk *et al.*, 1990; Olesiuk *et al.*, 2005; Ford, 2009). SeaWorld also states that "new research shows there is no difference in life expectancy between killer whales born at SeaWorld and a well-studied population of wild killer whales." However, they do not mention that these populations are either critically endangered (primarily due to prey declines; Ayres *et al.*, 2012) or threatened due to habitat degradation. See endnotes 427 and 429 for more on this issue.

33. However, as was discussed in endnote 11, one study found no significant difference in knowledge gain between tourists who viewed a live dolphin show at a marine theme park, and those who did not (Miller *et al.*, 2013).

34. In a study on children encountering animal exhibits, it was noted that comprehension of how an animal was adapted to and interacted with its environment and its role in the ecosystem (as suggested by the animal's prey or the kind of vegetation it ate) was actually greater when children looked at animal dioramas in museums than when they observed exhibits of living animals at a zoo. Children visiting museums also had a greater understanding of threats to the animals, in particular problems caused by human activities (Birney, 1995).

35. For example, a public aquarium commissioned a virtual beluga whale (*Delphinapterus leucas*) exhibit; computer-generated belugas responded as living whales would, using artificial intelligence programs that process live whale behavioral data. The researchers noted that "the simulation was realistic enough that it could influence even expert opinions on animal behavior" (p. 108 in DiPaola *et al.*, 2007). LightAnimal (*http://www.lightanimal.net/*)—which projects digital images of whales on walls or buildings—is becoming increasingly popular. Its images can be life size and even interactive. Children growing up in the Digital Age learn in ways consistent with early exposure to technology—those responsible for teaching them about the natural world should take note.

36. See, e.g., *http://awesomeocean.com/top-stories/anthropomorphism/*. Awesome Ocean is a blog website that was founded with a grant from SeaWorld and often reflects SeaWorld's views.

Anthropomorphism is a tool judiciously utilized by animal protection groups and others to connect with people emotionally. The more society learns about most animal species, domesticated or wild, the more their cognition and social lives are revealed as complex and sophisticated. Intelligence and emotion and associated needs are qualities that connect the human animal to other, non-human animals and are not unique to humans.

This is in turn criticized by the public display industry, which by its actions and treatment of non-human animals often disregards intelligence or emotion and associated needs in a wholly anthropocentric manner. Yet at the same time, the industry harnesses the same tool and anthropomorphizes marine mammals to suit its own commercial ends—to entertain—at the expense of the beings in its care.

37. It is likely that if cetaceans were displayed in a traditional, non-performance, zoo-like exhibit, they would not elicit the same unmatched enthusiasm as they do in shows. The exhibit (now defunct) with two Pacific white-sided dolphins (*Lagenorhynchus obliquidens*) at the San Francisco Steinhart Aquarium is a good example of this. There was no show, and most patrons seemed to become bored after only minutes of watching the two dolphins float or swim aimlessly in the small, barren tank; simply eliminating exploitative performances is therefore not a solution to the problems of marine mammal public display.

After recent criticism on the lack of educational content in SeaWorld shows (see Chapter 12, "The *Blackfish* Legacy"), the parks have revised the orca performance format to be more educational, but the public almost immediately decried the new show as "boring" (Macdonald, 2017).

38. Shane (1990); Östman (1990); Kuczaj *et al.* (2013).

39. Of 13 marine parks holding orcas captive in 2004, five provided information on whale and dolphin conservation. Five provided educational information for teachers, six provided information for children, and six had online information about whales. Only three facilities offered educational materials for sale. Yet 10 of these same 13 facilities offered photographs of visitors taken in close proximity to an orca and six allowed visitors to feed orcas (Lück and Jiang, 2007).

40. In one 1980s study on learning at American zoos, researchers found that the typical zoo visitor's concern for and interest in the biology and ecology of animals actually decreased after a zoo visit. An attitude of dominion and mastery/control over animals increased in visitors, as did negative attitudes toward animals (avoidance, dislike, or indifference). The study also found that people who were more interested in learning about conservation issues were also more concerned about the ethical treatment of animals—a result suggesting that those most interested in learning about conservation would probably avoid or be uncomfortable with visiting a zoo due to ethical considerations. Finally, far from leaving with higher levels of knowledge about animals and their biology, visitors actually seemed to experience a decrease in their level of knowledge as the result of a visit to a zoo (Kellert and Dunlap, 1989).

These results have been echoed in subsequent studies. In a survey of members of the public near Marineland in Canada (both those who had visited the dolphinarium and those who had not), researchers found that only 27 percent thought the facilities provided information about marine mammal conservation and the marine theme park did little to make visitors aware of conservation of marine mammals (Jiang *et al.*, 2008).

Blamford *et al.* (2007) reviewed the effect of visiting a zoo for over 1,000 people at six zoos in the United Kingdom. The authors concluded, "We found very little evidence, in the zoos we sampled, of any measurable effect of a single informal visit on adults' conservation knowledge, concern, or ability to do something useful," (p. 133) emphasizing that their statistical analysis suggested that the effects of visiting a zoo on the public's conservation ethic "must be slight or non-existent to have gone undetected given our sample size and analytical framework" (p. 133). Lach (cited as a personal communication in Blamford *et al.*, 2007) noted that a visit to a zoo had no effect on visitors donating funds to conservation.

Broad (1996) found that 80 percent of visitors to one zoo, when called by phone 7–15 months later, stated that their visit had not influenced them at all. Adelman *et al.* (2000) stated that visitors to the National Aquarium in Baltimore, Maryland, in the United States were no more concerned about trying to do something to aid conservation, or any more likely to change their behavior to be pro-conservation, at the end of their visit than on their arrival. Smith *et al.* (2008) (looking at the influence of a bird exhibit at an Australian zoo) found "only limited research support" (p. 554) for the claim that zoos promote conservation. Their study, which surveyed 175 visitors, found that "only three [survey] participants had started a new [conservation/environmental] action and these were actions previously known to them [rather than ones suggested by the exhibit]" (p. 554). These three constituted 8 percent of the respondents to a phone survey six months after their visit. The authors concluded "zoo visitors are largely motivated by the opportunity to see and engage with the animals and to enjoy a recreational experience with friends and family. They may thus resent or resist overt attempts to be educated about appropriate [conservation-oriented] behaviour" (p. 559).

Bueddefeld and Van Winkle (2016) found no significant increase in pro-sustainability behaviors after a zoo visit—when questioned, although the participants stated that they "felt" they had changed their behavior, there was no tangible evidence that this was the case. There was no difference between zoo visitors and a control group, i.e., in real terms, although there might be a short-term positive attitude towards conservation resulting from a zoo visit, such visits "fail to lead to actual sustainable behavior change" (p. 1205).

41. Donaldson (1987).

42. This was shown in the Kellert and Dunlap (1989) study on how zoo visits changed public attitudes. The researchers noted that "moralistic values," i.e., concern about the right and wrong treatment of animals, actually decreased after exposure to captive animals in a zoo. As an example of how the display industry facilitates this desensitization, zoos and aquaria constantly refer to a tank, enclosure, or cage as a "habitat," as if such enclosures were natural. For example, SeaWorld routinely refers to its wholly artificial concrete orca enclosures as "habitats" (see, e.g., "SeaWorld Responds to Questions About Captive Orcas" (*http://www.cnn.com/2013/10/21/us/seaworld-blackfish-qa/*), in which SeaWorld's then-vice president of communications, Fred Jacobs, stated the following in a 2013 CNN interview: "Our *killer whale habitats* are the largest and most sophisticated ever constructed for a marine mammal: 7 million gallons of continually filtered and chilled water" (emphasis added)). Yet the barren environment of an orca tank is totally different from what is truly "the largest and most sophisticated" habitat—the ocean—in terms of both physical and ecological complexity and size.

In their study of dolphinarium visitors, Jiang *et al.* noted that nearly a quarter of the general public who had not visited the facility agreed with the statement: "Animals are not always treated decently/humanely at aquariums or marine parks." As a result, the researchers concluded, "Some people are aware of problems associated with keeping marine mammals in captivity, and they have strong feelings against the animal capture and display industry" (p. 244 in Jiang *et al.*, 2008).

43. See Dombrowski (2002). The author states: "Ultimately, zoos are for us rather than for animals: Zoos entertain us, they help to alleviate our guilt regarding what we have done to … wild animals" (p. 201). People who visited Marineland in Canada, and who considered what they learned as the result of their experience, "were more likely to agree with the notion that humans were created to rule over the rest of nature" (p. 246 in Jiang *et al.*, 2008).

44. In their study on education offered by a dolphinarium, Jiang *et al.* noted that members of the public who did not visit the facility were more aware of the environment than people who did visit the facility. This finding was taken to imply that "higher awareness of environmental issues could be one of the reasons for not visiting a marine park" (p. 246 in Jiang *et al.*, 2008).

CHAPTER 2 • THE CONSERVATION/RESEARCH FALLACY

45. As an example, the Dolphin Research Center in the Florida Keys used to be known as Flipper's Sea School.

46. One study summarized the limitations of captive breeding: "Problems with (1) establishing self-sufficient captive populations, (2) poor success in reintroductions, (3) high costs, (4) domestication, (5) preemption of other recovery techniques, (6) disease outbreaks, and (7) maintaining administrative continuity" (p. 338 in Snyder *et al.*, 1996). The authors emphasized the need for *in situ* conservation (in natural habitat) and that *ex situ* conservation (in confined situations, including captive breeding) should be a "last resort in species recovery," stating that it "should not displace habitat and ecosystem protection nor should it be invoked in the absence of comprehensive efforts to maintain or restore populations in wild habitats" (p. 338 in Snyder *et al.*, 1996).

47. In a 2018 study, it was noted that only 54 of over 2,400 North American zoos (less than 2.25 percent) contributed captive-born animals for conservation releases to restock depleted or locally extinct populations. Looking at publications on these releases, zoos contributed only 14 percent of all animal species involved in conservation releases and only 25 percent of all animal species that were bred for releases occurred in North America. In terms of aquatic conservation releases, zoo-bred fish comprised only 2 percent of released animals and zoos did not contribute at all to conservation releases of marine invertebrates. There was a "low overall contribution by zoos to captive breeding for release" (p. 5 in Brichieri-Colombi *et al.*, 2018).

In addition, reintroduced carnivores actually have poor survivorship rates. In a 2008 review, of 45 case studies of 17 different carnivore species reintroductions, researchers found that only 33 percent of the animals released survived. Animals who had been caught from the wild and then released had better rates of survival than those who were captive-born (as is the pattern seen in cetaceans), with captive-born carnivores lacking many essential behaviors found in wild-caught animals and "being particularly susceptible to starvation, unsuccessful predator/competitor avoidance and disease" (p. 355 in Jule *et al.*, 2008). This study suggests that claiming zoos and aquaria are "Noah's Arks"—essential bulwarks against extinction, especially of carnivores—is at best hyperbole and at worst highly misleading.

48. A baiji (*Lipotes vexillifer*) named Qi-Qi was kept in a captive facility in Wuhan, China, from 1980 to his death in 1993. Other baiji were captured in the hopes of setting up a captive breeding program, but all of the animals died

soon after capture or transfer to the captive facility. The facility was criticized as inappropriate for a serious attempt at rescuing this species; the author of a review of baiji conservation attempts stated "a very substantial facility would be needed to maintain a captive population of baiji, but the Wuhan dolphinarium was not designed for this purpose" (p. 107 in Dudgeon, 2005).

Dudgeon (2005) also noted that "if captive-bred individuals cannot be released, then founder breeding stock taken from the wild become 'living dead,' unable to contribute to the genetic future of populations in nature or in *ex situ* reserves" (p. 107).

49. Turvey *et al.* (2007).

50. The Ocean Park Conservation Foundation, based in Hong Kong, provides funds for research, conservation, and education projects on critically endangered species in Asia, such as the Ganges and Indus river dolphins (*Platanista gangetica gangetica* and *P. g. minor*, respectively). The Chinese Academy of Sciences has been working to preserve the critically endangered Yangtze finless porpoise (*Neophocaena asiaeorientalis*), a freshwater porpoise that shared the Yangtze with the baiji, but still has a potentially viable population. The dolphinarium in Wuhan that held Qi-Qi (Dudgeon, 2005; see endnote 48) also holds finless porpoises. In contrast to its efforts with baiji, the Wuhan facility has seen the successful birth of a finless porpoise calf (Wang *et al.*, 2005). The dolphinarium reported this successful birth (a male) as a major conservation breakthrough, but also noted that "[e]fforts to preserve the natural habitats within the river are the primary concern" (p. 248 in Wang *et al.*, 2005).

Five natural reserves for finless porpoises have been established along the Yangtze River, in which intensive efforts to decrease human-caused mortality are on-going. In addition, a "semi-natural" reserve (Tian-e-zhouan Lake, an oxbow lake adjacent to the Yangtze River) has been set aside for the finless porpoise (and the baiji, although no baiji were ever found to relocate there) and now holds approximately 60 of the animals—a managed population that produces about two calves a year.

However, in 2018, Chimelong Ocean Kingdom in Zhuhai and Haichang Polar Ocean World in Shanghai began a program to breed finless porpoises in their facilities (see *http://chinacetaceanalliance.org/en/2018/08/15/ccas-concerns-over-the-ex-situ-plan-of-transporting-yr-finless-porpoises-to-aquariums/*); the plan was to capture 14 porpoises for these two marine theme parks from these reserves in December 2018. Yet it is these efforts to protect finless porpoises in their natural river habitat that are the real hope for saving this species; these captive breeding attempts in concrete tanks are no more than good public relations and may lead to unnecessary deaths and almost certainly no successful releases (see endnote 48).

51. See *http://www.iucn-csg.org/index.php/vaquita/*.

52. In 2007, the SeaWorld and Busch Gardens Conservation Fund gave a grant worth US$15,000 to fund a project on vaquita (*Phocoena sinus*) distribution in the Gulf of California (approximately 0.002 percent of SeaWorld's annual income). Between 2010 and 2014, just three AZA institutions provided funding for vaquita conservation, for a total of US$50,000 (*https://www.aza.org/SAFE-vaquita*), which again is a tiny amount when one considers the overall revenue of these facilities (for example, approximately 0.0003 percent of SeaWorld's revenue during this period). In 2016, a number of zoos donated funds to the AZA's vaquita-safe program, although the amount was as small as a couple of thousand dollars per zoo. It could be argued that some of these donations were because of the substantive criticism the public display industry had received for doing so little up to then to help save the vaquita, currently the most endangered cetacean species in the world.

In 2017, a number of zoos, aquaria, and dolphinaria (including SeaWorld) did contribute to the Vaquita CPR program—a plan to capture and place the last few vaquitas in a natural refuge, to protect them from drowning in gill nets (*https://www.vaquitacpr.org/*). However, when this project was initiated, there were estimated to be fewer than 30 individuals left, and of the two animals captured, one female adult died, and the other possibly also died (this was a calf, unintentionally separated from his or her mother, and was last seen after release behaving in a stressed manner). Arguably this desperate attempt was too late, when every remaining individual was too valuable to lose. If public display facilities had put more substantive funds into vaquita conservation and education several years ago, when there were still a few hundred vaquitas left, it is possible that they could have had a more significant impact in arresting the species' dramatic decline.

53. It should be noted that several zoos and aquaria do conduct substantial and meaningful conservation research (for example, in the United States, the Brookfield Zoo and the Alaska Sea Life Center conduct or support conservation-oriented research focused on free-ranging marine mammals). However, after searching through the AZA conservation and research database (see endnote 55; this database contains project summaries from approximately 230 AZA facilities), we found that the number of accredited zoos pursuing substantial marine mammal conservation efforts is relatively small (less than 10 percent). Non-accredited facilities pursue almost no conservation efforts, comparatively speaking.

54. For example, the research facilities for the National Zoo in Washington, DC, in the United States are 70 miles away, in Front Royal, Virginia.

55. At the turn of the 21st century, aquaria (and zoos) belonging to the AZA, despite increases in conservation expenditure, only spent a tenth of 1 percent of their operating budgets on direct and indirect conservation-related projects (Bettinger and Quinn, 2000). In April 2007, the SeaWorld and Busch Gardens Conservation Fund allocated US$1.3 million to conservation projects (not just to marine mammal programs), the highest amount it had contributed on an annual basis to that time (in 2009 it dropped to US$0.8 million). (This information is available from the AZA database at *https://ams.aza.org/eweb/DynamicPage.aspx?Site=AZA&WebKey=bf0eb751-0a30-49b5-a127-63e380894186*; we searched on "mammal" and reviewed every entry to identify these data.) This sounds like a large amount of money until one realizes that this is less than one tenth of 1 percent of the revenue generated by SeaWorld that year. To put this into context, it would be like ordering a $100 meal and leaving a 10 cent tip.

Between 2004 and 2012, SeaWorld's contribution to the conservation of wildlife *in situ* was a tiny fraction of its annual budget (for example, just over US$70,000 in total to cetacean conservation over a 10-year period; Hodgins, 2014), despite being a billion dollar company (approximately 0.001 percent of the company's revenue), or, to use the analogy above, less than a tenth of a cent tip on a $100 meal.

After 2014, SeaWorld increased its contribution to conservation to a reported US$7 million for that year (Henn, 2015). In 2016, it announced that it would be spending US$50 million over five years on ocean conservation initiatives (Parsons, 2016). Again, these seem substantive amounts, but are actually roughly 0.5 and 0.7 percent of the company's annual revenue (US$1.38 billion/1.34 billion) for the respective years. To use the meal analogy again, SeaWorld increased its tip to 50 cents in 2014 and gave 70 cents in 2016 onward.

In contrast, it has been stated that if a zoo or aquarium is to make a serious contribution to conservation, *at least* 10 percent of its operating income should go toward conservation and research (Kelly, 1997). For some zoos this is actually the case—for example, Jersey Zoo in the United Kingdom's Channel Islands dedicates 23 percent of its gross income to conservation, over 100 times the relative contribution of SeaWorld (Tribe and Booth, 2003).

56. For example, as a result of the 1996 EU Council Regulation CE 338/97, "On the protection of species of wild fauna and flora by regulating trade therein," facilities importing threatened species (including cetaceans) into Europe must ensure removals are sustainable and also that, where appropriate, animals will be used "for breeding or propagation purposes from which conservation benefits will accrue to the species concerned" (Art. 8, §3(f)) or will be used "for research or education aimed at the preservation or conservation of the species" (Art. 8, §3(g)) (see also endnote 65). Portraying a dolphinarium as a conservation or enhancement (captive breeding) facility is a loophole allowing imports of animals to and from Europe (it has, however, been several years since any facility in the EU has attempted to import cetaceans deliberately captured from the wild for public display, regardless of conservation status). Of course, captive breeding of cetaceans, when the industry never intends to release any captive-bred progeny (offspring) back into the wild, is never appropriate from a conservation perspective.

57. Jule *et al.* (2008).

58. The most frequently displayed marine mammal species in dolphinaria and aquaria are the common bottlenose dolphin and the California sea lion (*Zalophus californianus*), neither of which are, at the species level, endangered or threatened. The effort by Georgia Aquarium in Atlanta, Georgia, in the United States, to import belugas from Russia (see Chapter 3, "Live Captures") was persistently portrayed as a conservation effort, when in fact the historic live capture operation in the Sea of Okhotsk has undoubtedly contributed to the depletion of the Sakhalin Bay–Amur River feeding aggregation of belugas (Rose, 2016; see *81 Fed. Reg. 74711*, 2016, and endnotes 72 and 230).

59. This is especially a problem in developing nations, such as Caribbean and South Pacific island states. In the 2007 survey commissioned by the WSPA (now WAP; see endnote 20), only 30 percent of respondents were aware that capturing dolphins for public display has negative impacts on populations in the wild; the harmful conservation impacts of live captures are well hidden by the public display industry. Notably, the policy of the AMMPA, considered the premiere professional association for dolphinaria, allows for acquisition from the wild (i.e., its policy does not prohibit acquisition from the wild, but rather actively provides for it) (Alliance of Marine Mammal Parks and Aquariums, 2017).

60. See Reeves *et al.* (2003), for a good discussion of this issue.

61. At least 533 live common bottlenose dolphins were captured from the Gulf of Mexico from 1973 to 1988, for the US Navy marine mammal program and for dolphinaria (Hayes *et al.*, 2017). Undoubtedly more were captured prior to 1973, before the implementation of the MMPA required the issuance of permits and monitoring the number of removals.

It was believed there were thousands of dolphins from Texas to Florida, but researchers in the 1970s did not know whether this was one continuous population or several reproductively isolated ones. Despite this uncertainty, NMFS allowed the capture of these dolphins to continue. In 1989, a voluntary moratorium on captures in the Gulf and the US Atlantic was established, prompted by a bottlenose dolphin unusual mortality event in 1987–1988 on the Atlantic coast (Lipscomb *et al.*, 1994), subsequent heightened public awareness, and studies beginning in the 1980s suggesting there were several distinct populations in the Gulf. Since then, research has shown there to be a minimum of 31 stocks in the Gulf of Mexico—genetically, behaviorally, or geographically distinct groups of dolphins numbering from 30 to 1,000 animals each, although NMFS does not consider these estimates to be robust—all facing various threats. The impact of the historic live captures is unknown and the moratorium on live capture continues (Hayes *et al.*, 2017).

62. One dramatic example of a small cetacean hunt occurs in the Faroe Islands (a Danish protectorate), targeting the long-finned pilot whale (*Globicephala melas*). This species has been hunted by the Faroese for generations (Reeves *et al.*, 2003), and it is unknown if the population can continue to sustain the loss of hundreds of individuals each year. In addition, government medical officers in the Faroe Islands have recommended that islanders stop eating pilot whale meat altogether, as it is now too toxic for safe consumption by humans (MacKenzie, 2008). However, as of January 2019, the Faroese whalers had not altered plans for the hunt.

63. The US public display industry presented testimony advocating this position through one of its representatives, John Hodges, at the 1992 IWC meeting in Glasgow, Scotland. The industry has rarely returned to this international forum since.

The United States is now a party to the SPAW Protocol of the Cartagena Convention, but the government delayed joining this treaty for some time when it was first negotiated. Some speculated that this delay was due to lobbying from the US public display industry, for the same reasons it opposed the expansion of IWC authority to small cetaceans. The SPAW Protocol prohibits the capture of protected species, including cetaceans, for commercial purposes in the waters under its jurisdiction.

Species Enhancement Programs

64. For example, in a technical report endorsed by the public display industry, the US Naval Command, Control, and Ocean Surveillance Center acknowledged that rehabilitation and reintroduction of long-term captive cetaceans could potentially benefit endangered-species enhancement programs (Brill and Friedl, 1993). Others have made similar cases in scientific journals (e.g., Ames, 1991). A statement on the Awesome Ocean website (see endnote 36) claims "Breeding Programs provide the opportunity to re-populate areas where species are threatened through successful breeding and release programs, but the success rate depends on habitat restoration and conservation efforts that mirror the goals of the breeding program" and "Captive breeding programs have helped to save a number of marine and terrestrial species from going extinct, acting as an 'insurance policy' against extinction" (*http://awesomeocean.com/top-stories/awesome-research-captive-breeding-program-management-strategies-cetaceans-pinnipeds/*). In fact, although some animal and plant species have been saved from extinction by being bred in captivity (see *https://en.wikipedia.org/wiki/Category:IUCN_Red_List_extinct_in_the_wild_species*), none are actually marine.

65. The EU Zoos Directive states that "Member States shall take measures … to ensure all zoos implement … research from which conservation benefits accrue to the species, and/or training in relevant conservation skills, and/or the exchange of information relating to species conservation and/or, where appropriate, captive breeding, repopulation or reintroduction of species into the wild."

66. In a review of captive breeding for endangered cetacean species, Curry *et al.* (2013) noted that the public display industry has not made a serious attempt at captive breeding for conservation and therefore "conclude[d] that the techniques required for successful captive breeding of most Endangered or Critically Endangered small cetacean species have not been sufficiently developed" (p. 223).

67. See also endnotes 48 and 52.

68. See endnote 50.

69. A pilot project—to determine whether pups (born and) raised for some months in captivity could survive once released back to the wild—was conducted on Midway Atoll, where six wild-born, weaned Hawaiian monk seal (*Neomonachus schauinslandi*) pups were captured and placed in pens at Midway. After being fed over the winter of 2006–2007, they were released back into the wild and monitored (see *https://www.pifsc.noaa.gov/media/captivecareproject.php*). SeaWorld was involved in this project. However, there appears to be no publicly available information on the released animals beyond 2007.

70. For example, 26 Irrawaddy dolphins (*Orcaella brevirostris*) were captured between 1974 and 1984 from the Mahakam River, Indonesia, and held at Jaya Ancol Oceanarium. By 1985, only six were known to be still alive, and only two were still living in 1995 (Curry *et al.*, 2013).

71. Curry *et al.* (2013) stated that the "fairly large captive population sizes necessary (to avoid loss of genetic diversity, inbreeding, and genetic adaptation to captivity), limited space available in aquariums, and high costs of captive breeding and reintroduction programs make it unlikely that captive breeding will play a major role in the conservation of most small cetaceans" (p. 223). Nevertheless, the public display industry and some scientists continue to actively promote *ex situ* conservation for endangered cetaceans (Ex Situ Options for Cetacean Conservation, 2018).

72. See the final rule in the *Federal Register* on the Sakhalin Bay–Amur River stock of belugas (*81 Fed. Reg. 74711*, 2016), the 5-year status review for the Southern Resident orcas (National Marine Fisheries Service, 2016), and the stock assessment for the Gulf of Mexico bottlenose dolphins (Hayes *et al.*, 2017).

73. Mayer (1998); Curry *et al.* (2013).

74. A proposal from the early 2000s for a captive-dolphin-breeding program in Jamaica, used to justify the construction of a new dolphinarium on the island, reveals how little at least some captive breeding programs at marine mammal facilities have to do with conservation. In this proposal, the justification for captive breeding was not to help augment dolphin populations in the wild, but rather to provide a source of replacement animals for this and other captive facilities in Jamaica (and perhaps elsewhere in the Caribbean). To do this, the dolphinarium proposed to import 10 dolphins from Cuba and also capture at least 18 (and possibly as many as 40) animals from Jamaican waters over a three-year time period (2004–2007), from populations for which numbers and other vital parameters were unknown. The proposal stated further that any animals bred in this program would not be released back into the wild (Dolphin Cove, 2004). This proposal did not progress.

Another proposal to start a captive breeding program, but which relied on an initial removal from the wild, was also presented as a conservation effort. In 2004, a company called Ocean Embassy submitted a proposal for a dolphinarium in Panama. In order to stock the dolphinarium, the company applied for a permit to take as many as 80 dolphins from local waters. Animal protection groups had concerns that the company planned to launch a major dolphin capture/breeding/export business. Due to opposition from local and international animal groups, scientists, and government officials, the plan for both the captures and the facility (for which ground had already been broken) was abandoned in 2008. International cetacean researchers (such as Dr. Randall Wells of Mote Marine Laboratory and Dr. Randall Reeves, the chair of the International Union for Conservation of Nature (IUCN) Cetacean Specialist Group (CSG)) wrote statements in opposition to the captures, notably because they would be from a population of dolphins about which little was known, and would likely be unsustainable (Karul, 2007; *http://www.hsi.org/news/news/2008/09/panama_dolphin_victory_091808.html*).

Ironically, throughout its campaign in Panama, Ocean Embassy portrayed itself as a conservation organization, and indeed still does on its website (see *https://oceanembassy.com/*).

75. This was alluded to in an early paper on captive breeding of cetaceans, where it was pointed out that "captive population growth from successful births (recruitment rate) does not equal or exceed the [captive] population's mortality rate" (p. 748 in Ames, 1991).

76. See pp. 56–59 in Hoyt (1992) for a discussion of this concept.

77. In a review of 145 reintroduction programs for captive-bred species, only 11 percent were found to have achieved any degree of success (Beck *et al.*, 1994). Fisher and Lindenmeyer (2000) looked at 180 captive animal translocation and release case studies (between 1980 and 2000) and found only 26 percent to be successful. Many of the failures were the result of improper behavior seen in captive animals when reintroduced into the wild, such as an inability to forage, avoid predators, or appropriately interact with free-ranging members of the same, or different, species (Snyder *et al.*, 1996).

78. See Dudgeon (2005), who noted "There are good reasons why captive breeding in a dolphinarium is no substitute for *ex situ* conservation in a reserve … there is no evidence that captive-bred cetaceans can be released to the wild" (p. 107). See also endnote 52, which describes the failure of the most recent attempt to save a critically endangered cetacean species by bringing it into captivity, albeit in a natural reserve (a plan that included the possibility of a captive-breeding effort).

79. Contrary to the industry's obstruction of efforts to develop and apply techniques for successful release of captive cetaceans, the parties to the Agreement on the Conservation of Cetaceans of the Black Sea, Mediterranean Sea and contiguous Atlantic area (ACCOBAMS) have proactively issued guidelines for the release of captive cetaceans back into the wild (ACCOBAMS, 2007). The guidelines state that the animals proposed for release should preferably be of the same subspecies as the local cetacean population at the proposed release site and that they should have a similar set of behavioral and ecological characteristics as this local population. Also, the animals should be vaccinated against local diseases they might encounter. Animals should be trained prior to release, in a temporary enclosure, so that they can, for example, forage for live fish. Also, before animals are released, they should be independent of humans and not show any habituated/dependent behavior. The animals should also receive long-term monitoring after release, including being equipped with a tag (which should not limit their natural behavior).

80. Some cetacean researchers have considered dolphins in captive facilities to be definitively not wild, but rather "domesticated" or "semi-domesticated"—in the sense of the definition of "domesticated" from the 7th edition of *Webster's Dictionary*: "Adapted to life in intimate association with and to the advantage of man" (see, e.g., St. Aubin *et al.*, 1996 and Sitt *et al.*, 2016, where the authors refer to captive cetaceans as "semi-domesticated" or "domestic," respectively). However, "adapted to life" is a vague phrase; domestication actually involves the deliberate selection of desirable traits (for example, docile disposition, smaller or larger size) in breeding stock, to develop descendants who are different in some fundamental way from their wild ancestors (Diamond, 1997).

However, dolphinaria are a long way from this stage in any of their captive breeding efforts—they may wish to create a "captivity-adapted" cetacean, but for now, they are still seeking simply to maximize the probability of successful births and working to avoid inbreeding, not always successfully (Kirby, 2012). According to Diamond (1997), it may in fact be impossible to domesticate cetaceans, because the various species share a number of characteristics that have by and large prohibited successful domestication in other taxa, including a diet high on the food chain (they are not herbivores, as are most domesticated animals, and it is energy (and cost) intensive to feed them); a slow growth rate (it takes about a decade for most species to reach social and/or physical maturity—animals that have been successfully domesticated tend to mature in two years or less); and problems with captive breeding (see above) (Diamond, 1997).

AWI and WAP do not necessarily agree that captive-bred dolphins should be considered unfit for release, but recognize that evidence supporting the likelihood of a successful reintroduction to the wild of dolphins bred in captivity is currently lacking. However, we reiterate that there is evidence to support the likelihood of a successful return to the wild of wild-caught dolphins held long-term in captivity (see, e.g., endnote 106).

81. International experts on captive breeding strategies emphasize that "captive breeding should be viewed as a last resort in species recovery and not a long-term or prophylactic solution" and "it should not displace habitat or ecosystem protection nor should it be invoked in the absence of comprehensive efforts to maintain or restore populations in wild habitats" (p. 338 in Snyder *et al.*, 1996)—efforts that are remarkably lacking in the so-called conservation and research strategies or programs of dolphinaria and aquaria.

Mixed Breeding and Hybrids

82. Four bottlenose and long-beaked common dolphin (*Delphinus capensis*) hybrids were bred at SeaWorld San Diego, although two of these animals died very soon after birth. One of the surviving hybrids was subsequently mated with a bottlenose dolphin to produce a calf who also died soon after birth (Zornetzer and Duffield, 2003). Other examples of hybrids who have been bred in captivity include a rough-toothed (*Steno bredanensis*) and bottlenose dolphin hybrid at Sea Life Park, Hawaii (Dohl *et al.*, 1974); a pregnancy resulting from a bottlenose dolphin and a short-finned pilot whale (*Globicephala macrorhynchus*) at SeaWorld San Diego (Antrim and Cornell, 1981); bottlenose and Pacific white-sided dolphin hybrids at Shinagawa Aquarium and Marine World Uminonakamichi; and 13 Risso's (*Grampus griseus*) and bottlenose dolphin hybrids, as well as four bottlenose dolphin and false killer whale (*Pseudorca crassidens*) hybrids at Enoshima Marineland, Japan (Sylvestre and Tasaka, 1985). Sea Life Park in Hawaii and Sea World in Tokyo have also had bottlenose dolphin and false killer whale hybrids (West, 1986), with the former also having hybrids further cross breeding with bottlenose dolphins.

At least two "polar" bears in ocean theme parks in China appear to be the result of crosses between brown bears (*Ursus arctos*) and polar bears.

Captive Cetaceans and Culture

83. See Rendell and Whitehead (2001) for a detailed description of culture and its importance in whale and dolphin populations. For the importance of culture in orcas, see Yurk *et al.* (2002).

84. Whitehead *et al.* (2004).

85. Orcas remain dependent on their mothers nutritionally for one to two years and behaviorally and socially for at least 10 years. In several populations of orcas, both males and females associate with their mothers for their entire lifetimes (Ford, 2009). This mother–son bond is exceptional in the animal kingdom—typically, males leave the natal group as a mechanism to avoid inbreeding. Male orcas, on the other hand, gain significant advantages by remaining with their mothers; those with living mothers have higher survival and higher reproductive success (Foster *et al.*, 2012). They apparently avoid inbreeding via other, quite likely cultural, mechanisms (they do not mate with their mothers or sisters (Barrett-Lennard, 2000)). See endnote 87 for examples of how this bond can be disrupted by captivity.

86. The birth of a female orca named Nalani at SeaWorld Orlando dramatically personifies this problem. Born in 2006, she was the result of incest, between her brother Taku and their mother Katina (meaning her brother was also her father and her mother was also her grandmother). This information came from the animal profiles SeaWorld maintains, which became public during the discovery phase of the Occupational Safety and Health Administration (OSHA) hearing in 2011 (see endnote 511). In the wild, Taku would have remained with his mother for life, but would never have mated with her. However, Katina was captured from the wild as a juvenile and clearly had yet to learn the incest rules of her Icelandic pod when she was taken from her family. Taku was born in captivity and had no cultural norms about incest to learn. SeaWorld management allowed Taku to remain with his mother until he was 12—apparently, staff just assumed they would not mate. (A SeaWorld representative was overhead saying in 2014 that the conception of Nalani was a "mistake.") Once staff realized the mating had occurred, Taku was removed from Orlando and sent to San Antonio—he died there soon after. Nalani and Katina are still alive; presumably SeaWorld had no plans to breed Nalani even before the company's orca breeding ban (see endnote 577).

87. Other examples include Keto, who was moved from SeaWorld Orlando to SeaWorld San Diego when less than 4 years old (and eventually was transferred to SeaWorld San Antonio and then to Loro Parque in the Canary Islands, a territory of Spain). Keet, another SeaWorld San Antonio animal, was separated from his mother at only 20 months of age, and Splash (who died in April 2005) was moved from Marineland in Canada to SeaWorld San Diego when only 2.5 years old. Skyla was sent to Loro Parque when she was just 2 years old. See *http://orcahome.de/orcastat.htm* for additional details.

88. See endnote 108.

89. Keiko had been removed from his family group in Iceland at the age of 1 or 2 years. He was eventually sold to a facility in Mexico (after spending periods in an Icelandic holding facility and a dolphinarium in Canada), where he had no other orcas for company; his only companions were the occasional bottlenose dolphin. Scientists analyzing Keiko's calls (his dialect) found them underdeveloped. He also mimicked and incorporated into his vocalizations both bottlenose dolphin calls and strange rhythmic sounds that were believed to be imitations of tank-related machinery. Consequently, when Keiko was being prepared for release back into the wild, his caretakers understood that not only did he have to be re-taught how to catch fish, but he would not be able to communicate with wild whales until (and unless) he re-learned how to "speak orca" (Turner, 1997). Clearly, "Behavioral traits that are learned or culturally transmitted are especially prone to rapid loss in captivity" (p. 341 in Snyder *et al.*, 1996).

90. Musser *et al.* (2014).

91. Miksis *et al.* (2002).

92. For an example of the problems caused in wildlife rehabilitation efforts as the result of contact with and habituation to humans, see Bremmer-Harrison *et al.* (2004).

93. As an example, Kalina, a captive-born female orca kept at SeaWorld Orlando, was impregnated at only 6 years of age. In the wild, female orcas have their first calf between 11 and 16 years of age, with an average first successful pregnancy at 15 years of age (Ford, 2009). Apart from lacking cultural knowledge, these captive females bred young may also suffer physiological damage from the stress placed on their bodies by having a calf so early in life, similar to that seen in humans.

Kohana, a female orca kept at Loro Parque in the Canary Islands, is a more tragic example. Born in May 2002, she was impregnated when she was 7 years of age. She had been living without any "adult supervision" since she was younger than 4 years old, as she was transferred to Loro Parque from SeaWorld Orlando with three other juvenile whales in February 2006. She had no one to teach her maternal skills; unsurprisingly, she rejected her first calf, Adán, born in 2010, and her second, Vicky, born in late summer 2012. (The reported father of these calves was Kohana's uncle, making them severely inbred; Lott and Williamson, 2017.) Both her calves were hand-reared, only one successfully; Vicky died at 10 months of age. Kohana's complete lack of maternal behavior toward her newborns—she apparently simply swam away from them and never attempted to nurse them—can almost certainly be attributed to her upbringing. If the public display industry had any true understanding of the natural history of this species, there would have been no attempt to breed a young female who had not been properly socialized by her mother or other adult females (see *www.orcahome.de/orcastat.htm* for data on these whales).

94. A study by researchers at Dolfinarium Harderwijk in the Netherlands mentions the high rate of infant mortality in public display facilities and how a female dolphin in Harderwijk's care had successively drowned three calves born in captivity. As a result, a training program was launched to try to train the female not to reject her newborn and to accept simulated suckling behavior from a model calf. Despite the training, the next calf who was born to this female died 15 days after birth as the result of an infection that the authors' paper suggests resulted from a wound inflicted by the mother immediately after the calf's birth (Kastelein and Mosterd, 1995).

A later paper noted that "[s]tillbirth and mortality in the first 3 months after birth are substantial problems in captive breeding programs of bottlenose dolphins (*Tursiops truncatus*)" (p. 88 in Van Elk *et al.*, 2007). The case study addressed by the authors noted that the calf failed to nurse properly and thus may have failed to gain "maternally acquired immunity" (all mammals gain an initial ability to fight off infection from antibodies ingested via their mother's milk). Failing to nurse can leave a newborn vulnerable to fatal infection from common bacteria such as *E. coli*, as appeared to have occurred in the case described in this study.

The Public Display Industry Double Standard

95. For example, the chief executive officer (CEO) of SeaWorld at the time, Joe Manby, said in an op-ed: "Some critics want us to go even further; they want us to 'set free' the orcas currently in our care. But that's not a wise option. Most of our orcas were born at SeaWorld, and those that were born in the wild have been in our parks for the majority of their lives. If we release them into the ocean, they will likely die" (Manby, 2016).

SeaWorld posted a statement by Manby on its website in 2016 about "sea cages" being dangerous, but the statement has since been removed. Among other things, Manby said that activists "believe we should simply 'set free' the whales and release them into the ocean. We believe that would likely be a death sentence for our whales. Never in the history of mankind has an orca born under human care survived a release to the wild." Also, "there are those who claim that simply establishing areas that are fenced in, or essentially sea cages, is the answer for the orcas at SeaWorld. This would be as dangerous for the whales as simply releasing them into the ocean, and could in fact be worse. Almost all of our whales were born at SeaWorld and have never lived in the wild. They would not be able to handle the ocean's man-made [sic] pollution or naturally occurring diseases. Stuck in these cages, they would be helpless to avoid contagious diseases, parasites and

pollutants. They would be sitting ducks, stuck in one place no matter what the tide brings in, whether it's an oil spill or a hurricane. That is a risk we simply won't take." While the statement is gone, some of the language was preserved in other media (see, e.g., The Telegraph, 2016; Mountain, 2016).

This disregards the fact that SeaWorld San Diego is coastal and draws local seawater for its enclosures and therefore is vulnerable to spilled oil and chemical pollutants that filtration cannot remove. Also, it ignores that many dolphinaria are sea pen facilities; indeed, SeaWorld San Diego is located near the US Navy marine mammal program, where its dolphins are kept in "sea cages." Hypocritically, SeaWorld was quick to co-opt the relatively low mortality rates of these sea-pen dolphins (see Chapter 9, "Mortality and Birth Rates," and endnote 412; Venn-Watson *et al*., 2015) to support its claim that its captive dolphins have lower mortality rates compared to free-ranging animals and are healthy. However, the industry cannot have it both ways—representatives claim "sea cages" are deathtraps yet then take credit for the lower mortality rates for dolphins kept in them.

Even more relevant to the double standard, at least five of SeaWorld's captive-born bottlenose dolphins have, over the past decades, been successfully transferred to the US Navy facility (and are currently alive), while others were sent to sea pen facilities in the Florida Keys—transferred to "sea cages" after having been born and raised in tanks (*www.cetabase.org*).

Mark Simmons, a long-time cetacean trainer who started his career at SeaWorld, in his book *Killing Keiko* (Simmons, 2014), was so opposed to releasing captive cetaceans that he wrote the release program for this orca was "doomed from the start." Given this view, it seems odd he would have agreed to participate in the Keiko Project at all; he was on staff from 1999 until the end of 2000 (see endnote 108).

These statements also disregard that, for some time now, animal protection groups have not advocated for the outright release back to the wild of captive-bred cetaceans or even cetaceans held in captivity for more than a decade or two. The industry appears to cling to this messaging to portray its opposition in as unreasonable a light as possible, rather than grapple with the reality that animal protection groups follow the science and recognize when they must modify their advocacy to account for a developing body of evidence (see Chapter 12, "The *Blackfish* Legacy—Seaside Sanctuaries: The Future for Captive Cetaceans?").

96. Beck *et al*. (1994).

97. Nine dolphins, five of whom had been caught from local waters and kept at Atlantis Marine Park, in Perth, Australia, were released on 13 January 1992. Four of these, including a calf, were captive-bred. Three of the captive-born animals were subsequently recaptured, and one (the calf) is presumed to have died (Gales and Waples, 1993). The fate of the five wild-caught dolphins was unknown due to the inadequacy of the tracking technology, but they were never observed in distress, as the captive-born animals were.

98. Two captive-born bottlenose dolphins (Shandy and Pashosh), who had been reared at Dolphin Reef Eilat, an Israeli facility on the Red Sea, were released on 26 August 2004 in the Black Sea. There were concerns, as it was believed that at least one of the parents of these animals was not a Black Sea dolphin, but rather an animal from a completely different ocean system (and probably a completely different species, the Indo-Pacific bottlenose dolphin, *Tursiops aduncus*). When the animals were released, there were no plans for tracking or tagging to monitor their health, reintegration, or survival. One of the released animals (Pashosh) was believed to be pregnant at the time of the release (Levy-Stein, 2004).

99. In a 1995 compilation of cetacean releases into the wild, 58 bottlenose dolphins and 20 orcas are mentioned, although most of these were accidental releases or escapes, with several releases after brief stays in holding pens following commercial captures. There were only 13 reports that involved animals who had been in long-term captivity, the majority of whom (12) were bottlenose dolphins (Balcomb, 1995).

In 1996, two female common bottlenose dolphins, Bogie and Bacall, were released into the Indian River Lagoon, Florida, in the United States after being held at a private country club for six years and then spending two years being rehabilitated by the Dolphin Alliance and The Humane Society of the United States, working together as "The Welcome Home Project." The dolphins were held for eight and half months in a temporary rehabilitation enclosure attached to a "spoil" island in the lagoon, very near to their original capture location, catching live fish and interacting through the pen fencing with local free-ranging dolphins (possibly former pod mates). However, in May they prematurely escaped from this pen (someone never identified cut the fencing below the waterline overnight) before they were freeze-branded or tagged. Both animals were re-sighted a handful of times in the immediate days following their release; however, their natural markings were not very distinctive and neither has been reported (alive or stranded) since (*http://rosmarus.com/Releases/Rel_2.htm#Bogie*). It is therefore unknown if either survived long term, although it is possible.

In 1997, Humane Society International worked with a local dolphinarium owner near Cartagena, Colombia, to release Dano (a young male) and Kika (an older female), two Guiana dolphins (*Sotalia guianensis*) (although at that time, they were still known by the common name tucuxi, which now applies only to the *Sotalia* found in rivers). They had been captured about eight years previously. After five months of rehabilitation, the two dolphins were released together in Cispatá Bay on 15 June 1997, but Dano was found dead, entangled in a gill net, only 11 days later. Kika was never re-sighted. The tragic ending of this release effort highlights the risk involved in both bringing dolphins into captivity and attempting to return them to the wild. Great care is needed to ensure the safety of any animals involved in such an effort (Rose, 1997). In the past 20 years, several additional releases have occurred (see endnotes 100–109).

100. As the result of a project funded by the WSPA, Flipper, a bottlenose dolphin who had been captured in Brazil in 1981, was released in Brazilian waters in 1993. The release seems to have been successful, as Flipper was regularly sighted for several years after his release and was seen in the company of other dolphins (Rollo, 1993).

101. The first of these animals was a common bottlenose dolphin captured in Florida named Rocky, who was held in captivity for 20 years and was the last captive cetacean held at Morecambe Marineland in England. After extensive public demonstrations against cetacean captivity and a resulting drop in park attendance, the facility sold Rocky to the UK-based charity Zoo Check, which subsequently paid for his transport and rehabilitation in a Caribbean facility (in the Turks and Caicos Islands). This release was followed, as the result of public pressure and campaigns, by the release of two more dolphins, from the Brighton Aquarium (Missie, a common bottlenose dolphin from Texas held in captivity for 22 years, and Silver, possibly an Indo-Pacific bottlenose dolphin from Taiwan, held in captivity for 15 years) (McKenna, 1992). However, it should be stressed that the two *T. truncatus* dolphins released in the Caribbean were not native to that region, and Silver was from a completely different ocean system. Moreover, he may have been from a species not found in the Atlantic Ocean, although this species was not officially identified until several years after the release.

102. See endnote 97 and Gales and Waples (1993).

103. In June 2001, two bottlenose dolphins (Ariel and Turbo) were being held in a small tank in the mountains of Guatemala. When questions were raised regarding the animals' origins and the lack of proper permits, the dolphins' trainers abandoned the animals, taking their food and the tank's filtration system. When the WSPA rescue specialists arrived, the dolphins were malnourished and stressed. Once stabilized, the animals were moved to a rehabilitation pen off the Guatemala coast, not far from what was believed to be their home range, and were released several weeks later (Rossiter, 2001). Local fishermen reported sighting both dolphins in area waters for some time after their release.

104. In Nicaragua in 2002, two dolphins (Bluefield and Nica), captured from local waters for eventual use in a private exhibit, had been confined in a small freshwater swimming pool for three months when animal protection investigators found them. The Ministry of Environment took immediate custody of the animals and called in the WSPA experts to aid the failing

dolphins (Cetacean Society International, 2002). They rebounded after only a few weeks of rehabilitation and were released into their home range, with help from the Nicaraguan military. No reports of re-sightings were made, so their fate is unknown.

105. Tom and Misha were reportedly captured in waters near Izmir, Turkey, and then used in at least two Turkish dolphinaria for display and swim-with-dolphin (SWD) encounters before being rescued by animal protection groups from a sub-standard enclosure in autumn 2010 (Foster *et al.*, 2015). Over the next year and a half, they were rehabilitated and finally released approximately 150 miles from Izmir in May 2012. Misha was tracked for a full six months, successfully returning to a life in the wild. Tom separated from Misha almost immediately and, after several weeks, had to be recaptured, as he was soliciting food from fishermen and predating their nets. He was successfully relocated and tracked for an additional month, showing normal foraging behavior. This release was considered a success.

106. Five Indo-Pacific bottlenose dolphins, after becoming entangled in fishing gear off Jeju Island, South Korea, were subsequently sold to aquaria in 2009 and 2010 (Jang *et al.*, 2014a; 2014b). In 2013 the Korean Supreme Court ruled that their captures were illegal—Korean wildlife law requires cetaceans entangled in fishing gear to be released if they are found alive—and ordered the animals to be returned to the wild. A coalition of local government authorities, academics, scientists, and animal protection groups transferred the dolphins to an aquaculture pen off the coast of Jeju Island and, after a period of rehabilitation, released the dolphins (in one group of three in 2013 and the remaining pair in 2015) back to their original population. In 2017, two more dolphins, who had been entangled in fishing gear off Jeju Island in 1997 and 1998 and held in captivity since then, were also released (Korea Bizwire, 2018).

The first five dolphins have all been observed multiple times, most recently in summer 2018, since their release. They integrated with various pods within weeks of their release and three have successfully given birth, the last in August 2018 (this female had lost two calves while in captivity; Hyung Ju Lee, personal communication, 2018). The fact that these animals successfully re-adapted to the wild after several years in concrete enclosures illustrates that returning some captive cetaceans to the wild is feasible. However, it should be noted that the two dolphins who had been in captivity for 20 years and were most recently released have not been re-sighted to date and that the five successfully released animals were adults (not juveniles) when originally taken from the wild.

107. In June 1987, two common bottlenose dolphins captured in Mississippi (Joe and Rosie), who had been kept at a research facility, were released in Georgia (Linden, 1988). The dolphins had been in the research facility for four years before being transferred to Florida and spent the last two years before their release at an SWD facility in the Florida Keys. The animals were seen several times in the months immediately after their release.

In October 1990, two bottlenose dolphins (Echo and Misha), who had been held at a California research facility for two years, were released where they were originally captured, in Tampa Bay, Florida. Prior to release, the animals were kept in a sea pen and re-trained to eat live fish for three and a half weeks. They were only released after they had demonstrated the ability to catch live fish on their own. The dolphins were observed apparently healthy several years after release, and observations demonstrated normal interactions and reintegration with free-ranging dolphins. This was the first detailed and systematic rehabilitation and monitoring study of its kind and has served as a model for subsequent release efforts (Wells *et al.*, 1998).

108. After the release of the feature film *Free Willy*, Keiko's fame resulted in a powerful public campaign to return him to the wild. A collaborative effort among animal protection groups, the filmmakers, a private benefactor, commercial and non-profit sponsors, and scientists resulted in the Keiko Project, which eventually repatriated Keiko to Iceland in September 1998. He lived for some months in a specially built sea pen, where he underwent extensive rehabilitation and was fitted with a radio/satellite tag on his dorsal fin. He began supervised forays into the open ocean in May 2000. These "walks," during which he followed a research vessel, continued through that summer and recurred during the next two summers. For several weeks each season, he interacted at a low level with the local orca pods who came to the area to feed.

In July 2002, Keiko, after several weeks of interaction with the local wild whales, began a three-week unsupervised 1,400 km (870 miles) journey across the Atlantic, monitored the entire distance by satellite telemetry. He arrived in Norway in September 2002 in good health but clearly having failed to reintegrate into a wild pod. His caretakers moved their operation to Norway, where he lived unconfined but supervised for more than a year. Keiko died suddenly, probably from pneumonia, in December 2003 (Brower, 2005).

109. Examples include Ulises, a male orca who was living alone in Barcelona, Spain; Keiko; and dolphins who were considered surplus to the US Navy marine mammal program in San Diego, California, where dozens of dolphins and other marine mammals are used as subjects in research programs and trained to perform tasks unsuited, for physical or safety reasons, to human divers. Both whales were put up for sale by their owners; the Navy offered 25 to 30 of its dolphins free to any licensed public display facility. Animal protection groups lobbied in all three cases to place these animals in reintroduction-research programs; in all three cases the AMMPA and its member aquaria publicly recommended keeping the animals in captivity within the industry system.

Ulises was bought by SeaWorld (he is now performing in San Diego). Keiko was donated by his owners to a release program (see endnote 108). After animal protection groups appealed directly to Navy officials, the Navy transferred three dolphins to a release project in Florida, but the then-executive director of the AMMPA strongly urged the Navy not to allow the transfer (M. Keefe, letter to Rear Admiral Walter Cantrell, 2 November 1994). This project, known as the Sugarloaf Dolphin Sanctuary and operated as a coalition of the owner of Sugarloaf Key, The Humane Society of the United States, and the Dolphin Project, ended in the premature but deliberate release of two of the dolphins (Buck and Luther) in May 1996, when the groups could not agree on a final release protocol. The dolphins had to be rescued by NMFS officials, as they approached boaters in a marina and were injured and malnourished, and were returned to captivity (see *http://rosmarus.com/Releases/Rel_2.htm#Navy*).

The releases in Korea (see endnote 106) went forward unhindered by the industry probably for two reasons; one, the Western industry seemed unaware of them and two, the releases had been ordered by the Korean court system and therefore the Korean industry was legally obliged to allow them to proceed unobstructed.

110. Such risks include, among others, exposing the released individual to pathogens in the wild to which the animal has not been exposed previously; exposing populations in the wild to pathogens the released individual may be carrying to which the free-ranging animals have not been exposed previously; and introducing novel or non-native genes or gene complexes, which may be maladaptive, to the population in the wild via the released individual (see, e.g., Brill and Friedl, 1993). Any release, either of captive-bred progeny or long-term captive animals, must be approached methodically and with careful monitoring and, depending on the jurisdiction, may require permits under local wildlife protection laws.

111. See, e.g., S.J. Butler, letter to Paul G. Irwin, 23 July 1993, in which he states "[AZA] members would never subject the animals under their care to such risky and ill-conceived [release] experiments." For more recent examples, see Manby (2016) and endnote 95.

Another hypocritical argument industry representatives have been known to make to support their practices relates to captive breeding. This viewpoint was heard most often as proposals to ban captive orca breeding gained momentum in the mid-2010s (see endnotes 573 and 577) and then immediately after SeaWorld's announcement that it was ending its orca breeding program (see endnotes 577 and 582 and Chapter 12, "The Blackfish Legacy—The End of Captive Orcas?"). This argument claims reproduction is a "right" for animals in zoos and aquaria and thus ending captive breeding is ethically wrong and even cruel (see, e.g., SeaWorld, 2015a and *https://www.loroparque.com/index.php/en/el-parque-eng/pressroom/loro-parque-s-*

press-release). Yet this appears to be the only right the public display industry seems eager to protect for the wildlife in its care; captivity of course prevents marine mammals from ranging widely, diving deeply, freely choosing social partners, hunting live prey, and so on. The only right the industry seems to think should not be restricted is the one that produces more marine mammals to display.

Ethics and Captive Breeding

112. See Moriarty (1998), for a discussion of this concept.

113. See endnote 52, regarding the Vaquita CPR program, for an example of a program where a majority of scientists and management authorities concluded the risk to the species of capture and confinement was ethically justified, given how rapidly vaquitas were disappearing (see, e.g., International Whaling Commission, 2019). However, the program was still controversial and support for it was not unanimous within the environmental or scientific communities.

Stranding Programs

114. See *http://www.sealsanctuary.co.uk*.

115. Nancy Yates, personal communication (2014).

116. A good example of this was the 1998 rehabilitation and release by SeaWorld San Diego of JJ, a gray whale calf (*Eschrichtius robustus*). This effort was extremely expensive, yet the release was technically unsuccessful—JJ dislodged her tracking tags within three days of release into the ocean and was never seen again (Stewart *et al*., 2001). She could easily have died from starvation or been killed by predators soon after. Yet the entire process was presented as a huge success in the media and on SeaWorld's website, and as completely justified on conservation and scientific grounds, even though the science gained from her time in captivity was minimal, at least as suggested by the small number of subsequent publications (Stewart, 2001). This is in sharp contrast to the industry's response to Keiko's release (Hutchins, 2004; Simmons, 2014). The industry portrayed it as a total failure, even though Keiko spent more than five healthy years in a semi-independent state in Iceland and Norway and was successfully tracked for three weeks by satellite while he crossed the Atlantic (Simon and Ugarte, 2003; Simon *et al*., 2009).

117. Masunaga (2016). See also endnote 95, for examples of industry representatives portraying natural habitat as dangerous. As another example, in 2015, the script for the Lolita show at Miami Seaquarium painted the wild as a grim, hazardous place, in contrast to the safety of Lolita's small concrete enclosure and the filtered water in which she lives. Even *The CRC Handbook of Marine Mammal Medicine* implicitly fosters this negative image of natural habitat, by stating that one of the pros of captive display is that "[a]nimals have clean water and food, adequate shelter, safety from predators, behavioral enrichment, regular physical exams, and daily observations related to health and well-being" (p. 68 in Dierauf and Gaydos, 2018), a list that, unsurprisingly, is meaningless to free-ranging marine mammals in healthy habitat, who need none of these things from humans to secure their welfare.

118. A dramatic variation on this scenario occurs when a facility claims it is rescuing animals from certain death by bringing them into captivity; an example is orphaned walruses acquired from native hunts in Alaska. These so-called rescues may in fact have acted as incentives to Native hunters to kill walrus mothers and thus create orphans, as money was once exchanged to acquire these animals. The Cincinnati Zoo acquired three walrus orphans in 1996. When one of them died in 1998, the *Cincinnati City Beat* newspaper conducted an investigation that revealed that the zoo paid a substantial sum of money to the Native hunters. One hunter admitted to the reporter that the hunters went out specifically to acquire the walrus calves for the zoo and returned immediately after obtaining them (the mothers were killed and eaten). The calves were not in fact "surplus" to the subsistence hunt; they were the objectives (Firor, 1998). Apparently in the same year the zoo acquired these walruses, the FWS began making it a permit condition that no money be exchanged when acquiring walrus orphans for public display (Reeves and Mead, 1999).

119. Only five orcas have been rescued alive by dolphinaria and most did not survive long. These included Sandy in Washington State in 1973, Miracle in British Columbia in 1977, Surfer in California in 1979, Pascuala in Mexico in 2007, and Morgan in the Netherlands in 2010. Some in the industry call Kshamenk in Argentina a "rescued' animal, but he was likely forced to strand (see endnote 121), and therefore is more akin to a drive-caught animal.

The story of Pascuala, or Pascualita, unfolded in April 2007. A calf believed to be no more than a few days old was found stranded on a beach in Mexico. It was never determined how she was separated from her mother. She was taken to a local dolphinarium, which voiced concern from the outset that the enclosure (designed for bottlenose dolphins) was unsuitable for an orca and that the staff was not trained in orca care. However, others pointed out that moving her any distance would cause her considerable stress and might hasten her death. Nevertheless, SeaWorld sought to acquire her, despite the fact that cetacean exports had been illegal in Mexico since 2006. Her deteriorating condition, the plan to transfer her, and the conflict with the law caused considerable controversy, but before it could be resolved, Pascualita died in June 2007 (Ellrodt, 2007). Many blamed Mexico's environmental authorities and animal protection groups who opposed the transfer, but her survival, regardless of treatment, was always unlikely, without a mother's care in the crucial first months. The public display industry, rather than face this tragic reality and make her welfare its first priority, instead pursued a plan whose first priority was to add a new female orca to the captive gene pool.

Morgan's story is ongoing. She is a female orca who was found as a calf, emaciated and alone, in June 2010 in the Wadden Sea off the Netherlands. While still free-swimming, she was rescued and taken into captivity at Dolfinarium Harderwijk. The facility, however, was too small for the whale and a debate ensued over Morgan's fate. The Free Morgan Foundation (*http://www.freemorgan.org/*) argued that Morgan could and should have been released back to her natal population, determined to be a group in Norway, based on acoustic analysis. However, after a protracted legal battle, Morgan was exported to Loro Parque, a zoo and dolphinarium in the Canary Islands, Spain, in November 2011 (Cronin, 2014). Dolfinarium Harderwijk had not made any attempts to rehabilitate Morgan for release.

Morgan's CITES export permit allowed her transfer from the Netherlands to Spain only for research and conservation, not breeding (Spiegl and Visser, 2015; Spiegl *et al*., 2019). Loro Parque had effectively acquired gratis an orca worth several million US dollars in value. Nevertheless, in 2016, in violation of her CITES permit and of SeaWorld's self-imposed breeding ban, which also applied to the whales at Loro Parque (see endnote 577), she was bred with one of two captive-born male orcas held with her. Her pregnancy was announced in 2017 and her daughter was born on 22 September 2018. Named Ula, she is not releasable to the wild, as she is a genetic hybrid.

120. For example, in September 2012, three female and one male juvenile pilot whales were rescued during a mass stranding of 22 animals in Florida and taken to SeaWorld Orlando for rehabilitation. The stated aim was eventually to release the animals (CBS Miami, 2012), but ultimately they became permanent exhibit animals at SeaWorld. The stated rationale for not releasing them included concern about finding their original group and how young they were, but the lack of transparency in the decision-making process made it difficult for outsiders to assess these reasons. Another example is Martinha, a short-beaked common dolphin (*Delphinus delphis*), who stranded and was rescued in Portugal in 2007. She too may have been releasable yet remains in captivity (see *www.martinha.org*). Her case is unique, however; she is being held in a facility that is not open to the public, nor does she appear to be in use as a research subject.

121. Again, a more dramatic variation on this theme is when an animal is forced to strand, by facility staff or local fishermen, to provide an exhibit animal to a dolphinarium. An orca in Argentina, named Kshamenk, seems to have been a victim of such a forced stranding in 1992, when he was a calf. Argentina prohibits live captures of marine mammals—it hardly seems a coincidence that almost all the animals in the collection of Mundo Marino, a dolphinarium on the Argentine coast, are "unreleasable" stranded animals, including Kshamenk. His stranding report suggests he was not injured and was at worst mildly sun-burned, yet he was not refloated along with the adult

orcas with whom he was reportedly found (they swam away). Instead, he was brought to Mundo Marino for rehabilitation. By the time he was pronounced healthy in 1993, he was considered to have been held too long for a successful release (Gabriela Bellazi, personal communication, 2001).

Research

122. Kellert (1999); Naylor and Parsons (2018).

123. In the wild, dominance hierarchies, segregation of the sexes, and other social dynamics do much to affect marine mammal reproduction. The artificial groupings, small enclosures, and husbandry practices experienced by captive marine mammals may lead to animals breeding at younger ages and at shorter intervals than those typical of free-ranging animals. The constant and abundant food supply may also lead to faster maturation than occurs in the wild. Using data gathered from captive animals to estimate reproductive rates of populations in the wild would therefore give an inapplicable value. If, for example, these data were used to calculate how quickly a population would recover from depletion, or to address some other similar conservation issue, the answer would be incorrect and could compound the conservation problem. For a discussion of this issue, see Mayer (1998).

124. Despite these improvements, it should be noted that capture and release of free-ranging cetaceans is a stressful experience, as the situation in the tuna fishery in the eastern tropical Pacific Ocean has long attested (Curry, 1999). In this fishery, dolphins are encircled with large nets to capture the tuna swimming underneath and then released. Decades of this treatment have led to stress-related physiological damage and other negative effects (Forney *et al.*, 2002). Even carefully conducted capture-and-release of free-ranging cetaceans for research purposes (including health assessments) can result in stress responses (Stott *et al.*, 2003; Mancia *et al.*, 2008), so this is not necessarily a benign research methodology. This latter study clarifies that capture (and release of unsuitable animals) for public display will cause stress, which may be a contributing factor in post-capture mortalities.

Indeed, long-term acclimation to captivity and frequent handling does not eliminate this stress response. A study with captive porpoises concluded that whenever a cetacean is handled (in this case, removed from the water for husbandry/medical procedures, versus training the animals to submit voluntarily to such procedures in-water), significant stress responses occur, even over the course of several years (Desportes *et al.*, 2007). See Chapter 7 ("Stress") and Chapter 9 ("Mortality and Birth Rates") for additional discussion of stress in captivity and the lack of habituation in cetaceans to transport and removal from the water over time.

125. Rees (2005).

126. SeaWorld has claimed that its artificial insemination (AI) techniques for orcas (and other cetaceans) will one day be invaluable to the conservation of endangered species (Robeck *et al.*, 2004; Robeck *et al.*, 2010), a highly dubious claim to say the least. There may be behavioral or physiological—not to mention logistical—issues that invalidate the technique for free-ranging cetaceans. To illustrate, beluga whales kept in captivity had very poor reproductive success for many years. Eventually it was discovered that belugas have facultative induced ovulation (Steinman *et al.*, 2012), wherein the presence of males, ideally more than one, assists in promoting conception. While AI techniques have worked on belugas (Robeck *et al.*, 2010), the success rate was only 20 percent. This has clearly not been sufficient to maintain the captive population of belugas in North America, where the technique was developed (see Chapter 3, "Live Captures;" Georgia Aquarium, 2012), let alone a free-ranging population. In some cases, such as the vaquita, simply handling free-ranging individuals for AI application would cause sufficient stress to make survival, let alone conception, far from certain (see, e.g., endnote 52).

Dolphinaria should be trying to save endangered species *in situ* by, among other actions, contributing to the protection of habitat. For a discussion of how inappropriate and misdirected such captive-based reproductive research could be for wild and endangered marine mammals, see Mayer (1998), Curry *et al.* (2013), and endnote 50.

127. In the orca AI study, for example, three females were successfully impregnated over two years, but one of the females died while pregnant, together with her 129-day-old fetus—hardly a glowing advertisement for the technique (Robeck *et al.*, 2004). The SeaWorld paper also states that 26 orcas have been born in captivity, lauding this as a success. However, this is a significant misrepresentation of the facts; there were 66 known pregnancies at the time of the study, but most fetuses miscarried, were stillborn, or died soon after birth (with one newborn calf dying soon after the paper was accepted for publication). Therefore, at least 61 percent of captive orca pregnancies had been unsuccessful to that time, due to the death of the calf before or just after birth.

128. When studies on the hearing abilities of captive beluga whales were used to calculate the distance at which the whales could detect shipping traffic, a distance of 20 km (12 miles) was estimated. However, observations on free-ranging animals showed that belugas were detecting vessels at distances of well over 80 km (50 miles) and were actively avoiding shipping at distances up to three times farther away than the captive studies would have estimated (Findlay *et al.*, 1990). This strongly suggests that at least some studies on captive animals are not directly applicable to free-ranging cetaceans (see also Wright *et al.*, 2009). In another study, researchers noted that captive bottlenose dolphins do not show the same variability in whistles as free-ranging animals do and may have abnormal whistle patterns, potentially resulting in incorrect conclusions about natural acoustic behavior (Watwood *et al.*, 2004). As a non-acoustic example, captive animals swim at speeds that are not comparable to those exhibited in the wild (Rohr *et al.*, 2002). Metabolic studies in captivity that rely on activity levels, therefore, may not give results applicable to free-ranging animals.

Studies using the hearing abilities of captive marine mammals to predict the behavior of free-ranging animals are a particular problem. Data from such studies have been used to develop guidelines for sound-exposure levels considered to be safe for marine mammals in the wild. But as noted above, animals in the wild have been observed reacting to sound hundreds or even thousands of times quieter than predicted by captive animal studies (Findley *et al.*, 1990; see also Gould and Fish, 1998). Part of the problem may be that captive marine mammals are continuously exposed to high levels of background noise, which may lead to premature hearing loss (Ridgway and Carder, 1997; Couquiaud, 2005; Popov *et al.*, 2007) or habituation to higher sound levels.

For example, trained, captive cetaceans—in noisy facilities and exposed to high sound level experiments many times—are unlikely to respond in the same way as naïve, free-ranging animals (Parsons *et al.*, 2008; Wright *et al.*, 2009). These and other factors lead to situations where sound-exposure safety standards based only or primarily on captive animal studies might be inappropriate for populations in the wild. Researchers using captive cetaceans have said that captive animal studies are "likely not directly transferrable to conspecifics [members of the same species] in the wild. The dolphins have years of experience under stimulus control, which is a necessary condition for the performance of trained behaviors, and they live within an environment with significant boating activity. These factors likely impact the threshold of responsiveness to sound exposure, potentially in the direction of habituation or increased tolerance to noise" (p. 130 in Houser *et al.*, 2013).

129. Researchers studying the behavior of captive river dolphins noted among other issues that "[w]ithin the captive environment, pool size, shape and structure are considered to be important in influencing the behaviour of these dolphins" (p. 39 in Liu *et al.*, 1994).

130. For example, Dr. Christopher Dold, a marine mammal veterinarian and chief zoological officer for SeaWorld, claimed "the value of animals in zoological parks is that they are available for controlled science to be conducted with them on their behalf" (Shiffman, 2014).

131. SeaWorld's website in early 2014 listed 52 publications specifically on orcas (starting in 1976), but three of these were papers that had been listed twice. One was a book review by a SeaWorld employee on a book written by someone claiming to be able to communicate with orcas. Some of the publication authors were SeaWorld staff, but the research was performed entirely on free-ranging orcas. Some were not peer reviewed. One was a legitimate publication, but the author list had been altered to place the SeaWorld co-author first; he

was not the lead researcher. Some simply did not seem to exist, and could not be tracked down by any means, including requests to SeaWorld staff. Finally, although some papers (such as those related to anatomy, physiology, and development) might be broadly applicable to free-ranging orcas, most were only relevant to the husbandry of captive animals (Shiffman, 2014). SeaWorld has since updated its list of publications (*https://seaworldcares.com/en/research/killer-whales/*), but this update is actually a comprehensive list of publications by SeaWorld authors (on mammals, birds, reptiles, and fish) and only 27 of them are specifically on orcas. This includes, for example, a 1977 paper on how many orcas the public display industry captured from the wild. Considering that SeaWorld has kept orcas for more than 50 years and takes in more than US$1 billion in revenue annually, as well as that the company has claimed for years that research is a primary justification for maintaining orcas in captivity, this research output is woefully low.

132. See *https://www.guidestar.org/profile/59-2072869*. In 2003, its income was US$3.4 million, most of which came from human–dolphin interactions (Kestin, 2004c).

133. The Dolphin Research Center (see endnote 45) was established in 1984. For the first two decades of its operation, based on information found on the facility's website (*www.dolphins.org*), the staff appear to have produced only three peer-reviewed journal papers and a book chapter (Nathanson, 1989; Nathanson and de Faria, 1993; Smith *et al.*, 1995; Jaakkola *et al.*, 2005). This is not an impressive output for a dedicated "research center" receiving an income of tens of millions of US dollars over that period. Another paper involved an experiment that was highly controversial—it deliberately exposed dolphins to toxic pollutants in the form of oil slicks (Geraci *et al.*, 1983; Smith *et al.*, 1983; St. Aubin *et al.*, 1985).

In 2010, there was a sudden increase in the number of studies produced by the Dolphin Research Center (perhaps not coincidentally, the same year Congress held a hearing on cetaceans kept in captivity; see endnote 13). Thirteen papers are listed for the period 2010–2017 (although two of these are short 1–2 page commentaries on other researchers' works, rather than original research), which is still somewhat low for a "research center."

134. See *www.marinemammalscience.org*

135. In the previous (4th) edition of *The Case Against Marine Mammals in Captivity* (Rose *et al.*, 2009), we analyzed the number of presentations at the 17th Biennial Conference on the Biology of Marine Mammals in Capetown, South Africa (Society for Marine Mammalogy, 2007) describing results of studies on captive marine mammals. Out of 571 cetacean presentations, 11 reported on studies of cetaceans kept in naval or private research facilities (1.9 percent), with only 18 (3.2 percent) reporting on studies of cetaceans held at dolphinaria or aquaria (for a total of 5.1 percent reporting on captive cetacean research). The majority of the cetacean research done with public display animals was conducted by facilities outside North America. For pinniped-related studies (248 abstracts), a greater percentage (7.3 percent) was conducted on captive animals, although more than a quarter of these studies used pinnipeds held in a US government–subsidized research facility (the Alaska Sea Life Center). Only 3.2 percent of the pinniped-related research was conducted at dolphinaria, aquaria, or zoos.

In response to this assessment, Hill and Lackups (2010) assessed the wider cetacean literature to see how many publications focused on free-ranging and captive cetaceans. Making specific reference to Rose *et al.* (2009), they claimed to have refuted our findings that only about 5 percent of cetacean studies use captive animals. They reported that roughly 30 percent of the more than 1,600 published articles they examined presented results from captive cetacean research. However, while the sample from Rose *et al.* (2009) included all the presentations at the Biennial Conference related to studies of cetaceans, large and small, Hill and Lackups (2010) restricted their sample to literature focused only on "cetaceans that had been cared for by humans for some length of time" (p. 417). This of course would lead to a greater percentage of captive studies being represented in their sample.

Indeed, even with this restricted sample, Hill and Lackups (2010) noted that there was a relative paucity of publications using captive cetaceans, calculating that "captive research with *Tursiops* represented 18.1% of all articles and captive research with *Orcinus*, only 1.2% of all articles" (p. 431). This seems generally in line with our calculations looking at cetacean-focused conference presentations overall (keeping in mind that we did not restrict our evaluation to cetacean species routinely held in captivity). In fact, Hill and Lackups (2010) concluded that "research with captive populations is not published, or perhaps not conducted, as frequently as research with wild populations" (p. 432–433), a conclusion consistent with that of Rose *et al.* (2009).

Marine mammals have been held in captivity for many decades. For at least the past 30 years their public display has largely been justified by the industry with the claim that these exhibits are essential for marine mammal research and conservation. It is therefore telling that a literature review conducted expressly to support this claim determined that research conducted on captive cetaceans contributes relatively little to the field of cetacean science. Additionally, Hill and Lackups (2010) admitted that "[r]esearch in captivity involves overcoming many competing demands (e.g., availability of animals, training time, and monetary support) and working within the goals of the facility (e.g., education, animal interaction, and entertainment) … [which] pose *major obstacles* for researchers interested in captive populations and make experimental paradigms very challenging" (p. 434, emphasis added). This conclusion echoes the points made in this and previous editions of *The Case Against Marine Mammals in Captivity*, that "[t]he requirements of providing the public with a satisfying recreational experience are often incompatible with those of operating a research or breeding facility" (p. 4 in Rose *et al.*, 2009; p. 15 in this report).

Interestingly, Hill and co-authors did a similar literature review several years later (Hill *et al.*, 2016), this time focusing on orca and bottlenose dolphin publications only. By 2016, the situation, despite a concerted effort by dolphinaria in the previous six years, was not much improved. They found that only 11 percent of research done on orcas is done in a captive setting, while captive bottlenose dolphin research had increased to represent a third of all publications (Hill *et al.*, 2016). (Note that this is a generous interpretation of their results, as their 2016 sample was restricted more than in 2010, to just those two species, making any increase in the captive study percentage somewhat inflated.) In a sense, any recent increase in cetacean research done in a captive setting could be considered yet another *Blackfish* Effect (see Chapter 12, "The *Blackfish* Legacy"), given the baseline established in 2010 (Hill and Lackups, 2010).

136. See endnote 135 and Hill and Lackups (2010).

137. As an example, see Wells *et al.* (1998).

CHAPTER 3 • LIVE CAPTURES

138. There are many physiological changes associated with capture-related stress, including capture myopathy or shock (an acute reaction that can cause heart stoppage), as well as immune system depression, reproductive dysfunction, hyperthermia (overheating), and even genetic effects (Curry, 1999; Cowan and Curry, 2002; Forney *et al.*, 2002; Romano *et al.*, 2002; Stott *et al.*, 2003; Romero and Butler, 2007; Mancia *et al.*, 2008; St. Aubin *et al.*, 2011; Fair *et al.*, 2014). Stress responses resulting from capture may also affect survival after capture and indirectly cause mortality. Chases and capture can also have negative psychological or social impacts, including triggering aggressive behavior in a targeted group (Fair and Becker, 2000).

139. US government scientists measured strong stress reactions in pantropical spotted dolphins (*Stenella attenuata*), measured by changes in blood chemistry, stress protein levels, and other factors, as the result of being encircled by speed boats and entrapped by purse-seine nets in the eastern tropical Pacific Ocean tuna fishery (Forney *et al.*, 2002; St. Aubin *et al.*, 2011). In addition, heart lesions were found in dead animals, which the researchers linked to stress (Cowan and Curry, 2002; Forney *et al.*, 2002). Researchers also found that trapped dolphins had suppressed immune systems, which would make the animals more susceptible to subsequent disease (Romano *et al.*, 2002).

140. Page 17 in Reeves *et al.* (2003) and endnote 587. For example, during the 2013 capture season in the Sea of Okhotsk for beluga whales (see Chapter 3, "Live Captures—Belugas" and endnote 58), approximately 34 belugas were believed to have been killed, more than researchers believed had been killed in previous seasons, likely due to an increased number of capture teams competing on the water for access to the whales (Shpak and Glazov, 2014), leading to chaotic conditions, unintended entanglements in the nets, and whales drowning.

141. Small and DeMaster (1995a).

142. Hunting dolphin species with drives, for subsistence and cultural purposes, continues to occur elsewhere, including Solomon Islands and the Faroe Islands, but the Japanese village of Taiji is the only remaining location where drives occur to acquire dolphins for the purpose of public display. This method of hunting and killing various dolphin species has a long history in various locations (Reeves *et al.*, 2003; Vail and Risch, 2006).

The dolphins captured in the Taiji drive who are not selected for public display are often killed. Originally, after being driven to the shore, animals were killed by repeated spear strikes. Because of the obviously inhumane nature of this slaughter method, a new one was introduced in 2010. However, this new method has been highlighted as also inhumane (Butterworth *et al.*, 2013). The hunters destroy the dolphins' spinal cords by forcibly inserting a metal rod behind their skull—this paralyses them, but does not immediately kill them. They may also remain conscious and aware, meaning they would continue to feel distress and fear from pain, the chase and capture, and their witnessing of pod mates dying. After the rod destroys the spinal cord, a wooden peg is inserted, to impede bleeding. This is done to prevent staining the surrounding seawater red with blood (a visual that has been used by activists to emphasize the cruelty of the hunt), but it also prevents a more rapid death for the animals from blood loss.

Death from this method is ultimately by injury, trauma, and/or gradual blood loss. It is far from quick and as such, "This killing method … would not be tolerated or permitted in any regulated slaughterhouse process in the developed world" (p. 184 in Butterworth *et al.*, 2013). Indeed, the killing method would not be legal for livestock in Japan—Japanese welfare regulations require that livestock be rendered unconscious before slaughter and the methods used must be "proven to minimize, as much as possible, any agony to the animal," with the guidelines defining "agony" as pain, suffering, fear, anxiety, or depression (Safina, 2014).

143. The documentary film *The Cove* (*www.thecovemovie.com*) was released in July 2009 and won 39 awards (and was nominated for an additional 17), including the 2010 Academy Award (Oscar) for best documentary feature.

144. Between 2000 and 2013, more than 17,500 small cetaceans were killed in the Taiji drive fishery. In addition, more than 1,400 animals were live captured for sale to the public display industry, with the market now primarily in Asia (*www.cetabase.org/issues/taiji/*). The survival rate of drive-caught dolphins in dolphinaria is apparently quite low (although this has not been assessed systematically), given the size of this trade in comparison to the available market.

145. Data are from land-based observers (*www.cetabase.org/taiji/drive-results/*).

146. In 2007, two municipal officials in Taiji spoke out about the levels of mercury found in meat from the dolphin drives, publicly expressing concern for the first time about this long-known contamination problem (Adams, 2007). This concern was well founded, as researchers found mercury levels in dolphin meat nearly six times higher than health limit guidelines. The average mercury level found in the hair of locals who ate dolphin meat once a month or more was 12 times the national average. Three dolphin meat consumers were found with levels that held the risk of potential toxic effects (Endo and Haraguchi, 2010).

A later survey of nearly 200 Taiji residents found an average mercury level seven times higher than the Japanese average, and 12 individuals had levels that held the risk of potential toxic effects (Nakamura *et al.*, 2014). These mercury levels were significantly correlated with dolphin meat consumption. It is particularly worrying that mercury-contaminated cetacean meat is often given to those most vulnerable to its effects (schoolchildren and hospital patients; Parsons *et al.*, 2006). Moreover, in addition to mercury, there are also potentially high levels of pesticides and pathogens in dolphin meat that could pose a human health risk (Parsons *et al.*, 2006).

147. Solomon Islands' *Solomon Star News*, a newspaper that was closely following the controversial capture and sale of dolphins in this South Pacific island state for sale to dolphinaria (see, e.g., endnote 191), reported that export papers accompanying a shipment of seven dolphins to the Philippines recorded a single dolphin selling for US$60,000 (Palmer, 2008).

148. Vail and Risch (2006).

149. China Cetacean Alliance (2015; 2019).

150. In 2005, Cabo Adventures in Baja, Mexico, imported seven dolphins from Taiji. In 2008, Kish Dolphin Park in Iran imported 12 dolphins. Between 2010 and 2013, Dolphinarium Nemo in Ukraine imported 36. In 2013, Saudi Arabia purchased six dolphins, six were sold to South Korea, five to Vietnam, 11 to Russia, 20 to Ukraine, and 36 to China (Kirby, 2014a).

151. Reeves *et al.* (1994).

152. Tim Desmond was the American procurer of drive-caught cetaceans for Ocean Adventure in 2004. Desmond claimed that "he's the conservationist," as opposed to "the demonstrators trying to stop the drive-hunts. … He argues that Taiji is the most environmentally friendly place to acquire dolphins. If he ordered them from elsewhere—Cuba for instance, which is a major supplier—the dolphins would be caught specifically for him: in other words, he would be guilty of interfering with the species" (Kenyon, 2004). In short, capture operators view themselves as "the good guys," despite inflicting trauma on, disrupting, and possibly depleting cetacean populations.

153. A group of dolphins were captured in a drive in Taiji in October 2006. The Ocean World Adventure Park in the Dominican Republic placed an order for 12 dolphins from this drive. However, after public outcry, the government of the Dominican Republic stopped the proposed import (Underwater Times, 2007).

154. In 1987 and 1988, the Indianapolis Zoo in Indiana and Marine World Africa USA in California (now Six Flags Discovery Kingdom), respectively, applied for MMPA permits to import drive-caught false killer whales (*Pseudorca crassidens*) from Japan (*52 Fed. Reg. 49453*, 1987; *53 Fed. Reg. 7223*, 1988). NMFS initially granted these permits (*53 Fed. Reg. 12801* and *53 Fed. Reg. 16307*, 1988), but animal protection groups argued throughout the process that since the whales were coming from Japan, they were the product of drive fisheries (the only cetacean capture method used in that country) and therefore ineligible for import into the United States under the "humane" provision of the MMPA, as well as under the specific conditions of the permits issued (McClatchy News Service, 1993; Penner, 1993; White, 1993; J.R. Floum, letter to William W. Fox, Jr., 5 May 1993). These conditions included taking the animals from a specific location in Japan (Taiji) and using seine-netting as the capture method.

Ultimately the agency disallowed the imports, because "the place [Iki Island] and method of capture deviated from that allowed in their permit," with NMFS "sidestep[ing] the issue of whether the drive fishery was *per se* cruel and inhumane" (p. 9 in White, 1993; see also *58 Fed. Reg. 58686*, 1993; N. Foster, letter to Michael B. Demetrios, 3 May 1993). In other words, NMFS did not allow the imports because of a technicality, in an effort to avoid making a definitive determination that drive fisheries were an inhumane collection method. In February 1994, a local newspaper reported that just days before the Indianapolis Zoo's permit to import the false killer whales was set to expire, the Japanese zoo holding them decided to keep the animals (Indianapolis Star, 1994).

155. In the late 1990s and early 2000s, various Japanese public display facilities sought to import numerous wild-caught Alaskan sea otters (*63 Fed.*

Reg. 38418, 1998, for applications PRT-844287, 844288, and 844289; *64 Fed. Reg. 70722*, 1999, for applications PRT-018196 and 018197; and *66 Fed. Reg. 32635*, 2001, for applications PRT-020575 and 043001). Most of these facilities, including Kagoshima City Aquarium, Suma Aqualife Park, Izu-Mito Sea Paradise Aquarium, and Oarai Aquarium, had participated in drive fisheries. At the time of its application, Oarai Aquarium had actually stated its intention to do so again the following year. See endnote 281—the 1998 applications were granted; the 2001 applications were denied (*67 Fed. Reg. 58630*, 2002).

156. *68 Fed. Reg. 58316*, 2003. From a search of the *Federal Register*, it appears this permit request was never approved; it is possible the request was withdrawn.

157. See *https://www.aza.org/marine-mammal-conservation#dolphindrive* for the 2004 AZA statement and *https://zoosprint.zooreach.org/index.php/zp/issue/view/283/showToc* for the 2004 WAZA resolution, both opposing acquiring dolphins from drive fisheries. The European Association of Aquatic Mammals followed three years later with its own statement—see *https://eaam.org/wp-content/uploads/2018/04/Statement_Policy_Drive_Fisheries_2013.pdf.*

158. See *http://www.waza.org/files/webcontent/1.public_site/5.conservation/animal_welfare/change%20in%20dolphin%20acquisition%20policy.pdf* and also McCurry (2015). It is important to note that these industry associations may never have taken these public positions without the notoriety the drive fishery gained through advocacy campaigns, the documentary *The Cove*, and the subsequent public pressure the industry faced.

159. China Cetacean Alliance (2015; 2019).

160. Vail and Risch (2006). The last import of live cetaceans from Japan into Taiwan was in 2005.

161. Four dolphins (three female and one male), originally sourced from Taiji, were shipped from Japan to a Dubai dolphinarium in October 2008 (*www.cetabase.org*).

162. Lusseau and Newman (2004); Williams and Lusseau, (2006).

163. The Southern Resident orcas in Washington State were persistently targeted by capture operators in the 1960s and 1970s, leading to the removal of at least 53 juveniles over a decade (Goldsberry *et al.*, 1976). Researchers estimate there were approximately 24 breeding males prior to captures; however, the current population only has two (Ford *et al.*, 2018). While inbreeding was essentially unknown in the northeast Pacific populations prior to the 1990s (Barrett-Lennard, 2000), it has become increasingly common in the Southern Residents due to this "lost generation" and the other threats facing this endangered population (Ford *et al.*, 2018).

164. Naylor and Parsons (2018).

165. See endnote 20.

166. On 29 March 2004, Miranda Stevenson, Ph.D., then-director of the Federation of Zoos, stated that members of the federation are obliged to follow the federation's Animal Transaction Policy, which states, "When acquiring animals Federation collections are responsible for ensuring that the source of animals is primarily confined to those bred in captivity and that this is best achieved through zoo-to-zoo contact." This sentiment is shared by WAZA in its code of ethics (see "4. Acquisition of Animals"; p. 84 in World Association of Zoos and Aquariums, 2015). Also, both associations hold that any animal transactions must be in compliance with national and international laws relating to animal transport, trade, health, and welfare, including CITES, which certainly has not happened in the case of many cetacean live captures (see "5. Transfer of Animals"; p. 84 in World Association of Zoos and Aquariums, 2015).

167. See *www.chinacetaceanalliance.org* for details in its investigative reports for individual facilities.

168. Master (2018); China Cetacean Alliance (2015; 2019).

169. See *www.cites.org* for treaty text and definitions, in particular Article III, and for resolutions and other documentation clarifying the requirements for non-detriment findings (NDFs).

170. Controversy on the substance of NDFs erupted when more than two dozen Indo-Pacific bottlenose dolphins were exported from Solomon Islands to Mexico in 2003 and again when the same number were exported from Solomon Islands to Dubai, United Arab Emirates, in 2007 (see endnote 194). Information on dolphin populations in these South Pacific waters is lacking, yet the Solomon Islands government issued NDFs for both exports. The IUCN CSG organized a workshop in August 2008 at the Secretariat of the Pacific Regional Environment Programme to discuss this trade situation and concluded that there is an urgent need to assess Indo-Pacific bottlenose dolphin populations around any island where human-caused removals or deaths are known to be occurring and that the state of knowledge for Solomon Islands was insufficient to support the proposed quota of 100 dolphins a year (Reeves and Brownell, 2009).

171. The *Action Plan* (p. 17 in Reeves *et al.*, 2003) also states:

> Removal of live cetaceans from the wild, for captive display and/or research, is equivalent to incidental or deliberate killing, as the animals brought into captivity (or killed during capture operations) are no longer available to help maintain their populations. When unmanaged and undertaken without a rigorous program of research and monitoring, live-capture can become a serious threat to local cetacean populations. All too often, entrepreneurs take advantage of lax (or non-existent) regulations in small island states or less-developed countries, catching animals from populations that are already under pressure from by-catch, habitat degradation, and other factors.

In other words, many countries are "fishing" themselves out of dolphins.

172. See, e.g., International Whaling Commission (2019).

173. CITES does have a Review of Significant Trade process (*https://cites.org/eng/imp/sigtradereview*), but it does not specifically address individual NDFs that may be unsubstantiated or deficient in some way. It undertakes regular assessments of the status of species that are allowed to be traded but must be monitored, and that are traded in high volumes. This process can be invoked as an emergency measure when parties are concerned about the sustainability of trade in a particular species, but this is a relatively lengthy and laborious process.

Bottlenose Dolphins

174. Cuban authorities were issuing capture permits for, on average, 15 bottlenose dolphins per year from national waters and for as many as 28 dolphins in one year, through at least the mid-2000s. This average was reported in a document submitted by the Cuban delegation to the EU CITES Scientific Review Group in 2003, entitled "General Report of Research and Development Programs regarding the Tonina dolphin (Montagu, 1821) in Cuba." From 1986 to 2004, an average of 13 dolphins was exported each year. Twenty-four were exported in 2000, nine in 2001, 28 in 2002, 20 in 2003, and 25 in 2004 (Van Waerebeek *et al.*, 2006). The CITES Trade Database suggests Cuba exported 32 more dolphins from 2005 through 2013. No more exports from Cuba are recorded after that year (CITES, 2018).

175. There are at least eight dolphinaria in Cuba (*www.cetabase.org*).

176. See *www.cetabase.org*.

177. These two exports (of five and four dolphins respectively) from Cuba are the last included for that country in the CITES Trade Database (see endnote 174).

178. Van Waerebeek *et al.* (2006) reviewed any documents that could be found on the population status of bottlenose dolphins in Cuban waters. Only one paper, from 1954, could be found that was published in a bona

fide peer-reviewed journal. The researchers concluded that "the available documentation is insufficient for the international community of marine mammal scientists to assess the sustainability of current capture levels of *Tursiops truncatus* in Cuban waters. Therefore, we strongly recommend the international trade of common bottlenose dolphins from this area ceases until evidence of no detriment can be authenticated" (p. 45 in Van Waerebeek *et al.*, 2006). We searched for peer-reviewed papers or documents submitted to the IWC on this topic over the past 12 years, but could not identify any.

179. For example, in November 1996, Manatí Park, in the Dominican Republic, applied to import four dolphins captured in Cuban waters (Pasini, 2015).

180. Nine bottlenose dolphins were exported from Cuba to Italy (in 1987, 1988, 1989), six to France (in 1988), six to Malta (2003) six (although two soon died) to Portugal (1999), eight to Switzerland (1990, 1991) and 40 to Spain (1988, 1990, 1993, 1995, 1999, 2000, 2001, 2002) (data from Van Waerebeek *et al.*, 2006). The Portuguese imports and 25 of the Spanish imports effectively contravened the 1996 EU Council Regulation CE 338/97, "On the protection of species of wild fauna and flora by regulating trade." According to this regulation, the import by a member state of wild-caught specimens of Annex A species (which includes cetaceans) will only be authorized if this capture "will not have a harmful effect on the conservation status of the species or on the extent of the territory occupied by the relevant population of the species." Similar conservation provisions are found in the EU Zoos Directive, which entered into Spanish law in October 2003 (Spanish Parliament Act 31/2003). The ease and frequency with which these unsustainably caught animals were exported from Cuba to Europe illustrate the lack of enforcement of European law with respect to captive cetaceans.

181. In addition to being legally dubious under CITES, capture and transport of dolphins violates Articles 5(d), 5(j), 10.3(a), 11.1.b(i), and 11.1.c(c) of the SPAW Protocol of the Cartagena Convention (of which Cuba is a signatory), which prohibits the taking, harvesting, or commercial trade in wild specimens of endangered or threatened species (including dolphins).

182. International Whaling Commission (2007a).

183. In its 2002-2010 *Action Plan*, the IUCN CSG identified the investigation of live-captures of bottlenose dolphins in Cuban waters as one of its priority projects, due to concerns about the potential for depletion of coastal populations of these animals (Reeves *et al.*, 2003). To our knowledge, such an investigation has yet to be undertaken.

184. On 10 January 2002, Mexico amended Article 60 BIS of the Wildlife Law to prohibit the capture of marine mammals in its territorial waters. In June 2007, the first successful prosecution of this statutory prohibition occurred, when eight dolphins were confiscated from a company that had captured these animals illegally the month before. Six of the dolphins were secured by authorities where they were captured; they were released immediately in the same location. Two dolphins had already been sent to a dolphinarium in Mexico City, but they too were confiscated and it is believed that they were returned to the capture site and also released (Yolanda Alaniz Pasini, MD, personal communication, 2007).

185. Page 27 in Reeves *et al.* (2003).

186. These dolphins were captured for a hastily constructed sea pen facility in La Paz. Animal protection groups warned Mexican authorities and the facility owner that the sea pen's location (near a sewage outfall and relatively heavy vessel traffic) and shallowness were substandard and could create serious problems for the dolphins. One dolphin died within a few weeks of being brought into the facility, probably from capture-related stress.

In response to the capture, and the fact that the La Paz facility did not possess the appropriate permits for a live capture of cetaceans, the Mexican Environmental Enforcement Agency ordered the dolphinarium shut down. However, the Mexican courts ruled against this closure in June 2001, and so the dolphins continued to be used in SWD encounters.

In September 2003, La Paz was hit by a hurricane, but the dolphins were not evacuated. Due to contamination of the dolphins' pen—from the sewage outfall, just as animal protection groups had predicted—the large amount of storm-tossed debris, and the stress associated with the event, three of the seven remaining dolphins died within days of the hurricane's passing. In November 2003, a fourth dolphin died, reportedly from storm-inflicted health problems, following which Mexican authorities ordered the removal of the remaining three dolphins being held at the facility to a nearby land-based dolphinarium. Despite the urging of animal protection groups, the transfer of the dolphins, rather than their rehabilitation and release, was carried out that same month (Diebel, 2003; Alaniz and Rojas, 2007). See also Chapter 4 ("The Physical and Social Environment—Sea Pens") and endnote 247.

187. At the time of these captures, no research had been conducted on the dolphin population. Therefore, the size and structure of the population were unknown, making any claim that the captures were sustainable invalid (Parsons *et al.*, 2010a).

188. Under Article 175 of Dominican National Law #64-00 (General Law on the Environment and Natural Resources) enacted in 2000, capturing dolphins is illegal (see also Parsons *et al.*, 2010a). Also, the Dominican Republic is a signatory to the Cartagena Convention. This treaty's SPAW Protocol prohibits the unsustainable capture and commercial exploitation of cetaceans (Articles 3, 5(d), 5(j), 10.3(a), 10.3(b), 11.1.b(i), 11.1.b.(ii), and 11.1.c(c) would be violated by the capture of the dolphins; Parsons *et al.*, 2010a).

189. Alaniz (2015).

190. A population viability analysis found that the intended extraction rate for the bottlenose dolphins in the Dominican Republic would have led rapidly to the loss of the population (Roland, 2013). The analysis used results from photo identification studies, which gave the population size in the area where captures had taken place as approximately 102 animals. The analysis assessed an extraction pattern skewed toward young females (as the initial captures focused on this sex/age group, since females are preferred for SWD attractions—see Chapter 10, "Human–Dolphin Interactions").

191. After international outcry about this capture in Solomon Islands, the IUCN CSG sent a fact-finding delegation to investigate the situation in September 2003 and subsequently reported (p. 7 in Ross *et al.*, 2003):

> No scientific assessment of the population-level effects of the removals of bottlenose dolphins in the [sic] Solomon Islands was undertaken in advance of the recent live-capture operations. Without any reliable data on numbers and population structure of bottlenose dolphins in this region, it is impossible to make a credible judgment about the impacts of this level of exploitation. Until such data are available, a non-detriment finding necessary under CITES Article IV is not possible. Therefore CITES Parties should not issue permits to import dolphins from the [sic] Solomon Islands. Unfortunately, this episode of live-capture was undertaken with little or no serious investment in assessing the conservation implications for the affected dolphin population(s).

192. Parsons *et al.* (2010b).

193. The Solomon Islands government issued an NDF for these later captures, but there were major concerns about this documentation due to a lack of appropriate scientific assessment of the population (Reeves and Brownell, 2009; Parsons *et al.*, 2010b). The government responded that the quotas were based on the best available information from "anecdotal and community interview information" (N. Kile and A. Watah, letter on the dolphin fishery in Solomon Islands; see *http://www.prijatelji-zivotinja.hr/index.en.php?id=50*), i.e., the quota was not, in fact, based on scientific assessments of dolphin abundance, but rather anecdotal accounts of local people. Despite the Solomon Islands Fisheries Act (Act No. 6 of 1998; see *http://www.parliament.gov.sb/files/legislation/Acts/1998/The%20Fisheries%20Act%201998.pdf*) requiring that a precautionary approach be taken to marine resource management, such an approach was not being used. Indeed, it was the

complete opposite of the precautionary approach, in that potentially damaging actions were taken without full scientific review. The government argued that "practical difficulties had prevented a scientific assessment to be carried out at short notice," and that Section 32 of the 1998 Fisheries Act gave the relevant ministry the discretion to decide whether or not a proper impact assessment had been conducted. The government decided that there was no need for an actual scientific assessment of the local dolphin population (Kile and Watah).

194. In July 2003, 28 dolphins were exported to Mexico from Solomon Islands (the export was supposedly 30 dolphins; therefore, two may have died in transit). Twelve of the animals died within the first five years. After this export, the Solomon Islands government banned further exports, although this ban was reversed in October 2007, when 28 dolphins were exported to Dubai (see endnote 170). In December 2008 and January 2009, 18 more dolphins were exported to the Philippines, where they were to be trained before being exported onward to Singapore. CITES authorities in the Philippines concluded that these imports violated the treaty. In December 2009, nine dolphins were exported to Malaysia from Solomon Islands.

195. Kirby (2016).

196. Fisher and Reeves (2005).

197. Some of the dolphins captured in Guyana were almost certainly among the animals confiscated in Venezuela (International Whaling Commission, 2007a).

198. International Whaling Commission (2007a). The Venezuelan activities, involving "massive irregularities" in CITES and other permit documentation, were prosecuted by a district level court in the state of Sucre (Villarroel, 2008). The owners of the local dolphinarium were put on trial as the alleged perpetrators of the felonies under Article 59 of the Environmental Criminal Law 1992, which was replaced in 2012 (see *http://www.nortonrosefulbright.com/knowledge/publications/67734/venezuela-enacts-new-environmental-criminal-law*).

199. The lack of scientific data to assess the sustainability of these takes was emphasized by the Small Cetaceans Sub-Committee of the IWC's Scientific Committee (International Whaling Commission, 2007a).

200. Another company had advertised for years that it had an export quota of 20 animals per year, a number that would almost certainly have quickly decimated the small, coastal population in Guinea-Bissau, but it was unclear if any animals were ever actually captured or exported by this company. In 2004, a large capture and export plan was revealed, but its outcome was unclear (Van Waerebeek *et al.*, 2008).

In May 2003, five dolphins were captured in Senegal and taken by freezer truck to a small concrete pool located in Parc National du Siné-Saloum—a facility that violated park regulations. The captures were done by Spanish nationals claiming to have a government permit. Four of the animals died very quickly, and the fifth—a calf—was released into a local river, but found dead soon after (Van Waerebeek *et al.*, 2008).

Namibian waters were also apparently the target of Chinese capture operators in 2016, who sought permits for the live capture of a variety of species, including bottlenose dolphins, orcas, and penguins, although to date no captures are known to have taken place there (see, e.g., *https://www.earthrace.net/china-seeks-orca-and-penguin-import-license/*).

201. In 1989, a voluntary moratorium was established on the capture of bottlenose dolphins in the Gulf of Mexico and along the US Atlantic coast, due to a lack of information about stock structure and poor population estimates in some areas (see endnote 61). The last capture from US waters of any cetacean species was in 1993, when three Pacific white-sided dolphins were taken off the coast of California for the John G. Shedd Aquarium in Chicago, Illinois. The ensuing public outcry was intense, and no captures in US territorial waters have occurred since. However, it should be noted that public display facilities continue to explore the possibility of capturing cetaceans from US waters—supporting the notion that it is the potential controversy, not the law, that has held them back to date.

202. In fact, this 2007 import led the Netherlands Antilles government to establish a policy wherein no new dolphinaria, beyond one active proposal at the time for Sint Maarten, would be granted permission to operate in the islands (Netherlands Antilles, 2007). With the dissolution of the Netherlands Antilles in 2010, it is unclear if each constituent island (including Curaçao, Sint Maarten, and Sint Eustatius), still part of the Kingdom of the Netherlands, retains this policy.

203. The director of the Dolphin Academy, Laetitia Lindgren-Smits van Oyen, was reportedly fired by shareholders of the facility because Lindgren had made her opposition to the import of the "newly caught dolphins" from Cuba known to the government and also the media. Lindgren said after her firing that she would dedicate herself to opposing "this immoral and unnecessary dolphin business" (Amigoe, 2007).

204. Black Sea bottlenose dolphins are considered to be a unique subspecies of bottlenose dolphin: *Tursiops truncatus ponticus*. The initial proposal was to have Black Sea bottlenose dolphins moved from CITES Appendix II to Appendix I, which would have granted stricter controls and prohibitions against the commercial trade in these animals. (Appendix I includes species threatened with extinction. Trade in specimens of these species is permitted only in exceptional circumstances. Appendix II includes species not necessarily threatened with extinction, but in which trade must be controlled in order to avoid utilization incompatible with their survival.) Although this proposal failed (the dolphins are still listed under Appendix II), a compromise was successful; the quota for Black Sea bottlenose dolphin exports was reduced to zero (CITES, 2002).

Orcas

205. Mapes (2018a). The remaining Southern Resident whale in captivity is Lolita, also known as Tokitae, a female orca captured in 1970 and estimated to have been born in 1964. She is currently held at Miami Seaquarium in Florida in the United States.

206. One analysis estimated that if the Southern Resident captures had not taken place, the number of reproductively active orcas in the population would be 44 percent greater. These individuals would have given birth to approximately 45 surviving calves. The number of captured animals (all of whom theoretically could have survived to the present day), plus these "potential" calves, suggests that the population has approximately 90 fewer orcas than it might have had without the captures (Jacobs, 2004; see also endnote 163). The population was 75 whales as of January 2019 (*https://www.whaleresearch.com/*).

207. See National Marine Fisheries Service (2008b). While the population did show some recovery through the 1990s, it then began to decline again, largely because of habitat degradation and a catastrophic decline in their primary prey (king, also known as Chinook, salmon, *Oncorhynchus tshawytscha*), but also because an entire cohort of animals who should have been reproductively active was simply missing (see endnotes 163 and 206).

208. The animals were captured under a 1992 Japanese fisheries agency permit that allowed the take of five animals per year for "research" purposes. Within five months, two of the animals had died. A third member of the "Taiji Five" died in September 2004 and the remaining two died in September 2007 and 2008 respectively (Rossiter, 1997a; 1997b). These orca deaths are recorded at *http://www.orcahome.de/orcadead.htm*.

209. The female died of bacterial pneumonia; the scientists who performed the necropsy (animal autopsy) concluded that "the stress situations that the captured orca went through may have compromised its immune status, and, as a consequence, resulted in infection" (p. 323 in Rozanova *et al.*, 2007).

The annual quotas for 2001–2008 were reported by the Whale and Dolphin Conservation Society—now WDC—and the death of the juvenile during the capture operation was noted in Fisher and Reeves (2005).

210. Filatova *et al.* (2014).

211. Filatova *et al.* (2014).

212. Filatova *et al.* (2014); Filatova and Shpak (2017).

213. See *https://www.moskvarium.ru/* for more information on this facility. Three orcas were displayed when this facility opened in mid-2015; however, at least two of them were in Moscow, in a temporary holding facility, for more than a year before that (Eremenko, 2014).

214. Filatova and Shpak (2017).

215. There were 15 orcas in China as of January 2019 (Chinese Ministry of Forestry and Agriculture, letter to China Cetacean Alliance, 7 December 2015; Al-Jazeera, 2018; China Cetacean Alliance, 2019), with two of these having been imported as early as 2013 (the rest were imported in 2014, 2015, and 2016; see Chapter 3, "Live Captures—Orcas" and Chinese Ministry of Forestry and Agriculture, letter to China Cetacean Alliance, 20 October 2016). Yet the first four went on display in Shanghai only in November 2018 (Best China News, 2018). Thus the official Russian government capture and trade numbers do not directly align with the reality of animals in China and CITES Trade Database numbers were not yet up to date as of January 2019 (CITES, 2018).

216. Whale and Dolphin Conservation (2017).

217. See *https://www.facebook.com/russianorca/* for posts about the summer 2018 captures.

218. See *https://www.youtube.com/watch?v=gSplr9--R9c*. As of January 2019, only 87 belugas remained; three either escaped (as the capture operators claim) or died (Dalton, 2019).

219. See *https://awionline.org/sites/default/files/press_release/files/AWI-ML-Scientists-Letter-Russisan-Orca-Captures-112018.pdf*.

220. The Investigation Department of the Investigative Committee of the Russian Federation in the Primorsky Territory initiated a criminal case under Part 3 of Art. 256 of the Criminal Code of the Russian Federation, i.e., the illegal extraction of "aquatic biological resources" (which includes cetaceans).

221. See the federal law "On Fisheries and the Preservation of Aquatic Biological Resources." A provision that allowed aquatic biological resources to be captured for cultural and educational purposes and utilized in Russia *and abroad* was "canceled" in April 2018 (Oxana Fedorova, personal communication, 2019). See the official website of the Prosecutor General's Office (*https://genproc.gov.ru/smi/news/archive/news-1500938/*) for additional information.

222. Pravda (2018).

223. In its 2007 review of global orca populations, the Small Cetaceans Sub-Committee of the IWC's Scientific Committee noted that the captures of orcas in the waters off Kamchatka had been conducted without any scientific evaluation of the population prior to the captures taking place and called for a halt to further captures until such an assessment was done (International Whaling Commission, 2008).

Researchers subsequently have identified, using photo-identification methods, 688 fish-eating orcas in the Avacha Gulf, Kamchatka, and more than 800 fish-eating orcas around the Commander Islands, but the status of the population in the western Sea of Okhotsk is unknown (Filatova *et al.* 2014 and see below). Russian government scientists have estimated that there are more than 3,000 orcas in the Sea of Okhotsk (International Whaling Commission, 2019), but they do not differentiate between populations of fish-eating and mammal-eating orcas—the latter are more likely to be captured in the Sea of Okhotsk's Shantar region (where the capture teams are operating), as they come closer to the coast searching for prey.

The Sea of Okhotsk population size for mammal-eating orcas is not confirmed, although researchers identified 99 individuals, for a preliminary population estimate of 240–260 in the western Sea of Okhotsk where the captures have taken place (Filatova and Shpak, 2017). Without a finalized population estimate, it is impossible to conclude whether live captures from this population are sustainable, but certainly removing as many as 20–30 juveniles, with an unknown number injured or dead, in the past five years (perhaps as much as 10 percent of the population) is unlikely to be so. This was emphasized again by the IWC Scientific Committee in 2018, when the Russian delegation confirmed that its government still did not differentiate between the different ecotypes (reproductively isolated populations of orcas distinguished by cultural differences, including prey preferences, foraging techniques, and dialects; subtle differences in appearance, including size and eye patch types; and genetic differences) but had nonetheless issued a quota of 13 whales for 2018 (International Whaling Commission, 2019). See Chapter 3 ("Live Captures") and endnotes 212–222.

Belugas

224. Some of these may have come from the White Sea in Russia rather than the Sea of Okhotsk (see, e.g., *www.cetabase.org*, which refers to the Barents Sea—the White Sea is a sub-region of the Barents). The White Sea no longer appears to be a source for wild-caught belugas.

225. This information was collated from various sources during the public comment period for an import permit application submitted by SeaWorld Orlando for three captive-born male beluga whales from Marineland in Canada (*71 Fed. Reg. 33281*, 2006). The permit, despite strong opposition, was granted in November 2006 (*71 Fed. Reg. 67332*). Although inventory records from Marineland are not publicly available, efforts are made to monitor the animals there. Of the 12 belugas the facility imported in 1999, only four were still alive in 2018. Eleven belugas imported between 1999 and 2005 (39 percent) died before 2018. Only five (50 percent) of the Black Sea bottlenose dolphins were still alive in 2018 (*www.cetabase.org*).

226. Kilchling (2008). As of January 2019, two of these females had died (25 percent; *www.cetabase.org*) and Marineland had over 50 belugas, many of them the captive-born descendants of these imported whales.

227. According to the survey, 68 percent of Canadians felt "it is not appropriate to keep whales and dolphins in captivity," 58 percent were "supportive of laws banning the commercial use of captive whales and dolphins in Canada," and 55 percent were "supportive of laws prohibiting the importation of live whales and dolphins into Canada." Only 30 percent were in support of the "commercial use" of cetaceans in Canada, and only 31 percent opposed laws prohibiting the import of live-caught cetaceans (Malatest, 2003). See endnote 21.

228. Georgia Aquarium (2012).

229. The last import of wild-caught belugas into the United States had been in 1992, to the John G. Shedd Aquarium in Illinois from Manitoba, Canada. Four belugas were imported, but two died within minutes of being given deworming medication, with the remaining two saved—never receiving their intended dose—by their cohorts' rapid response to the drug (Mullen, 1992). After this incident, Canada suspended exports of wild-caught belugas (see Conclusion).

230. Under the MMPA, a population is considered depleted (defined at 16 USC § 1362 (3)(1)) if it is below its optimum sustainable population (defined at 16 USC § 1362 (3)(9)). In practice, the agencies have defined "depleted" as below 60 percent of optimum sustainable population (p. 74713 of *81 Fed. Reg. 74711*, 2016). NMFS analyses concluded that the Sakhalin Bay–Amur River population, from which all Russian-captured belugas have been taken since at least the year 2000 (Shpak and Glazov, 2013), was well below this threshold. Michael Payne, then-chief of permits in the Office of Protected Resources at NMFS, stated, "The ongoing live capture trade since 1989 has contributed to the decline [of the Sakhalin Bay–Amur River beluga population in the Sea of Okhotsk]" and therefore the capture operation there did not meet the

requirements for allowing an import under the MMPA (Emerson, 2013). See also *https://www.fisheries.noaa.gov/national/marine-mammal-protection/georgia-aquarium-application-import-18-beluga-whales-denied-file-no-17324*.

231. AWI, with other animal groups, intervened in the court case in support of NMFS and was allowed to make oral arguments during the hearing (Animal Welfare Institute, 2014). Full details of the court case can be found at *https://awionline.org/cases/protection-beluga-whales* and the final ruling is available at *https://www.fisheries.noaa.gov/webdam/download/71807220*. In the ruling, the judge stated that "Georgia Aquarium's arguments … cast a wide net, but haul in little of substance," and she called Georgia Aquarium's arguments about removals from the beluga population "fishy."

232. Two offspring of a 21-year old beluga whale named Maris had died over the course of several years, followed by Maris herself in 2015, only one month prior to the aquarium giving up its legal battle (Emerson, 2015).

233. Various newspapers and organizations have reported on these transfers in the last decade (see *www.cetabase.org* for a list of beluga transfers; see also *www.chinacetaceanalliance.org* for more information on belugas in China).

234. AWI was the lead petitioner; its co-petitioners were WDC, Cetacean Society International, and Earth Island Institute, the same organizations that intervened on behalf of NMFS in the Georgia Aquarium court case. See endnote 231; *79 Fed. Reg. 28879* (2014), *79 Fed. Reg. 44733* (2014), *79 Fed. Reg. 53013* (2014), and *81 Fed. Reg. 74711* (2016); and *https://www.fisheries.noaa.gov/action/designation-sakhalin-bay-nikolaya-bay-amur-river-stock-beluga-whales-depleted-under-mmpa* for more information.

CHAPTER 4 • THE PHYSICAL AND SOCIAL ENVIRONMENT

235. While this statement is an informed and substantiated opinion, *The CRC Handbook of Marine Mammal Medicine*, in its most recent edition, confirmed that researchers "have not quantitatively answered the question, 'Are captive marine mammals just coping, or are they thriving?'" (p. 70 in Dierauf and Gaydos, 2018). Any affirmation that captive marine mammals are thriving is therefore also only opinion, and the burden is on those who exploit these animals to demonstrate, as we do, that their opinion is also informed and substantiated.

Concrete Enclosures

236. The public display industry does not feel that in-air noises are a significant concern for captive marine mammals—it seems concerned only about acoustic impacts below the surface of the water (see, e.g., Scheifele *et al*., 2012, which measured in-air sound levels at Georgia Aquarium but discussed the results only in terms of what was audible underwater). This argument assumes that marine mammals spend most of their time below the water's surface in captivity, as they do in the wild. However, many captive marine mammals are not always in the water (such as pinnipeds and polar bears) and even cetaceans have their heads fully out of the water much of the time—not merely at the surface—awaiting commands and food (Galhardo *et al*., 1996). Therefore, in-air noise levels are clearly relevant to captive marine mammals.

237. In 2005, a special edition of the journal *Aquatic Mammals* was published, featuring the results of a decade-long project by Laurence Couquiaud, a then-dolphin researcher with a degree in architectural design who specialized in examining the design of dolphinaria and aquaria and the husbandry of captive dolphins. She conducted a survey of facilities around the world, in an effort to identify the best and the worst of dolphinarium design. She sought to provide guidance to the industry on best dolphin husbandry practices and on ideal construction of dolphin enclosures. Couquiaud was a proponent of public display at the time she conducted this survey, yet she recognized that many facilities fall short of maximizing dolphin welfare. She noted the priority in enclosure design: "The display of animals in a theatre setting allowed the oceanarium to accommodate large crowds and present shows. Until very recently, this remained the only type of display, with small additional features for husbandry and training purposes; it is still the dominant presentation type for shows around the world" (p. 283 in Couquiaud, 2005).

238. Couquiaud (2005).

239. See, e.g., Wright *et al.* (2007) for a review of how noise can induce stress in marine mammals and Couquiaud (2005) for a discussion of acoustic properties of tanks.

240. "Artificial facilities tend to be downsized compared to natural ones for economic reasons" (p. 317 in Couquiaud, 2005). As an example, SeaWorld announced a new initiative, called "Blue World," in 2014. This was a plan to nearly double the volume of the current orca complexes at its parks, starting in San Diego. This project, had it been implemented at all three parks, would have cost US$300 million (Weisberg, 2015). When the project's approval by the California Coastal Commission (see endnote 577) was conditioned on the company ending its orca breeding program, SeaWorld ultimately canceled the project—apparently it was not economically viable to invest in such an expansion if the company could not fill the space with more orcas.

241. See endnote 250 for more on temporary use of human swimming pools as a hurricane contingency.

242. For example, dolphins were kept in an Armenian hotel's indoor swimming pool, where tourists were allowed to interact with the animals (Hall, 2018). This facility was forced to close down in early 2018 due to pressure from animal protection groups. The St. Petersburg Dolphinarium (*http://dolphinarium.spb.ru/*) was a training pool built for the 1980 Moscow Olympics, but when the Olympics were over, it was repurposed as a dolphinarium. The Olympic Rings are still up on a wall, and the facility still has the diving boards (now holding the amplifiers for the music during shows) and the lane markers. The audience sits in the small seating area once reserved for coaches, swimmers, friends of athletes, and observers. It is a certainty that the filtration system of this complex is not up to the task of handling the waste of the belugas, bottlenose dolphins, walruses, and sea lions who live in the shallow end of the pool (behind a curtain, so the audience cannot see the cages). The performances occur at the deep end. To call this situation inadequate and inappropriate is an understatement, not only in terms of space but with regard to maintaining cold-water (Arctic) and temperate-water species in the same enclosure.

Even more troubling, Indonesia still has traveling dolphin shows (other countries, including the United States, had such shows in decades past, but over time all the others have ended). There are four such shows in the country (Promchertchoo, 2017). The animals are transported in crates from venue to venue, usually on the back of a truck. Upon arrival, staff set up a small plastic swimming pool (or dig a hole and line it with plastic), fill it with freshwater, add table salt, and put the dolphins in it. After a few days or weeks of performances, the show moves on. The negative welfare implications of this situation should be obvious.

243. In 1989, at SeaWorld San Diego, a female orca named Kandu V attacked an older female, Corky II, so violently that she broke her own jaw, severed an artery, and died after bleeding out (Reza and Johnson, 1989; Parsons, 2012; Ventre and Jett, 2015). In 2012, Nakai, a male orca also held at SeaWorld San Diego, suffered a massive chin wound that the company claimed must have happened due to something in the enclosure, but which was more likely to have been the result of an aggressive altercation with another whale (*http://www.seaworldfactcheck.com/health.htm*). Katina, the oldest female held at SeaWorld Orlando, was injured in 2018, appearing with a large tear at the base of her dorsal fin after interacting with tank mates (Ruiter, 2018). Despite the characterization of these types of injuries as "normal" by SeaWorld spokespeople, such wounds are rarely observed in the wild.

Aggressive interactions such as this do not occur only among captive orcas. A beluga whale named Nanuq was on loan from the Vancouver Aquarium to SeaWorld Orlando, when the other two animals in the tank attacked him, fracturing his jaw. The injury became infected, which led to his death (Evans, 2015). Afterward, SeaWorld posted on social media: "Fans,

please join us in remembering one of our favorite beluga whales, Nanuq. An older whale, [he] passed away yesterday at the estimated age of 31–32," implying to the public that the whale died from old age, rather than from a violent interaction with other whales.

Most marine mammal social groupings in captivity are artificial—their groupings determined not by animal choice but by facility operators—so social stress could be significant (see, e.g., Waples and Gales, 2002 and endnote 325). All facilities should have an area to which animals can retreat at will to escape aggression from other animals in their enclosures (Waples and Gales, 2002; Rose *et al.*, 2017)—this is rarely provided.

244. See, e.g., Chapter 2, "The Conservation/Research Fallacy—Stranding Programs" and endnote 117.

Sea Pens

245. In November 2004, dolphins kept in a sea pen in Antigua by the Mexican company Dolphin Discovery were threatened by sewage and contaminated water from a nearby salt lagoon. A local newspaper reported that the facility was illegally blocking the lagoon's drainage to address this threat, an action that resulted in the flooding of houses and businesses bordering the lagoon. After considerable delay and apparent disregard for orders issued by the Antiguan government to unblock the drainage, the company was finally forced to close the facility and evacuate the dolphins (to avoid exposure to the flood waters) to a sister facility in Tortola (Hillhouse, 2004).

More recently, a sea pen facility for an SWD attraction was built by a land-based aquarium called Coral World Ocean Park on the island of St. Thomas, in the US Virgin Islands (The Source, 2018). As of January 2019, enclosure construction was complete, but Coral World had not yet acquired dolphins; it intends to hold six initially and as many as 12. The site for the sea pen, Water Bay, was chosen because it is directly adjacent to Coral World rather than for its suitability to house dolphins. In fact, Water Bay, a relatively small body of water, frequently fails the tests required under the US Federal Water Pollution Control Act, 33 USC §§ 1251–1388 (1972) (also known as the Clean Water Act), which triggers notices to human swimmers that they should not swim in the bay (see *https://dpnr.vi.gov/home/weekly-beach-advisory/* for weekly reports from various testing sites in the US Virgin Islands—note Water Bay is frequently well over the "safe swimming" limit of 70 colonies per 100 ml for *Enterococci* bacteria and at times is the only site that fails). How an SWD attraction will function when approximately 40 percent of the time the water is not safe for human swimming is an interesting question, but the dolphins, who must live all day, every day in this body of water—where water quality will only get worse when a concentrated source of animal waste is present—are likely to suffer.

246. As an example of vandalism risk, three dolphins kept in a sea pen facility in Australia were killed when someone threw drugs into their enclosure water during the night, resulting in fatal poisoning of the animals (Whale and Dolphin Conservation, 2000).

247. As noted in endnote 186, in September 2003, a sea pen facility in La Paz, Mexico, was hit by a hurricane. The pen became filled with debris and contaminants. Three dolphins died within days of the storm, and by early November, a fourth animal had died from a storm-induced condition (Diebel, 2003; Alaniz and Rojas, 2007).

248. Hurricane Omar hit the island of St. Kitts in October 2008. A new captive facility there, Marine World, which held four sea lions and four fur seals, was seriously damaged and all eight pinnipeds escaped. One fur seal was immediately recaptured, but the rest were still at large more than a week later, sighted as far away as St. Thomas, US Virgin Islands (Poinski, 2008). It is not known if these latter animals were ever recovered, dead or alive. These species are not native to the region and therefore could have introduced non-native pathogens to the local wildlife.

249. In 1996, Anthony's Key Resort, in Roatán, Honduras, was hit by a hurricane-level storm. At least eight bottlenose dolphins, imported from Florida by the Institute for Marine Studies (an SWD attraction), escaped as a result of the barrier around their pen collapsing in the storm. All were captive-born or had been captured in Florida waters for Ocean World, a dolphinarium in Fort Lauderdale, Florida, in the United States, which went bankrupt and closed in 1994, sending all of its dolphins to Anthony's Key. Seven of these animals were never recovered—given their complete lack of familiarity with the area, it is unlikely they survived (Associated Press, 1996).

250. The Marine Life Oceanarium in Gulfport, Mississippi, in the United States held 17 dolphins in its various enclosures in 2005. Days before Hurricane Katrina hit, the staff moved nine of these animals to inland hotel swimming pools. This is a common contingency plan for coastal facilities, particularly for sea pen enclosures, yet hotel pools are comparatively very small and must hold several dolphins for days or even weeks at a time. In some cases, regular table salt is added to the swimming pool water and the amount of chlorine used is typically very high, as swimming pool filtration systems cannot cope with dolphin waste. The Marine Life dolphins were held in these pools for several days before being moved to a dolphinarium in Florida.

Eight other dolphins were left behind in the largest tank in the complex, one with 30-foot-high walls, which had weathered Hurricane Camille in 1969. While the inland hotel pools holding the evacuated dolphins were not damaged by the hurricane, Katrina completely destroyed Marine Life Oceanarium and the eight dolphins left behind were carried out to sea by a storm surge estimated to have been 40 feet high. In the next three weeks, all were recovered, although several were injured and ill from swimming in coastal waters heavily contaminated by hurricane debris and runoff. Subsequently all 17 dolphins were transferred to the Atlantis Hotel in Nassau, The Bahamas, where they were placed in an SWD attraction. A large number of federal and state government agencies were involved in this rescue, conducted almost entirely with taxpayer dollars. Clearly the facility's hurricane contingency plan was inadequate, putting half of the facility's dolphins in heavily chlorinated, artificially salinized hotel swimming pools, while leaving half in a tank on-site in the path of a Category 3 hurricane, with insufficient funds set aside for any rescues that might be required. According to *www.cetabase.org*, 14 of these dolphins are still alive at the Atlantis, while one died soon after arriving. The current status of the remaining two is unknown.

In addition to the dolphins, 19 sea lions and one seal were left behind at the facility, secured in a building that was thought to be safe. The building was destroyed along with the rest of the facility. Afterwards, some of the sea lions were recovered from as far as 20 miles away. At least five died during the storm or from storm-related injuries, including at least one who was loose on the street and shot by a police officer. The seal was never found. SeaWorld Orlando provided temporary housing for the surviving sea lions, until they were sent to a facility in The Bahamas (Dolphin Encounters in Blue Lagoon) in 2006 (Gardner, 2008).

251. For at least two of the sea pen facilities in this area, Hurricane Wilma completely wiped out all the features above the water line (Alaniz and Rojas, 2007).

252. Robinson (2017).

253. Soon after the 2004 tsunami, the chief scientist for the IUCN noted, "The mangroves were all along the coasts where there are shallow waters. They offered protection against things like tsunamis. Over the last 20–30 years they were cleared by people who didn't have the long-term knowledge of why these mangroves should have been saved, by outsiders who get concessions from the governments and set up shrimp or prawn farms" (Agence France-Presse, 2004). To guard their coasts from further tsunami damage, many countries bordering the Indian Ocean have embarked on extensive mangrove restoration and replanting projects (Overdorf, 2015).

254. Goreau (2003).

255. Griffiths (2005). More detailed information can also be found in Brink *et al.* (1999). The latest example of dolphinarium construction having an impact on already-embattled coral reefs is in the US Virgin Islands. As noted in endnote 245, Coral World, an existing aquarium on St. Thomas,

has constructed a sea pen enclosure, intended as an SWD attraction, and had to get permission from various authorities under the Clean Water Act, the Coastal Zone Management Act (16 USC §§ 1451–1466 (1972)), and the Endangered Species Act (ESA; 16 USC §§ 1531–1544 (1973)), to translocate several heads of threatened and endangered corals from the near-shore construction site (The Source, 2014; 2018).

256. There are many reports on the negative impact of aquaculture on the environment; see, e.g., Goldburg *et al.* (2001). For a report that specifically mentions the impacts of aquaculture waste on free-ranging cetaceans, see Grillo *et al.* (2001).

Pinnipeds

257. Good general overviews of pinniped natural history are provided in King (1983); Riedman (1989); Reynolds and Rommel (1999); Trites *et al.* (2006); Parsons *et al.* (2012); and Jefferson *et al.* (2015).

258. In the United States, the regulatory standards for captive marine mammal enclosures, which set the minimum requirements for such things as chlorination and the use of freshwater or saltwater, are established under the US Animal Welfare Act (7 USC §§ 2131–2159 (1966)) by the US Department of Agriculture's Animal and Plant Health Inspection Service (APHIS), in 9 CFR §§ 3.100–3.118 (1984; 2001). Other jurisdictions worldwide have similar minimal marine-mammal-specific regulations (such as in the EU—see endnotes 28, 56, and 65) and sometimes no regulations for captive wildlife at all.

APHIS announced its intention to revise the Animal Welfare Act regulatory standards for captive marine mammals in 1993, an implicit acknowledgment that these standards were outdated (they had not been updated in any way since 1984 at that time). Several sections were revised and published in 2001 and the agency announced the next year that it was beginning the process to update the remaining provisions. However, these provisions remained unchanged for the next 14 years, when APHIS finally published a proposed rule to amend them (*81 Fed. Reg. 74711*, 2016). However, APHIS's proposals were heavily criticized by animal protection groups for not considering the best available science (for example, the survey of captive facilities by Couquiaud (2005) was not cited in the proposed rule at all) or current standards in other countries or even the standards of professional association such as the AMMPA—for a detailed critique of the proposed rule, see Rose *et al.* (2017). Importantly, the proposed rule made no changes at all to existing standards for many aspects of public display facilities, including space requirements. This was in spite of over 30 years of new research on marine mammal behavior, movement patterns, and habitat use since the last update of those provisions (Rose *et al.*, 2017).

The public display industry actively endorses APHIS as the regulatory agency in charge of captive maintenance standards; it demonstrated this support during the reauthorization of the MMPA in 1994. At that time an effort was made by animal protection groups to shift all regulatory authority to NMFS (which has dozens of marine mammal experts within its ranks), but the industry defeated this effort and in fact successfully removed most of the authority NMFS had at the time to co-manage captive marine mammals with APHIS, leaving the bulk of regulatory oversight to the latter agency (which has only two marine mammal experts on staff). The industry continues to lobby to keep standards at their current outdated levels (see, e.g., endnote 463 for an example of how an industry association does this), which suggests that economic factors rather than animal well-being are the industry's first priority.

Regardless, the 2016 proposed rule is no longer actively being considered for finalization (Barbara Kohn, DVM, personal communication, 2018).

259. For a discussion of chlorine and its effects on marine mammals, see Geraci (1986); Arkush (2001); and Gage and Francis-Floyd (2018). In regions such as China, where dolphinaria are expanding and staff are inexperienced in handling marine mammals, the proportion of exhibited pinnipeds with opacities and other eye problems is extremely high (China Cetacean Alliance, 2015; *http://chinacetaceanalliance.org/en/category/cca-investigations/*).

260. See endnote 257.

Polar Bears

261. For general background information on polar bear natural history, see Guravich and Matthews (1993) and Stirling (2011).

262. Clubb and Mason (2003; 2007).

263. Stereotypies are repetitive, generally negative behaviors that manifest in captive animals whose movements or natural behavioral expressions are restricted. They include pacing, swaying, and self-mutilation and are seen in several species in captivity, such as primates, elephants, polar bears, orcas, and big cats.

264. One study noted that up to 95 percent of captive harbor porpoises' (*Phocoena phocoena*) time was spent engaged in stereotypical behavior (Amundin, 1974). Captive walruses and sea lions frequently suck their flippers as a stereotypical behavior (Hagenbeck, 1962; Kastelein and Wiepkema, 1989; Franks *et al.*, 2009; Carter, 2018). For other reports of stereotypical behavior in marine mammals, see Kastelein and Wiepkema (1989) and Grindrod and Cleaver (2001).

In addition, not only the predatory marine mammals develop stereotypies in captivity. Even the relatively docile, herbivorous manatees and dugongs (*Dugong dugon*) have been known to exhibit stereotypies in captivity (Anzolin *et al.*, 2014), including behaviors (such as rapid circling of their enclosures) that pose a risk of self-harm or injury to caretakers (Flint and Bonde, 2017).

265. A quintessential quote reflecting this error in logic was made by Brad Andrews, a SeaWorld representative. During an interview for a story about the attempt to return Keiko, the orca from *Free Willy*, to the wild. Andrews said, "[Keiko is] going to be in an ocean pen where the weather conditions are ferocious. It's cold, it's miserable, it's dark" (Associated Press, 1998). Andrews' implication that the ocean environment—natural habitat—to which an orca is supremely adapted should be judged from a human perspective is nonsense.

266. In a report on Canada's polar bear export program, the animal protection group Zoocheck Canada made an assessment of various polar bear captive facilities around the world. The report noted several areas of concern, including (1) undersized enclosures (e.g., enclosures of only a few hundred square meters housing one or more polar bears), (2) absence of soft substrates (polar bears used to walking on snow frequently are housed in enclosures with concrete floors), (3) lack of environmental enrichment (enclosures were often completely barren with few objects with which polar bears could interact to reduce their boredom or keep active), (4) inadequate and/or contaminated pools (polar bears are natural swimmers and pools also help the bears regulate their body temperature), and (5) abnormal stereotypical behaviors (pacing, head nodding, and self-mutilation are common behaviors that are indicative of stress and poor welfare) (Laidlaw, 1997).

267. In an article discussing a controversy about inappropriate captivity practices for elephants, the conservation and science director of the AZA, in mentioning the new polar bear enclosure at the Detroit Zoo, noted that polar bears traveled extensively in the wild and would never experience summertime temperatures found in Detroit: "Using [the Detroit Zoo's] logic … polar bears really shouldn't be in Detroit, either" (Kaufman, 2004).

However, the Detroit Zoo has made efforts to address concerns about captive polar bear welfare. Its polar bear exhibit is currently the largest captive enclosure for this species in the world, with a 720,000 l (190,000 gal) saltwater tank, a grassy "tundra" area, and a "pack ice" area. The Detroit Zoo also announced it was phasing out its elephant exhibit, sending its elephants to a sanctuary for "retirement" due to concerns about their welfare, in particular the effects of Michigan's cold winters on these warm-climate animals (Farinato, 2004).

268. As an example, in May 2001, despite strong opposition by animal protection groups, the FWS granted a permit for the Mexico-based Suarez Brothers Circus to import seven polar bears into Puerto Rico. Temperatures reached as high as 44 °C (112 °F), yet the bear enclosures often lacked air conditioning and access to cold water. This species is highly adapted to

life in a polar environment and has many anatomical and physiological specializations to retain heat. Forcing the bears to exert themselves and perform tricks in tropical heat was physically harmful, and the bears suffered from a variety of skin and other health problems.

After considerable controversy and legal protests from animal protection groups and others, the FWS seized one bear in March 2002, citing falsified CITES documents, and she was sent to the Baltimore Zoo. The agency confiscated the remaining six bears in November 2002, citing violations of the MMPA and the circus's public display permit as the reasons for the seizure. Unfortunately, one of the animals, a bear called Royal, died en route to a zoo in Atlanta. The other five bears survived and were sent to zoos in Michigan, Washington, and North Carolina.

Another example was Yupik, a female polar bear orphaned in Alaska in 1992 (D.C. Baur, letter to Greg Sheehan, US Fish and Wildlife Service, 19 July 2018). She was sent to a zoo in Mexico under a letter of authorization from the FWS, where she lived for the next 26 years in wholly inadequate conditions, where temperatures rarely dropped below 21 °C (70 °F). She died at the age of 27 in November 2018. While this is an advanced age for a polar bear, she suffered numerous health problems throughout most of her life, including poor dentition, which negatively affected her welfare. A concerted effort by animal protection groups was made to send Yupik to a better facility, either in the United States or the United Kingdom, an effort strongly resisted by the Mexican zoo and the Mexican zoo community, but she died before this could occur (Associated Press, 2018).

Yupik is an excellent example of how longevity is not a certain indicator of good welfare. An animal can live well into his or her geriatric years in miserable conditions. Yupik's welfare was clearly poor, but her relatively advanced age was used by the zoo holding her to argue that her holding conditions were adequate.

269. For example, in 1995, the Wildlife Branch of Manitoba Natural Resources exported two polar bear cubs to a zoo in Thailand.

270. In the original Zoocheck report on this trade (Laidlaw, 1997), the Manitoba Wildlife Branch claimed to thoroughly investigate target facilities before bears were exported. However, when Zoocheck ordered copies of this documentation through Canada's Access to Information Act (RSC, 1985, c. A-1 (see *https://laws-lois.justice.gc.ca/eng/acts/a-1/page-1.html*), it only received eight pages of brief notes from two facilities. The Wildlife Branch also maintained that all facilities to which the bears were sent had to meet the standards of the Canadian Association of Zoological Parks and Aquariums (CAZPA—now CAZA, Canada's Accredited Zoos and Aquariums) and Canadian Agriculture. The Zoocheck report pointed out that this was meaningless, as CAZPA guidelines at that time made no mention of polar bear husbandry and Canadian Agriculture standards did not actually exist. As of January 2019, the regulatory and guideline situation appeared unchanged.

Inspections of the zoos receiving these bears showed that conditions at many of them were very poor, and often dire. For example, Aso Bear Park in Japan had 73 bears kept in underground cells only 1 m x 2 m (3.3 ft x 6.6 ft) in size. Its enclosures for the polar bears it received from Manitoba were hardly better; an 8 square m (86 square ft) concrete cage for two animals. Dublin Zoo, which also received Manitoba bears, provided a larger but still wholly inadequate space—310 square m (3,336 square ft) for two bears. In contrast, Sweden's 1982 space requirement for two adult polar bears was approximately 1,200 square m (12,915 square ft), and the standard for two adult polar bears in Newfoundland is 4,500 square m (48,435 square ft) (Laidlaw, 1997). The Manitoba Wildlife Branch was also supposed to conduct "check-ups" after six months on traded bears, but these did not take place. Moreover, bears were frequently re-traded and documentation was lost. As an example, three polar bears exported to the Ruhr zoo in Germany were re-traded to the Suarez Brothers Circus in Mexico (see endnote 268).

Starting in 2002, there was a major push within the North American zoo community to increase the export of wild-caught polar bears from Canada to zoos in the United States, but after the species was listed under the US ESA in 2008, this was no longer allowed (Laidlaw, 2010). Consequently, the Manitoba government partnered with the Assiniboine Park Zoo, providing CN$15 million to establish a "polar bear conservation center." This facility's publicized mission was to conduct conservation research and serve as a waystation for rescued polar bears cubs to be "rehabilitated" before being sent on to a life in captivity.

After the conservation center was constructed, the Assiniboine Park Zoo then opened its Journey to Churchill exhibit, which was stocked with bears collected from the wild (Laidlaw, 2014). Other Canadian and international zoos are encouraged to acquire orphaned polar bear cubs from this facility. In addition, between 2000 and 2009, the Manitoba government issued permits for a release program for orphaned polar bear cubs, which placed the orphans with free-ranging mothers with only one natural cub. The program had mixed results that were more promising than most zoo reintroduction programs, but the dataset was too small to be conclusive. The primary problem with assessing the success or otherwise of this program was associated with the lack of technology at the time to monitor the bears after release without stressing the animals. After releasing only six orphaned cubs, the Manitoba government canceled the program in favor of placing the cubs in permanent captivity. In 2018, Manitoba officials acknowledged that they were running out of suitable zoos for orphaned cubs and would need to consider other options. Zoocheck Canada is funding a study to look at options for orphaned polar bear cubs, including, among other ideas, revisiting the surrogacy program with improved GPS tracking technology.

Despite zoo efforts to increase the number of polar bears in captivity in Canada, other zoos have been more sensitive to the issues regarding captive polar bear welfare and have taken steps to address these concerns (see endnote 267).

271. Laidlaw (1998).

272. See Continuing Consolidation of the Statutes of Manitoba (CCSM) c. P94 (2002), available at *http://web2.gov.mb.ca/laws/statutes/ccsm/p094e.php*.

273. However, many of the regulations governing the placement of these orphan cubs were still woefully insufficient—for example, two bears can be placed in an enclosure only 500 square m (5,380 square ft) in size and the regulations only require a "comfortable" temperature rather than the Arctic temperatures to which the bears are adapted. Even indoor facilities for polar bears cannot economically provide a temperature much below 10 °C (50 °F). A species supremely adapted to cope with temperatures well below freezing must live in perpetual Arctic summer when held in indoor enclosures (Rose *et al.*, 2017).

Manatees, Dugongs, and Sea Otters

274. The manatee exhibit at SeaWorld Orlando apparently does not use chemicals to maintain water clarity or sanitation; therefore, sea grasses and a variety of fish are maintained in the enclosure. The number of manatees in the exhibit varies; all are acquired through rescues, and most are in the process of being rehabilitated for eventual release. See also Walsh and Blyde (2017).

275. Walsh and Blyde (2017).

276. See Walsh and Blyde (2017) for a recent accounting of these animals. Unfortunately, in the few cases of dugong display, some animals are maintained in very poor conditions; there were reports of a dugong and her calf tethered by their tail stocks, like dogs on a chain, to the bottom of a sea pen enclosure in Indonesia for as many as seven years as a tourist attraction (Walsh and Blyde, 2017).

277. "Too often otters are viewed as small animals and thus kept in small spaces. Instead their comparatively large home ranges in the wild should be considered, and sufficient space must be provided" (p. 577 in Reed-Smith and Larson, 2017).

278. After the 1989 Exxon Valdez oil spill in Alaska, 347 oiled sea otters were captured and treated in rehabilitation centers. Of these treated otters, 33 percent died, with 81 percent of those doing so within 10 days of capture. It was noted by veterinarians dealing with these animals that some of these deaths may have occurred as a result of being confined and handled in rehabilitation centers (Rebar *et al.*, 1995).

In a sea otter translocation program conducted in California between 1987 and 1996, 147 healthy sea otters were captured and transported from the

mainland coast to San Nicholas Island. Of these animals, eight died during the translocation process, and six were later found dead—three shortly after the release, and the other three later. The fate of 61 of these released otters was unknown. Thus, nearly 10 percent of the otters were known to have died during or soon after the translocation, almost certainly from the effects of handling (as they were healthy otherwise), although the mortality rate may have been even higher (Benz, 1996).

279. The annual mortality rate of adult sea otters held in captivity between 1955 and 1996 was about 10 percent, with that of pups more than 70 percent. At least 18 sea otter pups were born at SeaWorld San Diego before the mid-1990s—all died before reaching sexual maturity (Brennan and Houck, 1996). By taking in orphaned southern sea otters, facilities add those that are considered non-releasable to their captive collections, thus replenishing their numbers. Zoos and aquaria have apparently adopted an active strategy to retain orphaned sea otter pups or to select "rescued" animals that can sustain collections through captive breeding. This transforms a project to help conserve the southern sea otter into a rather cynical method of easily obtaining new otters for a dwindling captive population. See endnote 282 for another rescue program that genuinely seeks to return orphaned otter pups to the wild and endnote 281 for other otter mortality statistics.

280. Yasui (2014). The main source of imported sea otters was the United States, particularly from Alaska, but the trade has now been restricted under CITES and by the listing of several otter species, including the sea otter, on the IUCN Red List of Threatened Species (*see https://www.iucnredlist.org/species/7750/21939518*). Japan's Law for the Conservation of Endangered Species of Wild Fauna and Flora (1992, Law No. 75) protects species listed under CITES Appendix I (Gomez and Bouhuys, 2018). However, "[t]here are no provisions in the law to take action against traders who illegally import and subsequently trade in CITES Appendix II species, like otters, once they are in the country. This also means that Japan is unable to implement and comply with CITES requirements effectively to regulate non-native CITES-listed species entering international trade" (p. 29 in Gomez and Bouhuys, 2018).

281. In July 1998, three requests, for the capture of a total of 24 sea otters in Alaska, were published in the *Federal Register* (*63 Fed. Reg. 38418*) (see endnote 155). The permit applications stated that six of the captured otters would then be chosen and transported to three Japanese aquaria. The justification for these captures was a lack of breeding success of sea otters in Japanese facilities. For this planned capture, after a maximum acclimation period of three days, the otters were to be taken on a 22-hour journey to Japan. It should be noted that for other marine mammals the acclimation period (during which mortality is higher) is approximately 45 days (Small and DeMaster, 1995a). Three of the animals were destined for the Ishikawa Zoo, which had acquired sea otters through another capture in Alaska in 1986. By 1994, half of these otters had died—by 1998, the rest were dead too (sea otters can live up to 20 years in captivity), hence the request for more captures. The permits to capture these otters were granted later that year (*63 Fed. Reg. 53091,* 1998).

282. The southern sea otter population (found in California waters) is listed as threatened under the ESA. At the Monterey Bay Aquarium, the sea otter exhibit holds rescued animals from this population that are either non-releasable or are in the process of rehabilitation. Orphaned otter pups were once raised by human caretakers and returned to the wild, often to die soon after. These pups are now placed in a "surrogate" program, where adult female otters adopt the orphans and care for them, specifically to minimize the influence of human intervention on the pup's behavioral development. This has resulted in higher survival rates following release back into the wild (Nicholson *et al.*, 2007).

Cetaceans

283. For a good general overview of cetacean natural history and behavior, see Reynolds and Rommel (1999), Mann *et al.* (2000a; 2017), and Parsons *et al.* (2012).

284. Most government standards for the maintenance of these animals, where standards exist, are minimal and, particularly regarding tank size, wholly inadequate (for a review, see Rose *et al.*, 2017). Furthermore, they are not specific with regard to species (for instance, species that are from tropical and temperate climates may be housed together; Rose *et al.*, 2017). While very few western facilities continue to display species from different ecosystems in the same exhibit (it was once more common), many Chinese dolphinaria hold, for example, beluga whales and bottlenose dolphins in the same enclosures (*www.chinacetaceanalliance.org*). This provides an inaccurate idea of their ecologies and creates a welfare problem for them, given the temperature of the water is almost certainly too warm for one and too cold for the other.

285. Small cetaceans are echolocators—echolocation is a sophisticated form of biosonar where the animals actively use sound to sense their surroundings with great precision, in an environment where light does not penetrate beyond a few tens of meters and vision is less useful at depth (Parsons *et al.*, 2012). They make high frequency clicks and listen for the echoes that bounce off objects, including moving prey, enabling them to hone in on such prey in complete darkness.

It was long believed among animal protection advocates that the reverberation of their clicks in a concrete tank was, for these acoustically sensitive species, like being in a "hall of mirrors," maddening and distressing. In fact, cetaceans can and do use their echolocation in tanks (although certain enclosure design elements can promote reverberation, which would be problematic; see endnote 239), but it is rare for them to do so (Mass and Supin, 2009). One possible explanation for why: in a barren, monotonic tank, where very little ever changes, such a sophisticated sense is unnecessary. Cetacean vision is good and, in a shallow tank where light penetrates to the shallow bottom, perfectly adequate. Given the importance of echolocation in natural habitat, however, it may be that decreasing its use has an impact on captive cetacean welfare. The industry has not studied this possibility.

286. Bassos and Wells (1996) are still among the only researchers who systematically measured behavioral differences when the main variable was enclosure size, despite a growing interest in understanding cetacean welfare in captivity. The small number of additional studies measuring the impact of enclosure size (Ugaz *et al.*, 2009, 2013; Shyan *et al.*, 2002) had confounding variables, such as smaller tank versus larger sea pen or smaller tank without underwater viewing window versus larger tank with underwater viewing window.

287. 9 CFR § 3.104(b)(1)(i). See also Rose *et al.* (2017).

288. Many animal welfare agencies consider that if an animal cannot perform or satisfy "behavioral needs" then "the individual's welfare may be compromised" (p. 151 in Friend, 1989). A paper on behavioral needs of captive marine mammals included among these the need to mate, forage, capture prey, or patrol an area (Goldblatt, 1993). The paper went on to say that exaggerated play behavior by marine mammals with items in their tank, misdirected behaviors (such as sexual behavior directed toward trainers and other species), play behavior with other (non-cetacean) species in their tanks, and high levels of stereotypical behavior can all be attributed to a lack of behavioral stimulation, or boredom. The paper concluded that marine mammals need to receive behavioral stimulation and to have some control over their environment, or they will "show signs of stress such as exaggerated stereotyped behaviour" (p. 154 in Goldblatt, 1993).

More than 25 years later, not much has changed in terms of understanding the specifics of how captive conditions, such as the limited space provided by most tanks, affect marine mammal welfare, particularly for cetaceans. Clegg *et al.* (2015) developed a welfare matrix for bottlenose dolphins, but it has yet to be widely used, based on its citation rate in applied studies. However, a study began in early 2018, involving 44 facilities in seven countries, sampling 300 dolphins and 20 belugas, with the intent of collecting over 7,000 hours of data (Ruppenthal, 2018a). This project is using specially designed and developed suction-cup tags to track the cetaceans' activity levels and usage of the space they are provided (for example, how much time they spend "logging" (floating motionlessly at the surface), how much time they spend below the surface, and so on). Results from this study are expected to be published in 2020.

It is concerning, however, that this multi-facility study does not include orcas, the species that may suffer the most significant welfare impacts of all the captive cetacean species. One study that developed an activity budget for a captive orca noted that the single animal observed spent 69.6 percent of the day (16.7 hours) "resting," which was defined as swimming at less than 1 m per second (Worthy *et al.*, 2014). The study did not in fact distinguish between resting and logging, a flaw in the observational protocol. Regardless, this is an excessive amount of time spent resting compared to activity budgets seen in the wild (see endnote 329).

Clegg *et al.* (2017) noted that there are still "very few studies on cetacean welfare and methods of assessment" (p. 165), but clearly such work is needed. Therefore, the authors put together a review of measures against which to monitor captive cetacean welfare (and also highlighted areas where more research was needed in order to determine which factors are an indicator of welfare). These factors included monitoring health, although they noted that cetaceans frequently hide pain and disease and so poor health might not be outwardly obvious.

Clegg *et al.* (2017) noted specifically that reproductive success was also not a good indicator of welfare (see Chapter 9, "Mortality and Birth Rates")—sometimes animals in stressful conditions actually reproduce more. This view is in stark contrast to the rhetoric from industry representatives, who sometimes claim reproduction is a sure indication that captive marine mammals are doing well in their facilities (see, e.g., *http://blog.loroparque.com/victoria-is-born/* and Kirby, 2015).

289. 9 CFR § 3.104(b)(1)(i). See also Rose *et al.* (2017). For comparison purposes, imagine keeping two German Shepherd dogs (this breed is approximately 65 cm (2 feet) long, not counting the tail) in a circular pen 2.5 m (8 feet) across, and just over a meter (3.7 feet) high for their entire lives.

290. Durban and Pitman (2012); Matthews *et al.* (2011); Eisert *et al.* (2015).

291. Baird *et al.* (2005); Reisinger *et al.* (2015).

292. Observations of increased breeding success in larger tanks and increased aggression in smaller tanks are from Caldwell *et al.* (1968); Myers and Overstrom (1978); and Asper *et al.* (1988).

293. This effort was reflected through a lack of consensus on the issue of enclosure size standards during the 1995–1996 APHIS negotiated rulemaking process to amend the US marine mammal care and maintenance standards. Author Rose was an appointed member of the negotiated rule-making panel to revise these standards (Rose *et al.*, 2017; Rose and Hancock Snusz, 2019). It was also reflected in the failure of APHIS to propose any changes to the minimum space requirements for captive marine mammals in its 2016 proposed rule (see endnote 258).

294. See endnote 42. In this same 2013 CNN interview, Fred Jacobs stated: "While a killer whale can and occasionally might travel as much as 100 miles in a day, it should be said that swimming that distance is not integral to a whale's health and well-being. It is likely foraging behavior. … Killer whales living in our parks are given all the food they require."

In apparent contrast to Bassos and Wells (1996), the Indianapolis Zoo sponsored a study that suggested that because dolphins spent more time in two side tanks that were smaller and shallower than the main display/show enclosure, large tank sizes were not necessary for bottlenose dolphin welfare. However, the dolphins did not have free access to all areas of the enclosure complex at all times, and there were different observers, leading to high inter-observer variability. In addition, the study did not consider that the dolphins might be avoiding the main enclosure due to high levels of noise associated with it or because there was an underwater viewing window, or that they were seeking shelter in the small side tanks—the surveys were only conducted in the evening, and the dolphins may have retreated to these smaller areas to rest (Shyan *et al.*, 2002; see also endnote 286). In comparison, Bassos and Wells (1996) had a more standardized methodology and, as the facility was not open to the public and the dolphins did not have to perform shows, their study was not compromised by these potentially confounding factors.

295. For an introduction to the natural history of the northeast Pacific populations of orcas, see Ford *et al.* (1994) and Ford (2009).

296. Clubb and Mason (2007) concluded that stereotypies and high infant mortality in certain zoo carnivores were more a result of their ranging behavior than of their foraging behavior; that is, less a result of their carnivory and hunting activities than of their tendency in the wild to have large territories and cover large areas routinely. For example, cat species with small territories in nature do better in zoos than cat species with large territories—both groups are from the same taxonomic family and both are predatory carnivores, but the wide-ranging species "needs" to roam, even though it is fed regularly in captivity, and suffers when it is not allowed to do so (see also Chapter 4, "The Physical and Social Environment—Polar Bears"). This also helps explain why elephants fit the "wide-ranging species" profile, even though they are herbivores; it is their wide-ranging nature that causes problems in captivity, not their ecological niche.

297. "Stereotypic swimming has been discussed … as a [welfare] concern for captive dolphins," yet there "are scarcely any published studies [on stereotypies] with captive dolphins" (p. 169 in Clegg *et al.*, 2017).

298. For detailed technical descriptions of the social structure of the northeast Pacific populations of orcas, see Bigg *et al.* (1990) and Ford (2009).

299. "Social group composition in captivity is somewhat artificial, as this is decided by the zoo staff and management" (p. 192 in Clegg and Butterworth, 2017).

300. For a discussion of captive orca social structure and breeding husbandry, see Hoyt (1992), in particular pp. 56–59. For a discussion of the captive breeding of bottlenose dolphins, see Leatherwood and Reeves (1989), in particular the chapter by Schroeder (1989).

301. Bottlenose dolphins can grow up to 3.8 m (12 ft), although coastal animals such as those kept in the Sharm el Sheikh facility are often closer to 2.5 m (8 ft). Beluga whales can grow up to 5.5 m (18 ft), twice the length and several times the weight of the average bottlenose dolphin.

302. Margaux Dodds, personal communication, 2018.

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303. For information regarding the nutritional value of the food provided to captive marine mammals and the need for nutritional supplements, see pp. 760–764 in Geraci (1986); pp. 42–43 in Hoyt (1992); pp. 811–816 in Worthy (2001), pp. 365–366 in Couquiaud (2005); and pp. 719–721 in Rosen and Worthy (2018). Rosen and Worthy (2018) note that "[b]oth a lack of diet diversity and the reliance on frozen foods present potential nutritional challenges" (p. 719). In particular, vitamins A, D, and E have to be supplemented for marine mammals, as the levels are much lower in frozen fish than in live fish. As a result, "vitamin supplementation of marine mammal food in zoos and aquariums has become standard practice" (p. 719). In contrast, "[v]itamin deficiency is not likely an issue in wild marine mammals, even during seasonal periods of fasting" (p. 722). Marine mammals also have to be supplemented with freshwater, as fresh fish provide all the water needs for free-ranging marine mammals, while freezing and storage of fish causes loss of water content (and water-soluble vitamins). Water supplementation is usually done through provision of gelatin blocks—a large proportion of their mass is freshwater—as several marine mammal species will not drink at all.

304. US government regulations allow for substandard dimensions in temporary quarters (9 CFR § 3.104(a)). Revisions published in 2001 clarify the definition of "temporary," but still allow maintenance in such enclosures at the discretion of the facility veterinarian, which can lead to prolonged maintenance in very small spaces indeed (*66 Fed. Reg. 239*, 2001).

305. One example of this practice involved Finna, a male orca exhibited at the Vancouver Aquarium in Canada. He was sequestered in a medical side enclosure in early March 1995 during the days preceding the labor of his mate, Bjossa, to allow the mother and calf "privacy" in the main display tank. The calf died minutes after birth, but the body was not removed from the tank for five days; Finna remained in the medical enclosure throughout this period. As another example, in a now iconic aerial shot, Tilikum, the male orca responsible for the deaths of three people (see Chapter 12, "The *Blackfish* Legacy"), was held in the SeaWorld Orlando medical enclosure, in which he could barely turn around, for hours after killing his trainer, Dawn Brancheau.

Adán, the male calf born to Kohana at Loro Parque (see endnote 93) was isolated in the medical tank for months, as he had to be hand-reared. He was moved into the main enclosure complex only when Morgan was transferred from the Netherlands (Visser and Lisker, 2016; see endnote 119).

Another example involving sea lions occurred at the Aquarium of the Pacific in Long Beach, California, in the United States, in summer 2006. A female and her pup were held in a behind-the-scenes nursery enclosure, which did not have a permanent tank (typically required for pinnipeds). The animals were periodically given water baths and checked hourly. Between one check and the next, both animals died from heat exhaustion—some external event may have caused hyperactivity in the two, which without a permanent tank of water to help with temperature regulation led to their deaths.

There is little evidence that this prolonged "temporary" maintenance in holding areas that do not otherwise meet primary enclosure standards has been curtailed in any country, despite the example set by the US regulatory revisions.

306. For information on the practice of administering routine medications, see Stoskopf (2018) and Gulland *et al.* (2018). Also see the Society for Marine Mammalogy (2014), which has guidelines produced by its Ethics Committee.

307. Lott and Williamson (2017); Haulena and Schmitt (2018).

308. The 2016 APHIS proposed rule (*81 Fed. Reg. 5629*) had updated total and fecal coliform standards and noted the need to test for potentially pathogenic (disease-causing) *Enterococci*, *Pseudomonas*, or *Staphylococcus* bacterial levels, but the proposal required a facility to conduct tests for only one of these types of bacteria, not all, and which to choose was up to the facility. As these tests each address a different health threat and water quality concern, facilities should test for all three, as well as other pathogens and chemicals that might negatively affect the animals' health (such as chlorine, copper, ozone, nitrates, and ammonia; see Couquiaud, 2005), with guidelines as to what levels are a potential health concern (Rose *et al.*, 2017).

309. For example, see Padgett and Glaser (2003) and Segerstrom and Miller (2004). See also online health sites at *https://medlineplus.gov/ency/article/000093.htm* and *https://www.healthline.com/health/pneumonia-weakened-immune-system*. In a veterinary presentation specifically about captive cetaceans, it was noted that pneumonia "can be considered a disease of mismanagement. Cetaceans require good air quality, including high rates of air exchange at the water surface in indoor facilities" (p. 8 in Gage, 2010).

310. In practice, the US public historically could not see full necropsy reports unless requested under the Freedom of Information Act (5 USC § 552), and has not seen any since 1994, when the MMPA was amended (see endnote 258). Since January 2017, three orcas have died at SeaWorld, each of whom was subject to a public display permit under the MMPA that requires the holder of the animal at the time of his or her death to submit necropsy and clinical history information to NMFS. AWI and other animal protection groups have been trying unsuccessfully to obtain these reports for Tilikum, who died at SeaWorld Orlando on 6 January 2017; Kasatka, who died at SeaWorld San Diego on 25 August 2017; and Kyara, Tilikum's granddaughter, who died at SeaWorld San Antonio on 24 July 2017. NMFS has taken the position that the 1994 amendments to the MMPA negated the agency's authority to enforce these permit provisions, but the agency refuses to explain the legal basis for that position. As a last resort, the animal groups turned to litigation. See Complaint for Declaratory and Injunctive Relief, *Animal Welfare Inst. v. Nat'l Oceanic and Atmospheric Admin.*, No.1:18-cv-00047-CKK (DDC, 9 January 2018), in which the co-plaintiffs seek to compel NMFS to respond to a request under the Freedom of Information Act to disclose its legal rationale. In a second suit, co-plaintiffs seek a declaration that NMFS' belief that it lacks the legal authority to enforce the necropsy and related provisions of the pre-1994 permits is unlawful. See Complaint for Declaratory and Injunctive Relief, *Marino v. Nat'l Oceanic and Atmospheric Admin.*, No. 1:18-cv-02750-DLF (DDC, 27 November 2018). For more on the provisions of these pre-1994 permits, see Rally *et al.* (2018) and Stone (2018).

311. Tryland *et al.* (2018) and see endnote 332.

312. Higgins and Hendrickson (2013).

313. The "dolphin's smile" is merely an anatomical quirk—a fixed expression regardless of the animal's mood. A dolphin smiles even when dead.

314. Occasionally, the cause of death is both obvious and unique to captivity: In January 2006, a 7-month-old dolphin calf at the Minnesota Zoo died after jumping out of a tank, apparently panicking during "gate training" (being trained to swim through a gate between two enclosures), and fracturing his skull on the concrete deck (McCartney, 2006). Apparently, the calf gave no indication (or at least none recognized by his caretakers) of his injury—he was returned to the tank and the severity of his condition was only realized when he ceased to surface for breath and died.

In another situation unique to captivity, a beluga died after ingesting 9 kg (20 lb) of oak leaves that had blown into her tank. The serrated edges of the leaves may have scratched the inside of her throat, creating pathways for a fatal infection (Gage and Francis-Floyd, 2018). Belugas in the wild would never be exposed to oak leaves (as there are no oaks in the Arctic), let alone ingest them. The staff at the facility were unaware she was swallowing these leaves; she died weeks after the problem began.

315. Nootka, a 13-year-old female orca held by SeaWorld Orlando, died in September 1994. She was reported by SeaWorld personnel to be "doing fine," appeared lethargic and uninterested in food one morning, and died by that evening (Leithauser, 1994). Quitz, a 5-year-old male Pacific white-sided dolphin, died at the John G. Shedd Aquarium in Illinois, in February 1995. He was reported by Shedd personnel as appearing healthy, exhibited subtle changes in behavior one evening, did not eat normally the next morning, and died by that night (Puente, 1995). Kotar, a 19-year-old male orca, died at SeaWorld San Antonio in April 1995. He was reported to have died "unexpectedly," exhibiting only subtle changes in behavior in the days leading up to his death (Coburn, 1995). Rio, a dolphin at the Minnesota Zoo, stopped eating the morning of 6 March 2006 and was dead by 9:30 that night (KARE 11 News, 2006).

Keiko, the orca from *Free Willy*, died in Norway in a similar fashion—he was reported as lethargic and "off his feed," then died within 36 hours. Other sudden, unexpected deaths involved dolphins at Gulf World in Florida (Smith, 2016) and the Brookfield Zoo in Chicago (Ruppenthal, 2018b). Outside the United States, a young dolphin named Will, conceived through AI using frozen sperm, died at Kamogawa Sea World in the early hours of a Tuesday in December 2005, after refusing to eat on the Saturday before (Japan Economic Newswire, 2005). An official at the park stated, "There was nothing particularly wrong with him right up to the moment [he died]. It is very regrettable."

316. Higgins and Hendrickson (2013); Haulena and Schmitt (2018).

317. Johnson *et al.* (2009); Venn-Watson *et al.* (2012); Mazzaro *et al.* (2012); Venn-Watson *et al.* (2013). Captive dolphins are *15 times* more likely to express elevated iron levels in their bodies (a precursor to developing the disease of hemochromatosis) than free-ranging dolphins. Hemochromatosis can lead to a variety of problems, including liver, heart, and reproductive organ problems, joint pain, and increased rates of cancer; hemochromatosis can be fatal.

318. Captive dolphins, who are fed a limited diet (of fish species often containing high levels of iron, such as herring), may not ingest enough saturated fatty acids, which are protective factors against high iron levels (similar to people

who develop various health problems because they do not consume enough omega-3 fatty acids) (Wells *et al.*, 2013; Venn-Watson *et al.*, 2015).

Activity patterns in the wild may also be a factor in protecting against this and related conditions. Dolphins in the wild are active and feed on a wide variety of fish in small bouts throughout the day and night. In contrast, captive dolphins are active for longer periods during the day (and are relatively inactive at night) and are fed larger amounts of a limited diet a few times a day. Free-ranging dolphins also range more widely and routinely dive more often and more deeply than dolphins in captivity (Wells *et al.*, 2013).

We hypothesize that the difference in diving patterns may be a significant factor in the higher occurrence of this condition in captivity. Cetaceans (and other marine mammals) have adaptations that allow them to dive deeper and longer than terrestrial mammals (including humans) can. One such adaptation is greater stores of the iron-based molecules hemoglobin and myoglobin, in their blood and muscle respectively, so they can store more oxygen than terrestrial mammals can (Parsons *et al.*, 2012). Free-ranging bottlenose dolphins spend more than 70 percent of their time underwater, frequently going below 10 m (33 ft) (Mate *et al.*, 1995). They have been tracked to depths greater than 450 m (1,476 ft) (Klatsky *et al.*, 2007) and are capable of holding their breath for eight minutes or longer (Corkeron and Martin, 2004).

In contrast, captive dolphins spend much of their time at or near the surface. In fact, they spend at least 25 percent their time with their heads fully above the water, waiting for food or direction from their trainers, and never dive deeper than a tank allows; most dolphin tanks are shallower than 10 m (Galhardo *et al.*, 1996). They rarely need to hold their breath for longer than one minute. Therefore, there is no need for these large quantities of oxygen-storing, iron-based molecules, which may result in excessive levels of iron in their tissues—or physiological reactions that resemble those of terrestrial animals facing excessive iron levels (Rose *et al.*, 2017). The common treatment in these captive dolphins is phlebotomy—that is, they are routinely bled to draw off the excess iron (Johnson *et al.*, 2009), rather than provided conditions that prevent the problem in the first place.

Most perplexing, despite the marked difference between the rates of iron overload seen in captive and free-ranging bottlenose dolphins and the implications of this difference for captive dolphin health and welfare, the cetacean research team that made this discovery has not looked very closely at why this difference exists (but see Venn-Watson *et al.*, 2015). While we speculate it may have to do with the lack of opportunity for captive dolphins to dive deeply or hold their breath for more than a minute or two during training or performances, this hypothesis (or any other, such as factors associated with a limited diet) is not being examined from the perspective of dolphin welfare by these researchers (or anyone else with access to a suitable sample of captive dolphins). Instead, they are studying how captive dolphins may serve as models to study the impacts of diabetes on humans (hemochromatosis can cause diabetes through damage to the pancreas) (see *http://www.diabetes.org/living-with-diabetes/complications/related-conditions/hemochromatosis.html*; Venn-Watson *et al.*, 2015; Rose *et al.*, 2017).

319. Hypocitraturia is a condition where citrate is found in the urine and is four times more common in captive versus free-ranging dolphins (Venn-Watson *et al.*, 2010). This condition, in turn, promotes the formation of kidney stones, which are severely painful and debilitating. Although there are several possible causes for this condition, it is often related to diet (Zuckerman and Assimos, 2009), which might explain its higher frequency in captive dolphins, given their restricted and unnatural diet of thawed, frozen fish.

320. This type of lesion is related to the disease erysipelas, caused by the pathogenic bacterium *Erysipelothrix rhusiopathiae*, and is usually transmitted via food. One symptom is widespread, slightly raised grey patches on the surface of a dolphin's skin (Van Bressem *et al.*, 2018). Erysipelas can be fatal and is listed as a cause of death for several dolphins in the NMFS *National Inventory of Marine Mammals*.

321. Van Bressem *et al.* (2018) report that in their 2012–2014 study, 20.6 percent of the 257 bottlenose dolphins held in 31 US and European facilities had tattoo lesions. Prevalence at different facilities varied from 5.6 percent (from a sample size of 18 animals) to 60 percent (sample size of 20), which they suggested reflected different "environmental conditions" at different facilities. They noted that the lesions were more common in males than females (31.5 percent versus 12.3 percent), whereas there is no sex-related pattern in the wild. Very large lesions were also more common in males than females (28.6 percent versus 11.1 percent). The researchers speculated that captive male bottlenose dolphins are more vulnerable to tattoo lesions than females "because of differences in immune response and because males may be more susceptible to captivity-related stress than females" (p. 305).

322. A worldwide study of 1,392 free-ranging small cetaceans, comprising 17 species, suggested that the prevalence and severity of tattoo lesions was an indicator of poor population health (Van Bressem *et al.*, 2009).

323. Buck *et al.* (1987); Zappulli *et al.* (2005).

324. Ventre and Jett (2015).

325. For example, see Waples and Gales (2002), which describes the death of a dolphin due to chronic stress resulting from being the target of aggression from other group members. In addition, dominance hierarchies in the wild are relatively stable and clearly established, which reduces repeated aggression (for example, see Sachser *et al.*, 1998). In captivity, animals have been frequently transferred between facilities and enclosures, which results in frequent new combinations of animals, destabilizing old and creating new hierarchies, which leads to repeated aggressive interactions as animals try to exert their dominance over newly introduced individuals.

326. In one incident, a dolphin died after colliding mid-air with another dolphin when they both leaped out of the water simultaneously during an SWD encounter (Associated Press, 2008). A spokesperson for the dolphinarium said, "This is a very unfortunate and very rare incident," which is certainly true, but it is also vanishingly unlikely to have occurred in the wild.

As noted in endnote 314, the causes of death for captive marine mammals are at times unique to captivity. Dolphins have died due to eating coins and other foreign objects people have tossed into their tanks. A sea lion died after bolting from a cage before staff could stop her and leaping out into her empty tank after it was drained for cleaning—she apparently thought it had water in it (Kestin, 2004b).

327. Dima and Gache (2004) reported that the most common causes of death for the dolphins in Constanţa dolphinarium in Romania were starvation through refusing to eat and striking themselves against the sides of their tank until they died. Another cause of death was swallowing foreign objects. They also noted that the average survival time for harbor porpoises in the facility was six months (with the longest being 14 months), for common dolphins five and a half years (longest 14 years), and for bottlenose dolphins five years (with the oldest dolphin at that time being 17 years of age).

328. Buck *et al.* (1993); St. Leger *et al.* (2011); Jett and Ventre (2012).

329. Captive orcas sometimes float motionless near the surface in excess of 15 minutes, for up to hours at a time (Jett and Ventre, 2012; Worthy *et al.*, 2014; Rose *et al.*, 2017). This excessive level of logging is abnormal and does not resemble the active, highly mobile behavior of free-ranging orcas at all (see, e.g., Baird *et al.*, 2005; Durban and Pitman, 2012; Eisert *et al.*, 2015; Matthews *et al.* 2011; Reisinger *et al.*, 2015). Free-ranging orcas do log, but usually for no more than a minute or two at a time, when resting or sometimes when socializing. Mosquito-borne illness, therefore, seems to be a risk unique to captive orcas.

330. Couquiaud (2005). Shade is not a requirement of US regulations (Rose *et al.*, 2017).

331. The effects of excessive ultraviolet exposure have only been examined in detail in pinnipeds (Colitz *et al.*, 2010; Gage, 2011; Gage and Francis-Floyd, 2018), but is almost certainly an issue for cetaceans as well. "Exposure to excessive amounts of [ultraviolet] light may be exacerbated by animals habituated to looking toward the sun for fish rewards or to consume their

daily diets. Keepers and trainers should strive to offer fish in such a way that the animal is protected from looking directly at the sun" (p. 758 in Gage and Francis-Floyd, 2018). Another element of captive conditions that may exacerbate eye problems for cetaceans is oxidants in the water. "Corneal disease is the primary ophthalmic problem in dolphins. … Good water quality, with low residual oxidants, is paramount for both prevention and treatment of corneal injuries" (p. 900 in Nollens *et al*., 2018).

332. Gili *et al.* (2017). Meticillin-resistant *Staphylococcus aureus* (MRSA) has been reported in free-ranging dolphins, but in the case of these two dolphins in Italian facilities, it is possible that it was transmitted to them from two human caretakers who tested positive for MRSA.

333. Graham and Dow (1990); Ventre and Jett (2015); Visser and Lisker (2016); Jett *et al*. (2017); see also endnote 335. Other marine mammals have been known to break their teeth in captivity, notably walruses. These pinnipeds have been known to break their tusks from trying to gouge the bottoms and walls of their tanks (Kastelein, 2002). This frequently results in tusk decay and the nerves inside the tusks becoming exposed. One female walrus at Six Flags Discovery Kingdom had to be fitted with titanium tusk caps because she wore down her tusks on the concrete of her tank (Gage *et al*., 2002). Tooth infection was so widespread in walruses at the Moscow Zoo that management brought in a dentist from the United Kingdom to assist with the problem (Wyatt, 2000). Some facilities simply remove their walruses' tusks altogether.

334. Ventre and Jett (2015); Jett *et al.* (2017). Dr. Lanny Cornell, the veterinarian for Marineland in Canada, submitted an affidavit in the court case wherein SeaWorld sought to recover its male orca Ikaika (see endnote 583), in which he described Ikaika's chronic dental infections, due to the drilling out of his teeth, and the constant care the whale required to address this problem. He stated, "These roots [of Ikaika's teeth] are open, allowing bacteria to enter and cause infections" (p. 5 in Cornell, 2011).

335. For example, in the northeast Pacific offshore orca ecotype, severe wear to the gum line in both jaws, exposing the pulp, is attributed to feeding on sharks, which have rough, abrasive skins (Ford *et al*., 2011). In Type 1 North Atlantic orcas, severe tooth wear is associated with suction-feeding (Foote *et al*., 2009). A lifetime of water rushing past the teeth, as individuals suction fish into their mouths, slowly wears away the teeth into nubs in both jaws, although generally the teeth are not worn to the gum line and the pulp is not exposed. Northeast Pacific resident and Type 2 North Atlantic orcas have very little tooth wear (Foote *et al*., 2009; Ford *et al*., 2011), while mammal-eating transients show slight wear, from tearing apart large mammal prey (Ford *et al*., 2011).

The pattern of tooth damage and wear in captive orcas differs in two main ways; it is asymmetrical (the lower jaw shows more wear and breakage than the upper and the forward teeth show more damage than the back teeth, almost certainly due to the mechanics of how captive orcas grind their teeth on the walls and pop their jaws on metal) and there is more breakage (as distinct from wear) than is typically seen in free-ranging orcas. Twenty-four percent of captive orcas show "extreme" damage to their teeth, while almost all show some degree of damage (Jett *et al*., 2017). As with hemochromatosis (see endnote 318), this pattern of tooth damage is clearly related to captivity itself, yet the public display industry has not studied this phenomenon (the Jett *et al*. paper was prepared without the cooperation of the industry, using high-resolution photographs taken from the public areas of various facilities) nor made medical records available to outside researchers, to examine whether these dental problems do in fact lead to higher rates of infection. This failure by the industry to study what is clearly a welfare issue for their animals is marked.

336. Ford *et al*. (2011).

337. See, e.g., *www.seaworldfactcheck.com/teeth.htm*, which quotes Ask SeaWorld's Twitter feed to this effect.

338. The connection between poor dental health and systemic disease (such as pneumonia and heart disease) is well-established in other mammals, including humans (Li *et al*., 2000; Niemiec, 2008), but studies specifically on how the obvious poor dental health of orcas might lead to health problems have not been published in the scientific literature.

CHAPTER 6 • BEHAVIOR

339. This point is emphasized in Clubb and Mason (2003; 2007). Walker and Coe (1990) reported the frequency with which captive cetaceans consumed debris: "Captive cetaceans have been known to ingest a wide variety of foreign material. Objects such as cotton gloves, tin cans, plastic bags, bottles, pens, coins, flashbulbs, plastic combs, nails, steel wool cleaning pads, plastic toys, and women's jewelry are some of the articles reported" (p. 750). They noted a number of animals in the United States and abroad who had died in captive facilities because of ingesting these items. They stated that "[t]he reasons for the high incidence of foreign body ingestion in captive cetaceans are not clear. The captive environment, due to its obvious spatial limitations, is at best an abnormal one. The social behavior of these animals has been severely altered" (p. 750 in Walker and Coe, 1990, citing Caldwell *et al*., 1968).

340. For examples and discussions of the behavioral problems experienced by animals in captivity, including marine mammals, see Carter (1982); Markowitz (1982); Ellis (1985); and Sweeney (1990). Dima and Gache (2004) noted extreme examples in a dolphinarium in Romania, where animals refused to eat and repeatedly struck the sides of their tanks until they died (see endnote 327). Author Parsons observed a dolphin at Ocean Park, Hong Kong, who repeatedly rubbed his head against the side of the tank, causing a large abrasion that became infected. Clegg *et al*. (2017) noted that stereotypical behaviors are likely an indicator of poor welfare status.

341. Dolphinaria and aquaria consider these plastic toys to be enrichment, but "there are few published studies describing the animals' responses … enrichment is often assumed to automatically enhance welfare even if it is unclear whether the animal's affective state will be improved" (p. 170 in Clegg *et al*., 2017).

342. For example, "floating, simplistic objects are not sufficient to hold the dolphins' interest in the long-term" (p. 170 in Clegg *et al*., 2017). Nevertheless, such objects are frequently the only enrichment items captive cetaceans or other marine mammals are provided (including surfboards, balls, and polystyrene pool noodles).

343. "Life in a controlled environment may impede certain aspects of normal social dynamics" (p. 296 in Couquiaud, 2005).

344. The extreme example of this was the fatal 1989 interaction between Kandu V and Corky II at SeaWorld San Diego (see endnote 243 and Chapter 11, "Risks to Human Health—Injury and Death"). Kandu had a dependent calf at the time, and Corky had shown interest in the calf (Reza and Johnson, 1989). Kandu had apparently repulsed her interest previously, in a show of dominance. Her final, excessively violent attack on Corky, which led to her own death, was fatal precisely because it occurred in restricted space, where tensions were exacerbated, and neither whale had an escape route. See also endnote 325.

Monitoring behavior can be used to assess marine mammal welfare, but in the case of cetaceans, "ethological [behavioral] studies of captive populations have not, until recently, been commonplace" (p. 168 in Clegg *et al*., 2017). Therefore, there is little baseline information against which to make comparisons. However, sudden changes in associations might denote a stressful situation, but certainly aggression would indicate stress and poor welfare. Clegg *et al*. (2017) suggest "Increased quantity and severity of rake marks could serve as a proxy indicator for levels of aggression and social stress" (p. 168).

CHAPTER 7 • STRESS

345. In their review on stress in captive animals, Morgan and Tromborg (2007) defined stress as "the experience of having intrinsic or extrinsic demands

that exceed an individual's resources for responding to those demands" (p. 263). They noted that while acute (short term) stress can be an advantage (triggering the "fight or flight" response), chronic stress has a number of serious and usually negative physiological impacts.

346. Morgan and Tromborg (2007) listed some of the factors that can stress captive wildlife, including "artificial lighting, exposure to loud or aversive sound, arousing odors, and uncomfortable temperatures or substrates. In addition, confinement-specific stressors such as restricted movement, reduced retreat space, forced proximity to humans, reduced feeding opportunities, maintenance in abnormal social groups, and other restrictions of behavioral opportunity" were considered (p. 262).

They also make an important generalization: "What many if not all of the potential stressors reviewed above have in common is the inability of the captive animal to control them. Indeed, perhaps the greatest stressor in the lives of captive animals is their perceived or actual inability to control most aspects of their surroundings" (p. 286).

347. For examples and discussion of how stress can affect marine mammals, including health impacts, see Carter (1982); Sweeney (1988); Dierauf (1990); Fair and Becker (2000); Waples and Gales (2002); Frohoff (2004); Clark *et al.* (2006); Hunt *et al.* (2006); Noda *et al.* (2007); Wright *et al.* (2007); Ugaz *et al.* (2009); Mason (2010); Schmitt *et al.* (2010); Spoon and Romano (2012); Rolland *et al.* (2012); Ugaz *et al.* (2013); Fair *et al.* (2014); Hunt *et al.* (2014); Atkinson *et al.* (2015); Kellar *et al.* (2015); National Academy of Sciences (2016); Monreal-Pawlowsky *et al.* (2017); Trumble *et al.* (2018); and, in particular, Atkinson and Dierauf (2018).

Clegg *et al.* (2017) highlighted that much could be done to monitor and research stress and welfare in captive cetaceans, but that the industry has not yet done so.

348. For extended discussions of these stress effects, see Keller *et al.* (1991); Sapolsky (1994); Apanius (1998); Maas (2000); Moberg (2000); Reeder and Kramer (2005); Deak (2007); Romero and Butler (2007); and Busch and Hayward (2009).

349. Even during routine handling for medical examination, stress-related blood chemistry markers became elevated (Schmitt *et al.*, 2010). Any alterations in the social environment can result in stress-related behavioral change (Castellote and Fossa, 2006).

350. Nielsen (1999). For a specific example in cetaceans, see the immune system response to transport stress in Spoon and Romano (2012).

351. See, e.g., Clubb and Mason (2007).

352. The following statement from a study on otters illustrates the connection between stress and capture/transport in mammals: "The capture, handling, transport, and confinement inherent to [the translocation of wild mammals] inflict a substantial amount of anxiety and fear on animals, particularly when free-ranging wild or semi-wild individuals who have had little previous exposure to humans are to be translocated. Being pursued, caught, and physically manipulated constitute stressful events for these animals" (p. 143 in Fernández-Morán *et al.*, 2004).

353. A good review of the literature on stress in dolphins caused by chase and handling, by the NMFS's Southwest Fisheries Science Center, can be found in Curry (1999). This review concludes that the chase and capture (handling) of dolphins can have significant negative impacts on individuals.

354. Small and DeMaster (1995a).

355. Noda *et al.* (2007) described one possible mechanism for the increased mortality risk faced by dolphins after a transport. Blood chemistry of animals transported between facilities indicated that dolphins find routine handling and transport stressful, even after living in captivity for several years. As a result, their various cell functions appear impaired, which would lead to a depression of their immune response. In such animals, "immunological uncertainty following transportation would enhance the potential risk of infectious disease in susceptible individuals" (p. 382 in Noda *et al.*, 2007). In short, because transport is stressful—to the dolphins, it is never routine—they face an increased risk of infection, illness, and death every time they are moved from one place to another, at least for a short time until they adjust to the new location. The four dolphins used in this particular study had been held in a dolphinarium for over five years and were transported 250 km (155 miles) from one facility to another (a distance often traversed by many dolphins displayed around the world, for husbandry and captive management purposes), using routine transportation methods.

356. Small and DeMaster (1995b).

357. Ugaz *et al.* (2009; 2013).

358. Papers with examples of this include McBride and Hebb (1948); Caldwell and Caldwell (1977); Samuels and Gifford (1997); and Spoon and Romano (2012).

359. Waples and Gales (2002); see endnote 325.

360. "Enclosures should be as large as feasible and should be designed to allow individuals to, at least, be out of the sight of others and not be trapped in corners. This can be achieved by a series of connecting pools or a single large enclosure containing barriers" (p. 22 in Waples and Gales, 2002). The researchers also suggested that captive facilities have behavior experts on hand to identify possible social and grouping problems in dolphins as soon as possible. They called for monitoring of dolphin behavior to "be as standard as water testing in maintaining the health and well-being of captive marine mammals" and stated that it "is imperative when dealing with captive social animals to attempt to maintain a group structure that resembles that found in the wild" (p. 23 in Waples and Gales, 2002).

361. Stirling (2011).

CHAPTER 8 • CETACEAN INTELLIGENCE

362. Manger (2006).

363. Marino *et al.* (2008).

364. Gregg (2015).

365. Page 217 in Gregg (2015).

366. Page 216 in Gregg (2015).

367. Human were using stone tools until the end of the Neolithic (approximately 6,500 years ago, although this period ended less than 3,000 years ago in northern Europe, and arguably only about 500–600 years ago in some regions of the world), so hominids (human-like ancestors and humans) were using technology no more complicated than sea otters for 99.9 percent of their history. Looking just at modern humans (*Homo sapiens*), we were using simple stone tools for 98 percent of our history. For 99.9998 percent of the history of *Homo sapiens*, we were unable to achieve the level of tool use referenced in Gregg's definition.

In addition, science still has very little understanding of the cognitive abilities of small cetaceans as they function in the wild. The sophistication of their echolocation, for example, far outstrips our own manufactured sonar and, in fact, the US Navy ceased attempting to replicate cetacean echolocation many years ago. Measuring non-human animal cognition against human cognition is undoubtedly a flawed approach in the first instance (see endnote 368). While certainly dolphins have not launched a rocket ship to the moon, humans have been unable to decipher their sophisticated acoustic signals and cannot even categorize their specific vocalizations by behavioral state with reliability. In other words, all non-

human animals are sub-par at human tasks, but humans are very poor indeed at many non-human animal tasks. And we are *trying* to understand and at times replicate these tasks, through our scientific studies, while non-human animals are not noticeably attempting to reciprocate.

368. Cosentino (2014) provided a critique of the book, noting that Gregg's definition of intelligence is "a measure of how closely a thing's behaviour resembles the behaviour of an adult human," which is anthropocentric and inappropriate for the study of animal behavior. It would, of course, be impossible (and frankly pointless) for an animal that lacks opposable thumbs, does not have the same sensory systems as a human, and is completely aquatic to emulate the behaviors of a human.

Cosentino noted Gregg's dismissal of dolphin behavior suggesting a high level of cognition and problem-solving ability as anecdotal—he stated: "For all we know it was alien visitors who first taught capuchins [monkeys] to smash nuts and dolphins to dig for fish with sponges" (p. 116 in Gregg, 2015). However, Cosentino also pointed out that Gregg chose to cherry pick studies, ignoring research that undermined his claims (such as studies showing spontaneous evolution of complex behaviors and sophisticated problem solving). She noted that "Dr Gregg is the co-editor of *Aquatic Mammals*, a journal funded by the International Marine Animal Trainers' Association, and he himself works with cetaceans in captivity during a period in American history when the ethical and moral justification for holding highly cognitive species, such as cetaceans (but also primates, elephants and other species) are receiving much greater public and official scrutiny. I question his objectivity" (Cosentino, 2014).

369. This is called the encephalization quotient, or EQ. Most animals would be expected to have an EQ of 1. However, dolphins have a much larger brain than would be expected for their size, with EQs ranging from 3.24 to 4.56. In comparison humans have an estimated EQ of 7.0, and the human ancestor *Homo habilis* had an EQ of 4.4 (Jerison, 1973).

370. Oelschläger and Oelschläger (2002). Among the cetaceans, dolphins generally have brains larger than one would expect for their body size—notably having particularly large cerebellums and a large cortex surface area, the latter assumed to play a role in complex brain processing (Ridgway and Hanson, 2014; Ridgway *et al.*, 2016).

371. Caldwell *et al.* (1989).

372. For discussions of these hypotheses and the evidence supporting them, see Sayigh *et al.* (1990); Sayigh *et al.* (1995); Smolker *et al.* (1993); and Janik and Slater (1998).

373. Janik (2000).

374. Terrace (1985); Wilkins and Wakefield (1995).

375. Miller *et al.* (2004).

376. McCowan *et al.* (1999).

377. Reiss and McCowan (1993).

378. Richards *et al.* (1984).

379. The facility where this study was conducted, Kewalo Basin Marine Mammal Laboratory (KBMML) in Honolulu, Hawaii, in the United States, had a controversial 30-year history, as the two dolphins (two more were added to the study later) were held in small, concrete tanks in a hurricane-prone area. Author Rose worked at KBMML for several months in 1982. Eventually, the four dolphins died (one in 2000, another in 2003, and the last two in 2004) and the laboratory was closed (it was entirely demolished in 2008).

380. Herman (1986).

381. Úbeda *et al.* (2018).

382. Barbary macaques (Konečná, *et al.*, 2012), rhesus macaques (Weiss *et al.*, 2011a), white-faced capuchins (Manson and Perry, 2013), orangutans (Weiss *et al.*, 2006) and chimpanzees (King and Figueredo, 1997) have all been shown to exhibit "personalities."

383. Herman *et al.* (1994).

384. Abramson *et al.* (2013).

385. Yaman *et al.* (2004).

386. Jaakkola *et al.* (2005).

387. For example, studies have indicated that members of the Pirahã tribe in the Amazon, which has a relatively simple language, have difficulty coping with numbers beyond two; it has been suggested that this apparent difficulty is due to the lack of complexity in their language (Holden, 2004).

388. For a review of self-awareness in dolphins, see Herman (2012). Herman stated that research "demonstrates an advanced capability of dolphins for motor imitation of self-produced behaviors and of behaviors of others, including imitation of human actions, supporting hypotheses that dolphins have a sense of agency and ownership of their actions and may implicitly attribute those levels of self-awareness to others" (p. 526). Herman explained the high level of awareness in dolphins—of both self and how other individuals perceive the environment—as "the demands of social living in complex networks of sometimes collaborating and sometime competing individuals, and in which identification and knowledge of the behavioral and social propensities of others is paramount. In such societies a strong sense of self and other might emerge as an adaptive trait. Knowing yourself and knowing others would be immensely beneficial, as expressed through self-recognition, self-awareness, body-awareness, and attributions of these traits to others" (p. 540). The conclusion was that dolphins have exhibited considerable evidence of high-level cognitive ability and understanding—with higher levels of awareness of self and others than exhibited by human toddlers.

389. Marten and Psarakos (1995); Reiss and Marino (2001).

390. Delfour and Marten (2001).

391. Gallup (1970; 1982); Suarez and Gallup (1981); Anderson (1984).

392. Amsterdam (1972).

393. What makes the mirror studies even more remarkable is that vision is not the primary sense of dolphins—hearing is. Their ability to use mirrors may be similar to a person being able to recognize his or her own voice on a recording (which many people cannot do). In addition, dolphins do not normally encounter reflective surfaces at all, other than a very calm ocean surface from underwater—that is, they have limited natural familiarity with seeing two-dimensional images of the world or themselves.

394. Resnik lists these factors as (1) the ability to feel pain, (2) consciousness, (3) the ability to grasp concepts or form beliefs, (4) the ability to form abstract concepts or self-concepts, (5) reasoning, (6) language use, (7) the ability to experience moral emotions such as sympathy, love, and guilt, and (8) the ability to understand and follow moral rules (Resnick, 1998).

Small cetaceans clearly can feel pain and have consciousness. Arguably they can reason (figure things out) and show emotion. For example, several field researchers have noted small cetaceans attending and supporting dead companions or calves, long after the animals have died, and sometimes for a period of several days (see, e.g., Fertl and Schiro, 1994). The Southern Resident orca J35 was recorded carrying her calf for 17 days (Mapes, 2018b). This is interpreted by several scientists as a sign of grief. The mirror-recognition

and signature whistle studies strongly suggest that bottlenose dolphins understand the concept of self and abstract concepts and may have linguistic ability. Only the last factor—the ability to understand and follow moral rules—is still entirely unknown.

395. Terrill (2001); Gasperini (2003). The Soviet Navy also maintained a dolphin program, but it was disbanded after 1991 and the dolphins were sold or otherwise transferred to public display facilities.

396. At least nine US Navy dolphins have gone "absent without leave" (also called "inadvertent escape") during open-water training or exercises, and were never recovered. In all cases, they disappeared in areas far from their original habitat, making their survival unlikely (see NMFS, *National Inventory of Marine Mammals*). This issue was resolved with the advent of GPS micro-chipping; escapees are now routinely located and recovered.

CHAPTER 9 • MORTALITY AND BIRTH RATES

397. See endnote 310.

398. Michael Hutchins of The Wildlife Society noted that "zoos should deal with the increasing media and public interest in zoo animal deaths, including: 1) a greater commitment to studying the reasons for mortality in a wide variety of species; and 2) an increased investment in record keeping and analysis" (p. 101 in Hutchins, 2006). The public display industry's claim that animal mortality is "natural" and "expected," and that the focus by those who oppose captivity on the natural phenomenon of death is overly emotional and unscientific, seems unwarranted given this article's implicit admission that the industry has in fact given insufficient attention to studying captive wildlife mortality patterns or even to keeping adequate veterinary records. Rigorous record-keeping should be routine, and the industry's public relations rhetoric insists that it is, but this is apparently overstating the case.

399. Clegg *et al.* (2017).

400. Clubb and Mason (2003; 2007).

401. In a study of captive birth rates of 44 species, Farquharson *et al.* (2018) concluded "our [research] shows that wild-born animals generally have higher reproductive success than their captive born counterparts in captive environments, across multiple industries and irrespective of taxonomy" (p. 8).

Non-cetaceans

402. Average annual mortality rates for additional pinnipeds in captivity (older than 1 year of age) have been calculated as 4.3 percent (South American sea lion, *Otaria byronia*, and gray seal, *Halichoerus grypus*); 4.9 percent (South African fur seal, *Arctocephalus pusillus*); 5.5 percent (Californian sea lion and harbor seal); and 8.2 percent (northern elephant seal, *Mirounga angustirostris*) (Small and DeMaster, 1995b; Roberts and DeMaster, 2001).

403. For a discussion of the survival rates of Steller sea lions (*Eumetopias jubatus*), see Small and DeMaster (1995b). Further information on Steller sea lion mortality rates at the time of that study can be found in York (1994), which estimates annual mortality rates of 10.1 percent to 13.1 percent from ages 3 to 13 years. Most current studies on marine mammal mortality do not use an averaged annual survival rate, as mortality rates are directly linked to age. For example, Holmes *et al.* (2007) reported annual mortality rates for free-ranging Steller sea lions ranging from 7 percent at age 4 to 22 percent at age 31. Thus, mortality rate averaged over the first 15 years is approximately 15 percent. It should be noted that during the period of this latter study, the Steller sea lion was listed as endangered under US law (National Marine Fisheries Service, 2008a), due to high mortality rates in the wild and dramatic population declines, potentially linked to a lack of prey availability and climate change (Trites, 2003). One would, therefore, expect captive Steller sea lions to have a lower mortality rate than a collapsing population in the wild.

404. South American sea lions and northern fur seals in captivity have a pup mortality rate of 66.2 percent and 66.8 percent, respectively (Roberts and DeMaster, 2001).

405. The average annual sea otter mortality rate in captivity (for animals held from 1984 to 1999) was calculated to be 5.5 percent (varying from 11.8 percent to 0 percent depending on the facility—endnote 279 notes that the mortality rate for animals held from 1955 to 1996 was higher), whereas mortality rates of 11 to 48 percent were recorded for free-ranging otters in California. However, due to the differences in how data were collected, it was impossible to determine whether mortality rates were significantly lower in captive sea otters (Jones and DeMaster, 2001).

406. See *www.chinacetaceanalliance.org* for details of specific facilities and the possible or admitted sources for their exhibited pinnipeds.

407. California sea lion pup annual mortality rate in captivity was 14.2 percent on average, 25 years ago (Small and DeMaster, 1995b), while mortality rates in the wild are much higher—the result of a high level of hookworm parasites in pups (see *http://www.afsc.noaa.gov/nmml/california/research/ccepresearch.php?url=nmmlccep0808*) and predation rates.

408. "A common concern in facilities housing marine mammals is the control of fertility. For pinnipeds the primary species for which fertility control has become a concern are the Californian sea lion and the harbor seal" (p. 176 in Robeck *et al.*, 2018). For these and other species, to minimize the number of surplus animals through over-breeding, the sexes are separated, with females put on contraceptives and/or males castrated (Robeck *et al.* 2018).

409. Chemical contraceptives help prevent pregnancy by disrupting the normal hormone cycle of intact animals to prevent the release of gametes (sperm and eggs). Some can be used in both males and females, while others are effective for use in females only. Benefits are that animals do not need to be separated, which may cause stress in stable social groups, such as those with mothers and older male offspring. However, there may be side effects (such as weight gain and behavioral changes), these contraceptives may not be reliably effective, and there is sometimes stress placed on animals when administering the contraceptive.

The effectiveness of chemical contraceptives varies by individual and species and the appropriate doses, side effects, and long-term impact of chemical contraceptives on marine mammals are still somewhat unknown, although anecdotal evidence suggests standard contraceptives are relatively safe to use (Heather Rally, DVM, personal communication, 2018). Progestin-related contraceptives (such as Depo-Provera) are routinely used on pinnipeds and bottlenose dolphins (Asa and Porton, 2005; Calle, 2005). Reactions at the injection site have been noted in pinnipeds.

Immunocontraceptives have been used on pinnipeds. These work by stimulating the animal's immune system to attack gametes. However, their long-term effect is unknown, and it is not known whether this method would be effective or safe/reversible with cetaceans. Progesterone-related contraceptives are currently most frequently used with marine mammals (including Regumate), but must be administered to animals daily. However, conception has occurred at least once when using this product, with a subsequent loss of the calf, in bottlenose dolphins (Robeck *et al.*, 2012).

410. Laidlaw (2010).

Bottlenose Dolphins

411. These studies include DeMaster and Drevenak (1988) and Duffield and Wells (1991), as well as several more recent, but unpublished, studies presented at industry conferences.

412. Venn-Watson *et al.* (2011) found that, from 1994 through 2003, the median age at death for US Navy dolphins was 17.2 to 18.7 years. Subsequently, for the periods 2004–2008 and 2009–2013, Venn-Watson *et al.* (2015) calculated a median age at death of 30.1 and 32 years respectively, showing a noticeable improvement. The mean annual mortality rate in the latter study was 2.7

percent. It should be noted that Navy dolphins are routinely taken for "open ocean" training and exercises, during which they swim, following a boat with their handlers, for miles in one direction (rather than circling in an enclosure) and dive to depths at times well in excess of 10 m (the maximum depth of most dolphin tanks or sea pens) to retrieve objects. In short, it cannot be assumed that dolphinarium dolphins, who mostly are held in concrete tanks, will have comparable mortality rates or median ages at death as the US Navy marine mammal program animals.

413. Long (2018).

414. The mean age at death for a well-studied population of free-ranging dolphins in Sarasota Bay, Florida, in the United States was estimated to be 19.9 years (Wells *et al.*, 2013), with a mean annual mortality rate of 3.9 percent (Wells and Scott, 1990). Free-ranging dolphins from northeast Florida are estimated to live a mean of 25 years (Sergeant *et al.*, 1973). These free-ranging populations in Florida, however, face many human-caused and natural threats, including fishing gear entanglement, ship strikes, attacks by sharks, and pollution, and higher rates of mortality would be expected than for populations living in less disturbed habitat.

415. One earlier industry-sponsored analysis determined that infant mortality in captivity was much higher than in the wild, but the mortality data from populations in the wild were almost certainly incomplete (Woodley *et al.*, 1997).

416. For information on causes of death of newborn calves, see also NMFS, *National Inventory of Marine Mammals*. See also endnote 493.

417. Long (2018).

418. For example, the estimated annual infant mortality rate is about 20 percent for dolphins less than 1 year of age in Sarasota Bay, Florida, in the United States (Wells and Scott, 1990). In Shark Bay, Australia, where, unsurprisingly, predation by sharks on dolphin calves is frequent, the mortality rate is 44 percent for dolphins less than 3 years of age (Mann *et al.*, 2000b), which is still a lower rate than noted for captive animals. In the Moray Firth, United Kingdom, the bottlenose dolphin calf mortality rate is just 13.5 percent for the first year (with a 1.9 percent mortality rate in the second year and 11.7 in the third year) (Civil *et al.*, 2019).

Orcas

419. Two SeaWorld documents from the 1990s made the original claim of a 35-year life span for orcas (SeaWorld 1993; 1994). This misinformation was found on SeaWorld's website for many years and docents at SeaWorld were recorded repeating this incorrect statistic in the documentary *Blackfish*. However, the company's website now states that "[w]hen factored in at birth, the average life expectancy of southern and northern resident killer whales is about 29 years for females and 17 years for males. … If a killer whale survives the first six months, a female's average life expectancy is within the range of 46 to 50 years and a male's is 30 to 38 years" (*https://seaworld.org/animals/all-about/killer-whale/longevity/*). While this is more accurate than previously, it is still misleading, as the infant mortality rate from the wild is only estimated, not confirmed. Therefore, life expectancy from birth is merely speculative; for this reason, expert orca biologists prefer to focus only on life expectancy from six months, including when comparing free-ranging statistics with captive ones. SeaWorld's insistence on calculating life expectancy for free-ranging orcas from birth also under-emphasizes its own captive breeding program's stillbirths and miscarriages.

420. See *https://seaworld.org/animals/all-about/killer-whale/longevity/*. SeaWorld's website neglects to clarify that as all whales captured from the wild have in fact survived the first six months of life (all orca captures are of weaned individuals; weaning occurs at about 2 years of age), a good number of the orcas captured from the wild over the decades should have (and could have) achieved at least the mean life expectancies they note, yet very few have.

421. Ford (2009).

422. It is highly likely that at least one or more of these females were actually older than 15 years of age at the start of this long-term study (given the unlikely circumstance that all four were exactly the same minimum age for adulthood). For a list of individual whales in the Pacific Northwest populations with known or estimated ages, see Olesiuk *et al.* (1990); Ford *et al.* (1994); Ellis *et al.* (2011); and Towers *et al.* (2015).

423. See DeMaster and Drevenak (1988); Small and Demaster (1995b); Jett and Ventre (2015); and Robeck *et al.* (2015); see also *www.orcahome.de/orcastat.htm*. Only two male orcas at SeaWorld have exceeded 30 years of age: Tilikum and Ulises (Tilikum was believed to have been born in approximately 1981—he died in 2017—and Ulises is believed to have been born in approximately 1977 and is still alive, so has in fact exceeded 40 years of age). Only two other captive males—in all of the other facilities globally holding orcas—have achieved 30 years of age (Orky of SeaWorld San Diego, who died in 1988 at approximately 30 years of age, and Kshamenk of Mundo Marino, Argentina, who was born in approximately 1988 and is still alive).

Only five female orcas belonging to SeaWorld have exceeded 30 years of age. Corky II, still living, was captured in 1969 from the Northern Resident community of whales in British Columbia, Canada, and is estimated to have been born in 1966. She is currently held at SeaWorld San Diego. Katina and Kasatka (who died in 2017) were born in approximately 1976 and thus both exceeded 40 years of age. Katina is still alive at SeaWorld Orlando; Kasatka was the matriarch of SeaWorld San Diego. Kayla (who died at the beginning of 2019 and thus was only a few months past her 30th birthday) and Orkid were captive-born in 1988, Orkid a few months earlier than Kayla. Orkid is still alive and is now the longest-lived of all captive-born orcas. Kayla was at SeaWorld Orlando and Orkid is in San Diego.

Only three other female orcas, held at other facilities, have exceeded 30 years of age (Lolita, still alive at Miami Seaquarium, is estimated to have been born in 1964—see endnote 205; Kiska, still alive at Marineland in Canada, is estimated to have been born in 1976; and Stella, still living at Port of Nagoya Aquarium in Japan, was born in approximately 1986). Of the more than 200 orcas who have been held in captivity since the 1960s, wild-caught or captive-born, this proportion achieving 30 years of age or more is therefore very small (less than 15 percent), even when considering only those whales who *could* have achieved 30 years of age or more by this time.

424. These analyses include The Humane Society of the United States (1993); Balcomb (1994); Small and DeMaster (1995b); and Woodley *et al.* (1997). It should also be noted that these calculated mortality rates for captive orcas do not include stillbirths, deaths due to breeding complications, or the 12 free-ranging orcas who are known to have died during the capture process.

425. Page 1362 in Jett and Ventre (2015).

426. Todd Robeck, the lead author of Robeck *et al.* (2015), is a veterinarian, Michael Scarpuzzi was the vice president of zoological operations (he has since left the company), and Justine O'Brien is a reproductive biologist, all at SeaWorld San Diego; Kevin Willis works at the Minnesota Zoo.

427. Robeck *et al.* (2015) used annual survivorship rates (ASR) to calculate average life expectancy (applying an equation discussed in DeMaster and Drevenak, 1988). However, DeMaster and Drevenak (1988) specifically cautioned against using this equation, as it is extremely sensitive to minor changes in ASR (a small percentage change in ASR can add or subtract many years from projected life spans) and because two required assumptions are typically violated by most mammalian datasets. One, ASR must remain constant over time (and Robeck *et al.* had actually determined it improved over time) and two, ASR must remain constant over age and sex classes (and for most mammals, survivorship is a bell curve—older and younger animals show lower survivorship than "prime-of-life" animals—and females tend to show higher survivorship than do males). Oddly, despite this, Robeck *et al.* actually cited DeMaster and Drevenak *in support of* their use of this equation, a discrepancy that the paper's peer reviewers failed to note.

Furthermore, Robeck *et al.* included the oldest animals in the SeaWorld sample, even though these wild-caught whales' ages had to be estimated from their size at capture, but eliminated the oldest animals from the free-ranging sample—that is, all whales born before the early 1970s when the long-term field study in the northeast Pacific began. In short, the authors retained data in the captive dataset that was most supportive of their bias, while rejecting data from the free-ranging dataset that was least supportive of their bias. Again, the peer reviewers of this paper did not object to this.

This inconsistent, even invalid, analysis obviously skewed the longevity of the SeaWorld animals upward, while skewing the longevity of free-ranging orcas downward. Indeed, Robeck *et al.* (2015) illogically concluded that "the vast majority (>97%)" of free-ranging orcas die before the age of 50, based on a dataset that deliberately excluded animals older than 45. The oldest female now alive in the northeast Pacific is believed to be approximately 80, but she and several other living whales are *at least* 60; they were first identified as adults (by size and behavior) when the study began 45 years ago, and they must have been at least 14–15 years of age at that time (this is the average age of first successful birth, considered sexual maturity for females, so this conservatively assumes they had just reached adulthood when the study began, actually an unlikely circumstance—see endnote 422). However, Robeck *et al.* did not consider these whales in the paper's analysis (as their ages were not known, but only estimated) and then drew conclusions as if deliberately excluding these whales from a dataset meant they did not exist at all.

428. As noted in endnote 423, only one wild-caught male and three wild-caught females who are currently alive are older than 35 years of age at SeaWorld. The oldest captive-born whale is Orkid, who reached 30 years of age in late 2018 (the next oldest, Kayla, was two months younger than Orkid—the next nearest-in-age living captive-born orca at SeaWorld was born three years after Kayla). There are now 17 living captive-born orcas in SeaWorld's collection, while a dozen more have died since the first successful birth in 1985. Most were younger than 20 (in addition, there have been 14 known stillbirths or miscarriages). It should be clear even to those with no math skills that an average life expectancy for captive-born orcas of almost 50 years is invalid when none living or dead have yet come within 20 years of this age.

429. SC 2002, c. 29. The US Pacific Northwest resident whales, in Washington State and British Columbia (Southern and Northern Residents, respectively) are some of the best-studied orca populations in the world (Ford, 2009). However, both populations have had to deal with significant threats over the years, including depletions of both populations through live captures for the dolphinarium trade in the 1960s and 1970s. In the 1990s and 2000s, high levels of pollutants (Ross *et al.*, 2000; Krahn, *et al.*, 2009) and shortages of prey, especially salmon (Ford *et al.*, 2009), became major threats. The Southern Resident orcas have been hit much harder by all of these factors and are listed as endangered under the ESA (see *https://www.westcoast.fisheries.noaa.gov/protected_species/marine_mammals/killer_whale/esa_status.html*). Their reproductive potential (which is a measure of their ability to recover from their current depleted status) is limited, given the small number of reproductive-aged females left in the population and the even smaller number of reproductive-aged males. The Northern Resident orcas are listed as threatened in Canada (see *http://www.sararegistry.gc.ca/species/speciesDetails_e.cfm?sid=698*). When compared just to the southern Alaska residents, a healthy population never targeted for capture, SeaWorld's orcas, especially their older animals, compare less favorably (Matkin *et al.*, 2014; Robeck *et al.*, 2015). Therefore, captive orcas are doing only as well as orca populations currently at varying levels of risk of local extinction from a wide range of threats such as pollution and starvation—which is hardly something to boast about.

Nevertheless, even in the face of these many threats, up to 80 percent of the whales in the northeast Pacific populations reach sexual maturity (about 14–15 years of age; see endnote 427) and up to 45 percent reach menopause (about 40 years of age). In captivity, to date, only 45 percent have made it to sexual maturity and only 7 percent have reached menopause (Jett and Ventre, 2015).

430. See *http://orcahome.de/orcastat.htm* for a complete list of all known captive orcas, their deaths, and pregnancies up to September 2018—this website was regularly updated until this date and was compiled from official government records (primarily from the United States, as other countries do not require inventories), media reports, and information submitted by animal activists around the world. The list is almost certainly incomplete regarding pregnancies, unborn fetuses, spontaneous abortions (miscarriages), and stillbirths, making the calculated calf survival rate generous. A particularly unlucky female, Corky II at SeaWorld San Diego, had at least seven unsuccessful pregnancies before she achieved menopause and stopped cycling.

431. See *http://www.orcahome.de/deadorig.htm*.

432. It has been estimated that, on average, 40–45 percent of orca calves in the wild die during the first six months of life (Ford, 2002). This datum is very uncertain, however, and is generally not cited by orca biologists.

433. Clubb and Mason (2003).

434. See endnote 93. Morgan, who gave birth in September 2018 at Loro Parque in the Canary Islands, Spain, has also failed to nurse her calf properly, requiring staff to step in and bottle feed the newborn (Alberts, 2018). She was approximately 11 years of age when she gave birth. Free-ranging orcas give birth to their first viable calf at 14–15 years of age on average in the wild (see endnotes 421 and 427), by which time they would have participated in alloparenting ("baby-sitting") of other calves (Waite, 1988) and would have seen other females in their family group rearing calves. While solitary calves have been observed in the wild, it is believed that this generally occurs when the mother dies, not because of maternal rejection.

Other Cetacean Species

435. Woodley *et al.* (1997).

436. Stewart *et al.* (2006).

437. Willis (2012).

438. Whale and Dolphin Conservation (2016).

439. Ceta-Base (2010).

440. Willis (2012).

441. NMFS, *National Inventory of Marine Mammals*; Couquiaud (2005); *www.cetabase.org*.

Summary

442. The most notable recent examples of this are Willis (2012) and Robeck *et al.* (2015).

443. The pattern of zoo animals often living longer than their free-ranging counterparts is well established. An analysis of more than 50 mammal species found that, in 84 percent of cases, zoo animals live longer than their wild counterparts (Tidière *et al.* 2016). This makes sense, given that prey species, for example, are not subject to predation in zoos. Elephants (Clubb *et al.*, 2008) and cetaceans are notable exceptions to this rule; they do not live as long as, and certainly not longer than, free-ranging counterparts.

444. Reeves and Mead (1999).

445. For comparison, "happier" captive orangutans—those provided conditions that reduce their stress levels—have been found to live longer (Weiss *et al.*, 2011b).

CHAPTER 10 • HUMAN–DOLPHIN INTERACTIONS

Dolphin-Assisted Therapy

446. For example, see the Dolphin Experience at *http://www.thedolphinexperience.com/Dolphin-Therapy-Benefits.html*.

447. See Marino and Lilienfeld, (1998); Humphries, (2003); Basil and Mathews (2005); Marino and Lilienfeld (2007); Baverstock and Finlay (2008); and Williamson (2008).

448. There is no overarching, international, or even national or academic management body regulating dolphin-assisted therapy (DAT) facilities, so there is no oversight of the qualifications, certifications, or degrees of the staff at these facilities (Brakes and Williamson, 2007).

449. Smith (2003). Even David Nathanson, one of the most vocal published proponents of DAT, suggested he might move away from using live dolphins. One of his publications reported on the use of animatronic dolphins for DAT (Nathanson, 2007). He concluded that "[i]nteraction with [an animatronic dolphin] provided the same or more therapeutic benefits as interaction with [live] dolphins, without environmental, administrative/legal and practical limitations, including high cost, associated with dolphins" (p. 181).

Swim-With-Dolphin Attractions

450. The parties to ACCOBAMS expressed concern about an increase in commercial operations involving "swim-with" and "dolphin-assisted therapy" programs in captive facilities and enclosed/semi-enclosed sea areas. They were "*Convinced* that the extent of such operations is likely to be an increasing threat to wild cetacean populations due to illegal takes and reintroductions" (ACCOBAMS, 2007).

451. For example, despite humans entering the water and interacting closely with cetaceans, there is no prohibition against tourists who are sick from interacting with cetaceans, so potentially dangerous infections could be transferred to dolphins (Rose *et al*., 2017). For the sake of the animals' health, and indeed that of other human participants, all staff and participants in interactive programs should disclose any illness, particularly of an infectious nature, before entering a marine mammal enclosure (Rose *et al*., 2017), but there is currently no such requirement anywhere.

452. Enforcement was suspended in April 1999 (*64 Fed. Reg. 15918*). See endnote 462 for a history of the US SWD regulations, ending in the suspension of their enforcement.

453. As noted in endnote 4, this authority is shared with the FWS. NMFS has authority over seals, sea lions, whales, dolphins, and porpoises. The FWS has authority over polar bears, sea otters, walruses, manatees, and dugongs.

NMFS (and the FWS) previously shared authority over captive marine mammals with APHIS (see endnote 258), but this co-management ended in 1994 when the MMPA was amended.

454. At the time, SWD encounters were considered experimental and only four operations existed in the United States. The report was later published, after peer review and revision, in the scientific journal *Marine Mammal Science* (Samuels and Spradlin, 1995).

455. Another scientific examination of SWD attractions concluded that SWD interactions are dangerous to humans and dolphins and recommended against the expansion of such facilities and the capture of dolphins from the wild to stock them (Frohoff, 1993). For a review article that examined SWD attractions up to 1994, see Frohoff and Packard (1995).

456. "Control" was defined as supervision by trainers who direct the type of interactions that occur between dolphins and swimmers, versus participants swimming freely with dolphins without direction from supervising trainers.

457. However, APHIS's 2016 proposed regulations gave a minimum refuge size of 7.3 m (24 ft) x 7.3 m (24 ft) x 1.8 m (6 ft). There is no scientific evidence to conclude that an enclosure of this size would be attractive to dolphins so that they would avail themselves of it as a refuge when they do not wish to interact with swimmers (Rose *et al*., 2017).

458. A behavioral study on captive common dolphins in an SWD attraction at Marineland Napier, in New Zealand, found that the dolphins increased their use of the refuge area (an area the same size as the main enclosure, where human swimmers were not permitted to enter) when swimmers were in the water with them. During periods without swimmers, there was no difference in the amount of time the dolphins spent in the refuge area and the main enclosure area.

The study also noted that many inter-animal social behaviors decreased with the presence of humans, but the rate of animals touching each other with flippers, and some other behaviors (such as synchronous swimming) increased, as did the number of surfacings. Despite this evidence of a significant impact on dolphin behavior from the presence of swimmers, the study's authors inexplicably dismissed these observations, stating that SWD interactions did not have any negative effect on the dolphins (Kyngdon *et al*., 2003).

Marineland Napier's last dolphin died in September 2008. The manager resigned in 2009 after 32 years in that position, when it was discovered he had been falsifying documents and had, therefore, been keeping pinnipeds illegally; the facility closed down soon after (De Leijer, 2009). In 2010, it was announced that the dolphinarium was to be demolished and the site turned into a skate park.

459. Few peer-reviewed studies have systematically examined whether participation in SWD sessions led to behavioral change in captive dolphins. Trone *et al.* (2005) concluded that participation did not lead to negative behavioral changes and was therefore not detrimental to the dolphins. For example, they considered "play" behavior observed in their animals to be evidence of no negative welfare impact from SWD participation. They did, however, emphasize the caveats—the study, which took place at a dolphinarium in Mississippi, had a very small sample size (three dolphins) and the dolphins only participated in one session per day. The authors recommended that the results of this study should be "accepted with caution" and "should only be generalized to situations where dolphins partake in a single Dolphin Interaction Program each day" (p. 364 in Trone *et al*., 2005). This latter situation is not typical of SWD attractions in high-tourist traffic areas such as Florida or the Caribbean, where dolphins are more often used in three to five sessions a day.

In contrast, Sew and Todd (2013) found negligible evidence of play behavior (0.035 percent of the time) for Indo-Pacific humpback dolphins (*Sousa chinensis*) participating in SWD encounters. They also noted significant changes in swimming behavior and tank utilization after SWD sessions, although there was marked variability among the three dolphins studied. Animals also associated more with each other after SWD sessions. Despite these changes, the authors concluded that SWD participation did not compromise the dolphins' welfare. However, increased directional swimming and animals coming together in closer groupings have been interpreted as negative reactions for free-ranging bottlenose dolphins exposed to boat traffic (Mattson *et al*., 2005; Bejder *et al*., 2006). Therefore, Sew and Todd's interpretation of no welfare impact is inconsistent with how field biologists interpret similar behavior in free-ranging dolphins.

Brensing *et al.* (2005) looked at two SWD programs, which involved animals in sea pens. At Dolphins Plus in Florida, in the United States, the dolphins showed some signs of "stress," such as avoidance, speed increase, higher rates of activity, and moving closer together. However, at Dolphin Reef Eilat in Israel, the dolphins did not display these negative changes. Brensing *et al*. concluded these differences arose because the latter enclosure was much larger (at 14,000 square m (151,000 square ft), more than 20 times larger) than the former. Also, they noted that Dolphin Reef has three areas: "an entry area, an area where dolphins and humans can interact, and a huge refuge area which is not entered by humans. The opportunity to enter a refuge area was rated to be an especially important contribution to the animals' welfare.… It has been observed that dolphins supplied with a proper refuge area, prefer this area and show reduced aggressive, submissive, and abrupt behaviors during [SWD] programs" (p. 425). Also in Eilat, the tourist groups were smaller (Dolphin Reef average = 3.2 people; Dolphins Plus average = 5 people) and the Eilat tourists "were always guided by a staff member who was well known to the dolphins" (p. 425).

We are aware of only one study (presented at a veterinary conference and published in its proceedings) that examined whether dolphins

experienced physiological (versus behavioral) changes from participating in SWD sessions. This study measured stress hormone levels and concluded that there was no difference in these levels between dolphins used in SWD encounters and those in performance-only exhibits. However, the described methodology did not clarify the sampling regime—it was not clear when the animals were sampled (directly after a swim session or after some time had passed, for example), how often they were used in swim sessions, and so on. Additionally, the study was apparently never submitted for publication in a peer-reviewed journal (Sweeney *et al.*, 2001).

460. On p. 5632 of the APHIS proposed rule (*81 Fed. Reg. 5629*, 2016), where it addressed SWD attractions, footnote 2 states: "We note that interactive programs have been operating for over 20 years without any indications of health problems or incidents of aggression in marine mammals." However, as enforcement of regulations has been suspended for 20 years, there is no requirement for facilities to report incidences of human or dolphin injury or aggression. The above statement is based solely on brief annual inspections, which are insufficient to draw such a comprehensive conclusion (Rose *et al.*, 2017). See also Chapter 11, "Risks to Human Health."

461. Researchers surveyed people who had participated in SWD interactions within the previous two to 36 months and asked them how they felt about the education offered at the facilities they visited. The respondents replied that they could not remember many of the details of the interpretation, they did not consider it to be very factual, and some viewed the material to be "fill-in" (p. 142 in Curtin and Wilkes, 2007) while the animals were being prepared for the interaction session.

462. On 23 January 1995, APHIS published proposed regulations specifically for SWD interactions in the *Federal Register* (*60 Fed. Reg. 4383*). After more than three years, APHIS published final regulations on 4 September 1998 (*63 Fed. Reg. 47128*). The regulations included requirements for refuge areas, swimmer-to-dolphin ratios, swimmer-to-staff ratios, staff training, maximum interaction times, and provisions for addressing unsatisfactory, undesirable, or unsafe behavior—all measures to promote the welfare of the animals (and the safety of the participants). Almost immediately, on 14 October 1998, APHIS exempted "wading programs" from these regulations until further notice, as there was confusion as to whether standards for space and attendant supervision meant for swimming sessions should apply also to sessions where participants remain essentially stationary and non-buoyant (*63 Fed. Reg. 55012*).

On 2 March 1999, a small article was published in the *Washington Legal Times*, stating that an influential casino owner, Steve Wynn (then-owner of the Mirage Hotel in Las Vegas, Nevada), who also had bottlenose dolphins on display and wanted to start SWD interactions, had hired an attorney to lobby the federal government to "seek a nullification" of the SWD regulations. On 2 April 1999, APHIS published a notice suspending enforcement of the SWD regulations (*64 Fed. Reg. 15918*). The suspension was never lifted (Rose *et al.*, 2017), despite agency assurances over the years that the regulations were undergoing revision; as of January 2019, SWD interactions are still effectively unregulated in the United States.

463. For example, during the public comment period for proposed new regulations in the United States to govern the care and maintenance of captive marine mammals (Rose *et al.*, 2017; see endnote 258), the International Marine Animal Trainers' Association urged members to send in the following statements (see *https://www.imata.org/aphis/index.html*):

"To my knowledge, there is no peer-reviewed scientific data that demonstrates a need for additional regulation or how further regulation would be a benefit to marine mammals."

"Additionally, I cannot support the proposed rule which stipulates that interactive sessions must not exceed 3 hours per day per animal. … With that said, in my experience, there is no indication that any restriction in time for interactive sessions is needed."

"With respect to the proposed changes in attendant/animal ratios, creating a requirement that there must be at least one attendant per marine mammal in each session and at least one attendant positioned to monitor the session is not necessary."

"Finally, I have some concerns with the language used to describe 'unsatisfactory' or 'undesirable' behaviors. … Trainers are in the best position to best [sic] determine if an animal exhibits unsafe behavior and facilitate behavioral redirection or the termination of its participation in a session due to such behavior."

464. The Source (2018).

465. The expansion of SWD facilities in the Caribbean in particular appears to have occurred as ports and vendors compete for the excursion dollars of growing numbers of passengers from cruise ships. The large vessels carry thousands of tourists who disembark for brief excursions in Caribbean ports. Due to the brevity of a port stay (often only several hours), passengers are offered short-duration activities, and visits to SWD facilities are a popular choice. However, there has been no obvious effort by the cruise lines to inspect the facilities to which passengers are sent, to ensure that they are safe for visitors, that the dolphins are being well treated, or even that the dolphins are being kept legally. There has been little or no active effort by cruise lines to offer passengers or otherwise promote non-invasive, sustainable marine mammal tourism activities, such as watching free-ranging whales and dolphins from boats run by responsible tour operators.

The SWD facilities gain substantial revenue from each influx of cruise ship passengers, making these operations highly profitable (and the cruise lines receive a commission for each excursion sold on board)—thus more facilities spring up, often run by entrepreneurs with little or no experience in maintaining captive marine mammals. Were cruise lines to issue guidelines for their vessels that they should only promote non-invasive and sustainable whale and dolphin-related tourism activities to their passengers, it would reduce both the risk of passenger injury and the pressure on populations in the wild from the need to supply animals for these operations.

In recent years, several tourism operators and associations are in fact distancing themselves from dolphinaria, after the negative public attention that these facilities received when the documentaries *The Cove* and *Blackfish* were released (see Chapter 12, "The *Blackfish* Legacy"). For example, in 2016 TripAdvisor stopped selling tickets to facilities that offered interactions with wildlife, including SWD attractions (Herrera, 2016). In 2017, tour operators Thomas Cook and Virgin Holidays stated that they would not book with vendors that failed to meet the Association of British Travel Agents welfare guidelines, which resulted in Thomas Cook blacklisting several SWD facilities (Russell, 2017). Virgin Holidays went further and stated it would not promote any new dolphinaria starting in 2017 (*https://www.virginholidays.co.uk/cetaceans*).

466. Manatí Park, an SWD attraction in the Dominican Republic, conducted a capture of bottlenose dolphins that was illegal under both national and international law (see Parsons *et al.*, 2010a and Chapter 3, "Live Captures"). As described in endnote 245, in November 2004, it was reported that Dolphin Discovery was expelled from Antigua after breaking laws and ignoring the orders of governmental officials when its activities led to the flooding of a nearby lagoon and risks to human health near its facility. In The Bahamas, a judge ruled that an SWD operator did not actually own the dolphins he was holding in a facility known as Blackbeard's Cay, located on Balmoral Island near Nassau, New Providence, in an alleged attempt to avoid paying customs duties when the animals were imported from Honduras (Hartnell, 2016).

Petting Pools and Feeding Sessions

467. In the survey of visitors to a dolphinarium in Canada, the authors concluded that "the motivation of visitors to marine parks is to see the display and performance/shows of marine mammals … rather than petting and feeding marine mammals. This finding disproves one of the claims of marine parks, which is that visitors come to marine parks because of the close personal interaction with marine mammals" (p. 247 in Jiang *et al.*, 2008).

468. See Vail (2016) for a discussion of the consequences of feeding for free-ranging cetaceans. In its report for the IWC's Scientific Committee, the Sub-Committee on Whale Watching noted that "in several locations where there are captive dolphin facilities with swim-with programs, petting pools or feeding stations, problems with human interactions with wild cetaceans

have been exacerbated. Members of the public have stated that they are permitted and encouraged to engage in such actions in a captive setting, so assume it is acceptable with free-ranging animals. This increases difficulties with awareness, acceptance and enforcement of regulations" (International Whaling Commission, 2007b).

469. All marine mammals are potentially dangerous. Even sea otters are capable of inflicting serious bite wounds and pinniped bites can be particularly dangerous and can cause serious infections (Hunt *et al.*, 2008). Most notably, bottlenose dolphins (in the wild) and orcas (in captivity) have inflicted serious injuries and even killed people (Santos, 1997; Parsons, 2012). See Chapter 11, "Risks to Human Health."

470. In 1999, initial research findings on the impact of petting pools on dolphins were sent to the US government, which forwarded this information to SeaWorld (Whale and Dolphin Conservation Society and The Humane Society of the United States, 2003). Subsequently, some improvements were noted at the petting pool exhibits, but many problems still remained. Negative publicity, coupled with chronic issues with dolphin obesity and aggression toward tourists, eventually led to SeaWorld ending the unrestricted interactions at its petting pools in 2015 (Glezna, 2015). Now the only visitor feeding that occurs has a separate fee and is strictly supervised by trainers, in "trainer for a day" and other such programs.

471. In comparison, the suspended regulations for SWD programs called for each dolphin to be exposed to public interaction for no more than two hours a day. In addition, the regulations stipulated that dolphins must have unrestricted access to a refuge area to which they could retreat to avoid human contact.

472. Under the APHIS regulations, giving of food to marine mammals by members of the public can only be done under the supervision of a facility employee, who must ensure that the correct type and amount of food is given, which, in turn, can only be supplied by the captive facility (9 CFR § 3.105(c)). Furthermore, under these regulations food for captive cetaceans should be prepared and handled so it is "wholesome, palatable, and free from contamination" (9 CFR § 3.105(a)). By definition, certain types of petting pools were a violation of these regulations, as members of the public handled and provided food to the animals without direct supervision (Rose *et al.*, 2017). While *ad libitum*, unsupervised public feeding has ceased at US facilities, it is not prohibited, and such interactions may continue in other countries.

APHIS excluded marine mammal feeding and petting pool exhibits from their proposed definition of "interactive programs" (*81 Fed. Reg. 5632*, 2016). Rose *et al.* (2017) suggested that regulations should either prohibit hand-feeding and petting exhibits entirely or that they should include them in the definition of "interactive program" and establish regulations specific to these types of exhibits.

473. Whale and Dolphin Conservation Society and The Humane Society of the United States (2003).

474. In addition to these foreign objects, dolphins were also fed fish that had been broken up, exposing bones with which dolphins could be injured when swallowing, or fish that were contaminated—for example, fish that had been dropped on the ground and then stepped on (Whale and Dolphin Conservation Society and The Humane Society of the United States, 2003).

475. Disease transmission is obviously not the only risk posed to people at petting pools and feeding sessions. Dolphins may also bite and strike at people with their rostrums (the beak-like projection, forming the mouth, at the front of their head), causing bruising and skin breaks, risking infection. A petting pool dolphin grabbed a young boy's arm with his mouth at SeaWorld Orlando in 2006, bruising it but not breaking the skin. There was a second incident the following month (see endnote 491), and in 2012, at the same facility, an 8-year-old girl was bitten (Hernández, 2012). The video of this latter incident was widely shared on social media and may have played a role in SeaWorld ending *ad libitum* feeding at its petting pools. As noted in Chapter 11 ("Risks to Human Health"), bottlenose dolphins are capable of inflicting serious injury and have even been known to kill people under certain circumstances (Santos, 1997).

476. Whale and Dolphin Conservation Society and The Humane Society of the United States (2003).

477. In a survey of public display facilities (Boling, 1991), respondents offered interesting insights on why many dolphinaria did not have petting pools or, if they did at one time, why they closed them. Respondents noted, "We abandoned the practice because of overfeeding, difficulties regulating amounts fed, and potential injury to the public," and "My objections are hygiene (the state of the public's hands), the possibility of foreign bodies being placed in the fish … and the staffing commitment that would be necessary to police such a facility." Our concerns are strongly reflected in these statements from industry representatives.

CHAPTER 11 • RISKS TO HUMAN HEALTH

Diseases

478. Of this group of respondents, 64 percent stated that their skin lesions occurred after physical contact with a marine mammal, and 32 percent noted that their infections were associated with marine mammal bites. When specific diseases were reported, these included poxvirus and herpesvirus infections, and bacterial dermatitis (caused by *Staphylococcus aureus*, *Mycobacterium marinum*, or *Pseudomonas* spp.). Ten percent of respondents noted the contraction of "seal finger," an infection caused by *Mycoplasma* spp. or *Erysipelothrix rhusiopathiae*. In one case this infection was so severe as to be considered "life threatening," ultimately requiring amputation of the infected finger. This particular infection occurred as the result of exposure to a marine mammal carcass, and not a public display animal, although it should be noted that several instances of "seal finger" infections have arisen from bites given to captive marine mammal workers (Mazet *et al.*, 2004). This report was subsequently revised and published in a peer-reviewed journal (Hunt *et al.*, 2008), in which the authors noted that "[d]uring certain recreational activities, the public may also be at risk of transmitting diseases to and contracting diseases from marine mammals," (p. 82). They specifically referred to SWD activities.

A paper by Waltzek *et al.* (2012) also reviewed the potential diseases that could be transferred to humans from marine mammals, warning that "[e]ncounters with … marine mammals pose certain risks, including traumatic injury and disease transmission" (p. 521). The authors go on to add that the list of diseases that can be transferred from marine mammals to humans is growing, including several potentially "life threatening" diseases (p. 521). They warn that "[m]arine mammal researchers, rehabilitators, trainers, veterinarians, volunteers and subsistence hunters have an increased risk of being injured or acquiring [marine mammal] diseases through extended occupational exposure" (p. 521) and that "[g]iven the popularity of oceanaria and continued marine mammal research and rehabilitation, future zoonotic disease cases involving bacterial, viral and fungal pathogens are inevitable" (p. 530). Zoonotic refers to diseases that can be transmitted from non-human animals to humans.

479. Long-term (more than five years) or frequent (more than 50 days a year) exposure to marine mammals, or being engaged in activities related to cleaning or repairing enclosures, were all statistically likely to increase the risk of infection (Mazet *et al.*, 2004).

480. Eighteen percent of survey respondents reported respiratory illnesses contracted while working with marine mammals, although only 20 percent believed that the disease was the result of marine mammal contact. Six percent also noted long-term malaise (with symptoms similar to those found with chronic fatigue syndrome or multiple sclerosis) that a third attributed to marine mammal contact. Workers exposed to marine mammals more than 50 days per year were three times more likely to contract a respiratory infection (Mazet *et al.*, 2004).

481. Marine mammals can host a number of pathogens that pose risks to humans. A study of bottlenose dolphins off Florida, Texas, and North Carolina in the United States found 1,871 bacteria and yeast strains and 85 different

species of microorganisms in fecal and blowhole samples, several of which were of potential pathogenic significance to humans (Buck *et al*., 2006). Black Sea bottlenose dolphins carry antibodies (meaning they have been exposed to the associated pathogens) to morbillivirus, *Toxoplasma*, and *Brucella* (Russia IC, 2008). *Brucella* is common in cetaceans and is zoonotic (Van Bressem *et al*., 2009; Guzmán-Verri *et al*., 2012). There have been several incidences of humans being infected by marine mammal strains of *Brucella*, a bacterium that can cause symptoms ranging from fatigue and depression to joint pain, fever, spontaneous abortion in pregnant females, inflammation of the gonads in males, and even death. For cases of human infection with seal and dolphin strains of the *Brucella* bacterium, see Brew *et al*. (1999); Sohn *et al*. (2003); and MacDonald *et al*. (2006). The Center for Food Security and Public Health at Iowa State University warns that marine mammal versions of *Brucella* can infect humans; groups at risk include "people who work in marine mammal rehabilitation or display centers, as well as anyone who approaches a beached animal or carcass" (p. 6 in Center for Food Security and Public Health, 2018).

However, *Brucella* is not the only transmissible pathogen; several more papers and case studies have been published documenting evidence of transmission of diseases from marine mammals to humans (see Eadie *et al*., 1990; Thompson *et al*., 1993; Smith *et al*., 1998; Clark *et al*., 2005; Norton, 2006). In particular, *Staphylococcus aureus*, including drug resistant strains, are common in dolphins (Venn-Watson *et al*., 2008) and can be transferred to humans (Faires *et al*., 2009). *Clostridium perfringens* infection has been fatal in at least one captive dolphin (Buck *et al*., 1987), has been found in captive dolphin tanks, and is one of the most common pathogens responsible for food poisoning in humans. *Toxoplasma* may also pose some degree of risk to people in close contact with infected cetaceans (Van Bressem *et al*., 2009), and tuberculosis has been transferred from pinnipeds to their human keepers (Kiers *et al*., 2008). In addition to the pathogens noted above, Waltzek *et al*. (2012) highlighted the bacteria *Bisgaardia hudsonensis, Leptospira* spp., *Mycobacterium pinnipedii, Mycoplasma phocacerebrale*, *M. phocarhinis*, and *M. phocidae*; caliciviruses (notably the San Miguel sea lion virus); parapoxvirus; influenza; and the fungal pathogens *Ajellomyces dermatitidis* and *Lacazia loboi* as being transmissible from marine mammals to humans and capable of causing disease. MRSA led to the deaths of two captive dolphins in Italy and was also found in two of their caretakers (Gili *et al*., 2017; see endnote 332).

482. Several cases are noted in the report by Mazet *et al*. (2004), where physicians were unable to diagnose long-term and recurrent infections. Some physicians refused even to acknowledge that there was a possible risk of infection, with one doctor quoted as saying that there were "no diseases that could be transmitted from whales to humans—so don't worry about it" (p. 15 in Mazet *et al*., 2004).

483. See p. 521 in Waltzek *et al*. (2012). For example, the bacterium *Erysipelothrix rhusiopathiae* can cause sepsis, *Leptospira interrogans* can result in renal failure, and *Mycobacterium pinnipedii* can result in tuberculosis.

484. Indo-Pacific bottlenose dolphins captured in Solomon Islands were found to have been exposed to both *Brucella* (Tachibana *et al*., 2006) and *Toxoplasma* (Omata *et al*., 2005), the causative agents of brucellosis and toxoplasmosis, respectively. *Brucella* is a pathogen transmissible to humans (see endnote 481). Toxoplasmosis is potentially fatal to marine mammals (Migaki *et al*., 1990) and, if contracted by pregnant women, can result in abortion or congenital defects in fetuses. In children and adults, there are other symptoms and it is sometimes fatal (Dubey, 2006). Solomon Islands dolphins have been exported to Mexico and Dubai for use in SWD attractions. This illustrates the potential for disease transmission to humans inherent in human–dolphin interactions, particularly since pathogens such as *Brucella* can be released into the water of tanks and sea pens via an animal's contaminated feces (Center for Food Security and Public Health, 2018).

485. As noted in endnote 451, there are currently no regulations prohibiting handlers or tourists who have illnesses or infections from interacting with captive marine mammals. Rose *et al*. (2017) state that, at the least, handlers and tourists with respiratory infections, open sores, or potentially contagious infections should be prohibited from interacting with captive marine mammals.

Injury and Death

486. It should be noted that because enforcement of regulations for SWD facilities is currently suspended in the United States (see endnotes 460 and 462 and Rose *et al*., 2017) and not required in other jurisdictions, there is currently no official reporting of injuries resulting from interactions with cetaceans at SWD attractions in any country. As a result, the extent of public injury globally could be far greater than noted here.

487. For example, a report to the US Marine Mammal Commission never considered aggressive contact behaviors between dolphins and humans, such as strikes or blows, to be accidental (Pryor, 1990).

488. Yomiuri Shimbun (2003). The injured party sued the facility for ¥2.8million in damages (approximately US$25,000), claiming the facility failed to take precautions to prevent such incidents.

489. In January 2008, an 11-year-old captive bottlenose dolphin known as Annie, held by the Dolphin Academy in Curaçao, breached above a group of tourists participating in a swim. She landed directly on three of them, a maneuver that was highly unlikely to be accidental. Two people received minor injuries, while one was hospitalized with what were described as "paralysis symptoms." The dolphinarium employees allegedly confiscated cameras from facility visitors who witnessed the incident and attempted to erase digital evidence of it, and forcefully told visitors not to describe the incident to anyone. One person, however, did retain a digital video clip from a personal camera. The Partij voor de Dieren (Party for the Animals) in the Netherlands (Curaçao was at the time part of the Netherlands Antilles, a Dutch protectorate, which has since dissolved; its constituent islands are still part of the Kingdom of the Netherlands; see endnote 202) asked questions about the incident in the Dutch Parliament, after expressing concern about the welfare of the dolphins and the safety of tourists.

490. See endnote 456.

491. For example, in July 2006, a 6-year-old child was bitten by a bottlenose dolphin in a SeaWorld Orlando petting pool, while a 7-year-old child was bitten the following month (Underwater Times, 2006). See endnote 475.

492. In an analysis of stranded harbor porpoises in the Moray Firth, Scotland, 63 percent of the animals showed evidence of being attacked and seriously injured or killed by bottlenose dolphins (Ross and Wilson, 1996).

493. Adult bottlenose dolphins were reported killing at least five dolphin calves in the Moray Firth, Scotland, and killed at least nine calves over two years in the coastal waters of Virginia in the United States (Patterson *et al*., 1998; Dunn *et al*., 2002). Calves have been killed in captivity as well—for example, in August 2004, a 4-month-old female bottlenose dolphin calf was repeatedly attacked by two adult male dolphins at the National Aquarium in Baltimore, Maryland, in the United States, while her mother was performing. The calf, also suffering from an infection, died soon after (Roylance, 2004).

494. "Killer whales" historically got their name from having been observed killing other marine mammals, namely baleen whales. Observations in Monterey Bay, California, have noted that orcas in this area attack and kill at least seven species of marine mammals, including pinnipeds and cetaceans. There is evidence of attacks (such as scarring and injuries) on two species of baleen whale in the bay, although such attacks have not been directly observed (Ternullo and Black, 2003). See Chapter 12 ("The *Blackfish* Legacy") for more on orca aggression.

495. Fifty-two percent of respondents reported marine-mammal-inflicted injuries, with 89 percent of injuries on the hands, feet, arms, or legs; 8 percent on the torso or abdomen; and 4 percent on the face. More than a third of the injuries were severe (90 cases)—either a deep wound, with some requiring stitches, or a fracture. Statistically, those in regular contact (more than 50 days a year) with confined marine mammals were several times more likely to suffer a traumatic injury (Mazet *et al*., 2004).

496. Reza and Johnson (1989); Parsons (2012). While free-ranging (and captive) common bottlenose dolphins have been observed attacking and even killing conspecific calves on multiple occasions, only one such attack has been observed in free-ranging orcas (Towers *et al*., 2018). Given the many numbers of hours various researchers have observed free-ranging orcas in several populations, the rarity of this observation—a mother and son from the mammal-eating population in the northeast Pacific killed the calf of a female from the same population—suggests this was an unusual occurrence. See endnote 243 for more on injuries captive orcas have inflicted on tank-mates.

497. See, e.g., Dudzinski *et al*. (1995); Seideman (1997); Deegan (2005); Williams (2007).

498. Shane *et al*. (1993).

499. Santos (1997). There was no retaliation against the dolphin for this action, given the sequence of events.

500. Kirby (2012).

501. Liston (1999); Kirby (2012).

502. See, e.g., the characterization of Daniel Dukes' death in Sherman (2005). Dukes' autopsy report makes no mention of hypothermia, either as a primary cause of death or a contributing factor. The only cause of death recorded is drowning. It also describes multiple contusions and abrasions over much of his body—a total of 37 separate injuries occurring before he died (Reyes and Perez-Berenguer, 1999), strongly suggesting that Tilikum dragged Dukes around the tank, much as he and his tank-mates did Keltie Byrne, *before* Dukes finally drowned. This forensic evidence of Tilikum's active participation in Dukes' death has been persistently ignored and misrepresented by SeaWorld and in the media.

503. Martínez died after Keto pushed (rammed) him against the side of the tank, inflicting lacerations and severe internal injuries (Parsons, 2012). Two years before, in October 2007, another trainer at Loro Parque, Claudia Vollhardt, was injured by Tekoa, the other male orca (son of the infamous Tilikum) sent to the Canary Islands by SeaWorld in February 2006 (two female orcas were also transferred at the same time). Vollhardt's arm was broken in two places and required surgery. The whale also inflicted chest injuries (Sydney Morning Herald, 2007; Zimmerman, 2011; Parsons, 2012).

504. See Parsons (2012). Brancheau's injuries were substantial—her autopsy report states that she died of blunt force trauma and drowning. She suffered a broken jaw, neck, and ribs, a dislocated elbow and knee, and a severed arm, with part of her scalp removed, exposing her skull (Stephan, 2010). The amount of water in her sinuses was actually minimal and probably not sufficient to cause drowning, yet her cause of death is persistently given in media accounts as "drowning" only, downplaying the violence of Tilikum's behavior. See Chapter 12 ("The *Blackfish* Legacy") for more information.

505. Viegas (2010).

506. Peters suffered a broken foot and puncture wounds from the whale's teeth. It should be noted that, just three weeks before this incident, another female orca, Orkid, had also grabbed a trainer, Brian Rokeach, by the ankle and dragged him underwater. Rokeach luckily escaped (Parsons, 2012).

507. Transcript of Proceedings at p. 369, from *Secretary of Labor v. SeaWorld of Florida LLC*, OSHRC Dkt. No. 10-1705 (September 2011). In addition, three additional incidents were reported in the Orlando log for SeaWorld-owned whales at Loro Parque in the Canary Islands during the 1988–2011 period. See also Parsons (2012).

508. Some of these incidents came to light during testimony at the administrative law hearing after SeaWorld challenged the citation issued by OSHA for the death of Dawn Brancheau (Parsons, 2012). For example, SeaWorld noted in the "animal profile" of Kayla, a female orca at SeaWorld Orlando, that she had been involved in seven aggressive interactions. However, only one was recorded in the official incident log (Transcript of Proceedings at p. 451, from *Secretary of Labor v. SeaWorld of Florida LLC*, OSHRC Dkt. No. 10-1705 (September 2011); see also Parsons, 2012). SeaWorld representative Chuck Tompkins eventually conceded in his testimony that "we missed a few" incidents in the official log (Transcript of Proceedings at p. 457, from *Secretary of Labor v. SeaWorld of Florida LLC*, OSHRC Dkt. No. 10-1705 (September 2011)).

509. "Aggression expressed by killer whales toward their trainers is a matter of grave concern. Show situations involving water behaviors with trainers and orcas have become popular in recent years. Aggressive manifestations toward trainers have included butting, biting, grabbing, dunking, and holding trainers on the bottom of tanks preventing their escape. Several situations have resulted in potentially life-threatening incidents. In a few such cases, we can attribute this behavior to disease or to the presence of frustrating or confusing situations, but in other cases, there have been no clear causal factors" (pp. 61–62 in Sweeny, 1990).

510. The initial narrative summary of the November 2006 incident with Kasatka and Ken Peters, which included extensive background details on the history of keeping orcas in captivity and previous incidents involving trainer injuries, was written by an investigator with the California Division of Occupational Safety and Health (Cal/OSHA) after extensive interviews with Peters and other SeaWorld trainers (Cal/OSHA form 170A, narrative summary inspection number 307035774, no date). The content of this initial summary was based on those interviews. The information memorandum—a requirement of Cal/OSHA, but not federal OSHA—was intended to address "potential hazards" to employees and to offer recommended solutions (Cal/OSHA form-1, information memorandum, report number 307035774, 28 February 2007).

These recommendations included (1) improving control over the orcas by reducing environmental stressors (the narrative summary included a description of such possible stressors, including a performance schedule that was overly demanding), (2) increasing the number of orcas in the captive population, to reduce the need for the trainers to rely on one or two animals for the majority of performances (this suggests that distributing SeaWorld's 20 or so orcas over three locations was not in the best interests of the animals, although it maximizes the parent company's profits), and (3) reconsidering the possibility that lethal force against "out of control" orcas might be necessary to protect trainers. All of these recommendations belied SeaWorld's self-characterization of its management practices as always in the best interests of the animals and of the in-water interactions (known as "waterwork") between trainers and orcas as absolutely safe.

SeaWorld strongly objected to the information memorandum, which under Cal/OSHA rules is only supposed to be issued when an actual violation of safety standards has been identified (whether or not an employee has been exposed to it), and insisted that the majority of the narrative summary's contents were beyond the expertise of the investigator and should be deleted (despite the narrative summary being based on interviews with SeaWorld's own trainers). Three days after the memorandum was officially filed, a press release from Cal/OSHA (dated 2 March 2007) announced that the memorandum was being withdrawn, as SeaWorld was in full compliance with safety codes, and that the agency regretted "the difficulties it may have caused Sea World [sic], its staff, and its patrons." The narrative summary of the incident was retained, but substantially redrafted to omit any language that suggested or otherwise contributed to an implication or impression that doing waterwork with orcas was high-risk. The final version was dated 4 April 2007.

Subsequent communication between author Rose and a Cal/OSHA employee indicated that the withdrawal was the result of unprecedented pressure from SeaWorld executives on the agency. The executives strenuously objected to any suggestion that current practices at SeaWorld were insufficient to protect the trainers from injury or ensure the well-being of the animals. The Cal/OSHA employee had never known the agency to redraft a narrative summary before (and deemed it an odd gesture, as the original summary would still exist as an official agency document, alongside the revised version) (Kirby, 2012).

A side-by-side comparison of the two versions showed that the changes were primarily deletions, with very few additions or revisions. More than half of the original document was simply redacted. The missing text included any language suggesting that orcas are inherently dangerous and unpredictable; that they have individual differences in personality that make careful evaluation of their "mood" on a daily and even hourly basis essential for trainer safety (indeed, a full but simple description of the seven individual orcas at SeaWorld San Diego was omitted completely); that trainers believe stressors in the captive environment exist and contribute to an unavoidable risk of the animals going "off behavior"; and that, in the end, trainers "have no tools at their disposal to punish an orca that is misbehaving. There is little that they can do to punish an animal of this size anyway" (p. 7 in the Cal/OSHA original narrative summary). All descriptions of previous "off behavior" incidents at SeaWorld and other facilities (both injurious and non-injurious), save for two previous incidents with Kasatka and one incident two weeks earlier involving another whale at SeaWorld San Diego that resulted in a minor injury, were deleted (Kirby, 2012).

In essence, the original narrative summary made it clear that "the trainers [at SeaWorld] recognize this risk [of injury and death through waterwork] and train not for if an attack will happen but when." (p. 17 in the Cal/OSHA original narrative summary). It concluded that waterwork interactions were inherently risky and incidents such as the one between Kasatka and Peters could and should be anticipated and the routine safety precautions in place at SeaWorld were not only essential but could easily be augmented. The final version implied the opposite, leaving the reader with the impression that waterwork was inherently safe, that "off behavior accidents" and attacks were completely aberrant, and that the routine safety precautions taken by trainers were good practice but almost never needed (Kirby, 2012)).

Less than four years later, Alexis Martinez's and Dawn Brancheau's deaths proved that Cal/OSHA's concern had indeed been warranted.

511. OSHA issued the citation on 23 August 2010 (Grove, 2010), the deadline by which the agency was legally required to issue a citation. OSHA charged SeaWorld with violating Section 5(a)(1) of the US Occupational Safety and Health Act of 1970 (29 USC §§ 651–678): "The employer did not furnish employment and a place of employment which were free from recognized hazards that were causing or likely to cause death or physical harm to employees" (p. 5 in Grove, 2010). OSHA determined that this violation was "willful," i.e., SeaWorld "intentionally and knowingly" exposed employees to possibly lethal harm and had "made no reasonable effort to eliminate" the risk (see *http://www.dol.gov/compliance/guide/osha.htm*; see also Parsons, 2012).

SeaWorld appealed the citation. The administrative law hearing that considered this appeal took place over nine days, in September and November, 2011. The final ruling of the administrative law judge (ALJ), in June 2012, upheld the citation, but downgraded it from "willful" to "serious," which essentially changed the violation from one where the employer *did* know better to one where it *should have* known better (*Sec. of Labor v. SeaWorld of Fla.*, 24 OSH Cas. (BNA) 1303 (OSHRCALJ), 2012 OSHD (CCH) P 33247, 2012 WL 3019734, slip op. at *9-10, *33-34 (No. 10–1705, 2012), available at *https://www.dol.gov/sol/regions/PDFs/ATLdecisionSeaWorld.pdf*). Despite this downgrade, waterwork was effectively banned by the ruling, meaning SeaWorld could no longer place trainers in the water with the orcas during performances.

512. US Department of Labor (2010). See also Parsons (2012).

513. The maximum fine is US$70,000 for a "willful" violation of the law (*http://www.dol.gov/compliance/guide/osha.htm*). SeaWorld was also fined an additional US$5,000 for other violations unrelated to Brancheau's death, for a total of US$75,000 (Parsons, 2012). When the ALJ downgraded the violation related to Brancheau's death to "serious," the fine was also reduced, to US$7,000 (the US$5,000 remained the same, making the final fine US$12,000) (*Sec. of Labor v. SeaWorld of Fla.*, 2012 WL 3019734, slip op. at *34-35 (No. 10–1705, 2012)). When SeaWorld appealed, a federal district court panel found against SeaWorld (the panel had three judges, two of whom voted to uphold the lower court ruling), concluding that (1) substantial evidence supported determination that "drywork" and "waterwork" with orcas were recognized hazards under OSHA, (2) the ALJ did not abuse his discretion in accepting the secretary of labor's expert witness with regard to the aggressive behavior of orcas, (3) substantial evidence supported the ALJ's findings that it was feasible for SeaWorld to abate (reduce) the hazard, and (4) the general duty clause was not unconstitutionally vague as applied to SeaWorld (*SeaWorld of Florida v. Perez*, 748 F.3d 1202 (DC Circuit, 2014)). The majority opinion noted "[t]he caution with which SeaWorld treated Tilikum even when trainers were poolside or on 'slideouts' in the pool indicates that it recognized the hazard the killer whale posed, not that it considered its protocols rendered Tilikum safe."

The penalty meted out to Sea Life Park in Hawaii in 2018 stands in stark contrast to SeaWorld's final, reduced fine. Sea Life Park was fined US$130,000 by OSHA for several safety violations (Consillio, 2018). Yet, institutional negligence resulting in a death, including repeated exposure of employees to a "hazard"—a group of animals involved in previous human mortalities and multiple injuries—resulted in a fine of only US$12,000. For a corporation that was pulling in over a billion dollars in annual revenue at the time, SeaWorld's fine was effectively negligible.

514. *The Cove* primarily covered the drive fishery for small cetaceans in Taiji, Japan (see Chapter 3, "Live Captures"), but highlighted the historic purchasing of these cetaceans by US aquaria, including SeaWorld.

515. See Chapter 1 ("Education") and endnotes 13 and 15–17.

516. A disturbing trend is the expansion of in-water interactions to other species, including larger cetaceans such as beluga whales (see *http://www.dolphinswim.net/eng/indexeng.html*) and pinnipeds such as California sea lions (see *https://seaworld.com/san-antonio/experiences/sea-lion-swim/*). Sea lions are a particularly risky species for tourists to swim with, as their bites are dangerous (see endnote 478); a report on animal-inflicted injuries at the Denver Zoo indicated that its sea lions were more problematic than any other species, frequently biting workers (Hartman, 2007).

CHAPTER 12 • THE BLACKFISH LEGACY

517. Much of this chapter is derived from Parsons and Rose (2018).

Blackfish

518. Zimmermann (2011); Parsons (2012).

519. See Chapter 11 ("Risks to Human Health").

520. Zimmermann (2011); Parsons (2012).

521. Parsons (2012).

522. Hoyt (1984).

523. Associated Press (1996; 2005). It can be argued that a major reason for this difference is that in the wild people do not closely associate with orcas, while in captivity the two species are intimately intertwined. However, viewing violent encounters as an artifact—rather than the principal result—of proximity entirely misses the point. Of course propinquity is why dozens of captive orcas and dozens of people have been involved in injurious and even fatal interactions over the decades since orcas were first exhibited to the public. That is precisely why it is unwise to keep them in captivity, given the need for trainers to interact with them to maximize their display value.

As the movie poster caption for *Blackfish* states: "Never capture what you can't control."

524. See Chapter 11, "Risks to Human Health," and endnote 511. As noted there, a "willful" violation is defined as a violation that "the employer intentionally and knowingly commits. The employer either knows that what he or she is doing constitutes a violation, or is aware that a condition creates a hazard and has made no reasonable effort to eliminate it." A "serious" violation is defined as a violation "where a substantial probability that death or serious physical

harm could result and where the employer knew, or should have known, of the hazard" (*http://www.dol.gov/compliance/guide/osha.htm*).

525. Grove (2010); Parsons (2012).

526. See endnote 508.

527. Kirby (2012).

528. Hargrove and Chua-Eoan (2015).

529. See *http://ac360.blogs.cnn.com/2012/06/01/debate-over-killer-whales-in-seaworld/* for *Anderson Cooper 360* and *http://www.cc.com/video-clips/lx3hyu/the-daily-show-with-jon-stewart-exclusive---john-hargrove-extended-interview* for *The Daily Show*.

530. John Crowe had been employed as a capture team member, taking free-ranging orcas in Puget Sound for the public display industry in the 1960s. He described his experiences after the director of the film, Gabriela Cowperthwaite, tracked him down via the phone book (Gabriela Cowperthwaite, personal communication, 2013). He revealed that several juvenile whales had died during one capture, after which the capture team was ordered to slit the carcasses' bellies open, stuff them with rocks, and sink the bodies. See *Blackfish* for more details.

531. The Numbers (2013).

532. There were 70,000 documentary-related Tweets seen by 7.3 million people during the initial October airing of the film (Rogers, 2013; Wright *et al.*, 2015).

533. CNN (2014).

534. See *http://www.imdb.com/title/tt2545118/awards?ref_=tt_awd*.

535. Busis (2014).

536. The film cost US$76,000 to make, but eventually grossed more than US$2 million at the box office (The Numbers, 2013), a major profit for a documentary film.

537. Cowperthwaite had previously directed a documentary on lacrosse (*http://www.imdb.com/name/nm1363250/*) and was not involved in any animal rights or animal welfare activities prior to making *Blackfish*. The story of her inspiration to make the film is recounted on the film's website (*http://www.blackfishmovie.com/filmmakers/*).

Shamu was the stage name of virtually all the orcas who performed at SeaWorld over the years. It was a combination of "She" and "Namu." Namu was the second orca ever held in captivity. A female was captured to be his companion in Seattle in 1965, but they did not get along—so the person who captured her sold her to the 1-year-old marine theme park in San Diego and she became the first Shamu (Neiwert, 2015).

The Blackfish *Effect*

538. Wright *et al.* (2015).

539. Renninger (2013).

540. SeaWorld (2014).

541. See *http://www.blackfishmovie.com/news/2015/9/18/blackfish-responds-to-seaworlds-latest-critique*. This rebuttal was produced directly in response to SeaWorld (2014).

542. Titlow (2015); SeaWorld (2015b).

543. For example, in 2014, 35 marine scientists, several of them prominent cetacean and orca biologists, signed a letter supporting the passage of AB 2140, the bill introduced that year in the California Assembly to phase out public display of orcas in the state (see endnote 573).

544. Kirby (2012); Neiwert (2013).

545. Other celebrities who made public statements opposing SeaWorld's practice of displaying orcas included Cher, Ricky Gervais, Simon Cowell, Stephen Fry, Jessica Biel, Harry Styles, Shannon Doherty, Ewan McGregor, Olivia Wilde, Eli Roth, Ariana Grande, Ellen Page, Russell Brand, Maisie Williams, James Cromwell, Ann and Nancy Wilson (of Heart), Tommy Lee, Jason Biggs, and Joan Jett. Another well-known and respected whale scientist who spoke out was Roger Payne.

546. Kumar (2014); Joseph (2015); Koerner (2014).

547. These acts included Willie Nelson, Pat Benatar, Heart, Cheap Trick, REO Speedwagon, Barenaked Ladies, and the Beach Boys (Duke, 2014).

548. Hooton (2015). Incidentally, *Finding Dory* was the second highest grossing movie of 2016, meaning its retooled message was seen by a substantial number of viewers (*http://www.boxofficemojo.com/yearly/chart/?yr=2016&p=.htm*).

549. Gelinas (2015). In the scene, a massive, predatory, aquatic reptile (a mososaur), with a beakful of sharp teeth, was trained to "perform" for the audience by leaping up and snatching a dangling great white shark off a line (a once-common trick—with a mackerel in place of a shark—for dolphins and orcas to perform at dolphinaria) in a tank that was arguably far too small for it. When the crowd devolved into chaos as the dinosaurs broke free of management's control, the mososaur leapt out of the water and summarily gulped down a pterosaur holding a screaming tourist, tourist and all.

550. Cronin (2014).

551. SeaWorld (2015b).

552. Apparently SeaWorld expected questions about the company's animal collection, its husbandry practices, its rescue of stranded marine life, its trainers' backgrounds, and so on—the sort of questions paying audience members, self-selected supporters of the park, would ask docents and trainers during a visit.

553. Lobosco (2015).

554. See *http://www.seaworldfactcheck.com*.

555. The Onion (2013a, 2013b).

556. The Onion (2015a, 2015b, 2015c, 2015d, 2017). Some of these articles got such wide distribution that members of the public, not understanding they were satirical, believed that SeaWorld was engaging in outlandish practices far worse than those described in *Blackfish* (for example, keeping orcas in plastic bags, like goldfish, while their tanks were being cleaned; see Snopes, 2015). Other parody websites also followed suit, including Clickhole (2016; 2018).

557. See *https://www.youtube.com/watch?v=Tloss7UKUaw&feature=youtu.be, https://www.youtube.com/watch?v=XEVlyP4_11M&feature=youtu.be&t=6m39s* and *http://www.cc.com/video-clips/ebp0j3/the-daily-show-with-trevor-noah-it-s-time-to-free-jeb-bush*.

558. Veil *et al.* (2012). As a final example, even the gaming community had something to say about the issue. Game Grumps, popular video game commenters, had a critical and fairly comedic discussion about SeaWorld and *Blackfish* as they reviewed a SeaWorld video game (see *https://youtu.be/ZlspTKY2Meg*).

559. PRNewswire (2015).

560. Share prices declined 45 percent from a high in mid-2013 to mid-2014, including a one-day plummet of 33 percent on 13 August 2014, when the company released a weak second quarter report (Solomon, 2014). This 2014 second quarter report was the first time SeaWorld indicated that *Blackfish* was having a negative impact on the company. Tellingly, despite finally admitting publicly that the film was affecting its financial picture—indeed, the *Blackfish* Effect arguably halved the company's overall market value in two years—SeaWorld still did not sue the filmmakers for libel, despite its original and ongoing insistence that the film was fundamentally dishonest and misleading in its content. SeaWorld's failure to sue *Blackfish*'s makers for libel made sense when it claimed the film was inconsequential and was having no impact on the corporate bottom line. Once executives admitted to shareholders that the film was a negative influence, however, the company's continued failure to sue suggests very strongly that it was well aware that the filmmakers would likely prevail in court, because in fact its content was substantiated and accurate.

561. PRNewswire (2015).

562. He was replaced by Joel Manby in April 2015. Manby had been president and CEO of Herschend Family Entertainment, which managed several theme parks in the United States (including the Dollywood theme park), but he had no experience running an animal-based attraction.

563. Russon (2017a).

564. Russon (2017a, 2017b).

The Legal and Legislative Impacts of Blackfish

565. See *Anderson v. SeaWorld Parks and Entertainment, Inc.*, No. 15-cv-02172-JSW, 2016 WL 4076097, n. 1 (N.D. Cal. Aug. 1, 2016), which states, "The other three cases were consolidated and were pending in the United States District Court for the Southern District of California as *Hall v. SeaWorld Entertainment, Inc.*, No. 3:15-CV-660-CAB-RBB (the 'Hall litigation')." The Hall case was dismissed in May 2016 and an appeal failed in August 2018 (*Hall v. SeaWorld Entertainment, Inc.*, No. 16-55845, --- Fed. Appx. ----, 2018 WL 4090110 (9th Circuit, 28 August 2018)). As of January 2019, the Anderson case was progressing.

566. MarketWatch (2015).

567. These laws include California's Unfair Competition Laws (Cal. Business & Professions Code §§ 17200 –17209) and Consumers Legal Remedies Act (Cal. Civil Code §§ 1750 –1784), Florida's Deceptive and Unfair Trade Practices Act (Fla. Stat. §§ 501.201–.213), Texas' Deceptive Trade Practices Consumer Protection Act (Tex. Business & Commerce Code 17.41 et seq.) and several other false-advertising laws (MarketWatch, 2015).

SeaWorld was also the target of class action suits for keeping customers' credit card information and, therefore, making them liable to identity theft, and also for automatically charging renewal fees for SeaWorld passes without obtaining customers' permission. See, e.g. Class Complaint, *Herman v. SeaWorld Parks & Entertainment Inc.*, No. 8:14-cv-03028-MSS-JSS (MD Florida, 3 December 2014).

568. Class Action Complaint, *Baker v. SeaWorld Entertainment, Inc.*, No. 3:14-cv02129-MMA-AGS (SD California, 9 September 2014). See also Weisberg (2014) and Russon (2017).

569. Weisberg and Russon (2017).

570. Russon (2018).

571. Swenson (2017).

572. Zaveri (2018).

573. Assembly Bill 2140; for the original language of the bill, see *http://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=201320140AB2140*. See also Thomas (2016).

574. See *http://leginfo.ca.gov/glossary.html* for a definition of this term.

575. Assembly Bill 2305.

576. For the final language of the bill that the governor of California signed, see *http://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=201520160AB1453*.

577. In April 2015, SeaWorld San Diego applied for a permit from the California Coastal Commission (CCC) to build "Blue World," an expansion of its existing Shamu Stadium (California Coastal Commission, 2015; see endnote 240.). SeaWorld noted in its application that the enlargement of the enclosure was for welfare reasons, but critics were concerned that construction would distress the animals in their existing enclosure, cause coastal pollution issues, and lead SeaWorld to breed more orcas (which would effectively negate the welfare benefit of the additional space) for its own parks and eventually for sale and export, potentially, to other dolphinaria.

Animal protection groups mounted a well-coordinated campaign to use the CCC permit process to bring about lasting change to California's governance of captive orca display, not through legislation but through regulation. This campaign included outreach to traditional media, lobbying the commissioners, and preparing detailed critiques of the permit application and SeaWorld's public relations push. The Blue World project seemed to be SeaWorld's attempt to show it was trying to respond to the public's desire for better conditions for orcas in captivity. Animal protection groups took a two-pronged approach to countering that narrative: One faction pushed for an unequivocal rejection of the Blue World permit application, because bigger enclosures, while cosmetically more appealing to a public concerned about captive orca welfare, were still not big enough and would simply encourage SeaWorld to put even more whales in them. Another pushed for issuance of the permit, but with conditions. These conditions would include a ban on future breeding of the whales. While these two approaches were mutually exclusive, they put the onus on SeaWorld to defend a rejection of option 2—if in fact Blue World was about improving the welfare of the company's orcas, then the company should accept this outcome as a partial win.

The CCC held an all-day hearing on the permit application in October 2015 and voted on it at the end of the day. Dozens of people, including scientists, advocates, SeaWorld supporters, industry representatives, and even a celebrity, Pamela Anderson, testified. The vote was unanimous to issue the permit; however, the commissioners did attach certain conditions. SeaWorld would have to end its orca breeding program in San Diego, no orcas could be transferred into or out of the facility, and the maximum number of whales that could be held was 15 (four more than current numbers, to allow for the possibility of animals who needed rescue and rehabilitation) (California Coastal Commission, 2015). These conditions were clearly unacceptable to SeaWorld; the company sued the CCC over its decision, claiming such conditions were beyond the CCC's authority (Martin, 2015; Verified Petition for Writ of Mandate & Complaint for Declaratory Relief, *Sea World LLC v. Cal. Coastal Comm'n*, No. 37-2015-00043163-CU-WM-CTL (Cal. Sup. Ct. San Diego 2015)). Ultimately, the company rejected the choice the CCC gave it, confirming for SeaWorld critics that the request for a larger enclosure was not to improve welfare (which should have been independent of whether or not SeaWorld could breed the whales), but for an expanded breeding program. SeaWorld appeared to see no value in building bigger enclosures if the only whales who would ever live in them were the animals currently in the San Diego park. See also Weisberg (2016).

Then, in March 2016, SeaWorld suddenly and very unexpectedly announced a voluntary end to its orca breeding program (Allen, 2016). SeaWorld withdrew its application for the expansion permit (and its lawsuit) soon after (Weisberg, 2016). Assembly Member Bloom was invited to attend SeaWorld's press conference and actually announced the reintroduction of his orca bill there (KUSI, 2016).

578. State Senator Greg Ball introduced Senate Bill 6613, which would have prohibited the keeping of orcas in facilities in New York State. For the text of the bill, see *https://www.nysenate.gov/legislation/bills/2013/s6613/amendment/original*.

579. Senators Kevin Ranker and Christine Rolfes and Representative Brian Blake (and others) introduced similar bills in Washington State: Senate Bill 5666-2015-16 and House Bill 2115-2015-16. As of January 2019, California is the only state that has actually passed a post-*Blackfish* bill addressing captive cetacean welfare.

580. HR 4019 was co-sponsored by Representatives Adam Schiff (D-California) and Jared Huffman (D-California), along with several other co-sponsors. For the text of the original bill, see *https://www.congress.gov/bill/114th-congress/house-bill/4019/text*. The original bill did not progress, but was reintroduced as HR 1584 in March 2017; see *https://www.congress.gov/bill/115th-congress/house-bill/1584*. For more about the legislative landscape in the United States regarding captive orcas, see Wise (2016).

581. Lake (2018).

The End of Captive Orcas?

582. Manby (2016).

583. This policy originally affected not only the 20-plus whales in its three US parks, but the whales the company owned in Spain (the Canary Islands) and any new parks it might build or manage abroad (it still applies to the latter). However, in late 2017, the company transferred ownership of all the whales held in Spain to Loro Parque. SeaWorld had never before relinquished possession of any orca; in fact, for some time in the 1990s and 2000s, the company made a point of acquiring the last orcas held by other facilities, including Ulises (from the Barcelona Zoo in 1994) and Bjossa (from Vancouver Aquarium in 2001). Although the company had also "loaned" Ikaika to Marineland in Canada in 2006, it reclaimed him in 2012. SeaWorld had to go to court to enforce its legal right to repatriate him at will, under the contract it made with Marineland (Casey, 2011). Marineland sought to retain him, despite this contract, but failed (*Seaworld Parks & Entertainment v. Marineland of Canada*, 2011 ONSC 4084 (Ontario Superior Court of Justice, 5 July 2011), available at *https://www.scribd.com/document/67453282/SeaWorld-vs-Marineland-of-Cananda-Ikaika-Custody-Court-Decision*).

The unusual decision to relinquish any legal claim to the whales in Spain appeared to be the result of Loro Parque management refusing to abide by the March 2016 corporate policy to end orca breeding. As noted in endnote 119, Loro Parque did not prevent Morgan, the wild-born female rescued but not released in 2010, from mating with one of the two sexually mature males exhibited at the zoo. It is not clear when SeaWorld learned of this corporate policy violation, but at some point after learning of it, the company apparently decided to divest itself entirely—and quietly—of the soon-to-be seven whales at Loro Parque, rather than announce publicly that it could not control the husbandry practices of the facility hosting its whales. It only became clear that SeaWorld no longer claimed ownership of the whales at Loro Parque when examining the shareholder materials released with the company's third quarter report in 2017.

See Spiegl and Visser (2015) for a full analysis of the legal implications of Morgan's transfer to Loro Parque in Spain from Dolfinarium Harderwijk in the Netherlands. Additional analysis on the dilution of the law with regard to Morgan can be found in Spiegl *et al.* (2019). For information on Morgan's pregnancy and the subsequent birth of her calf, see *http://www.freemorgan.org/pregnancy-timeline/*.

584. SeaWorld (2017a).

585. The conservation projects to be supported by SeaWorld funding included campaigns against the commercial hunting of seals in Canada, shark finning, and the over-exploitation of ornamental fish (and the protection of the reefs they inhabit). These were campaigns championed by The Humane Society of the United States (Lange, 2016), SeaWorld's non-profit partner in this endeavor. SeaWorld also pledged to take steps to make its parks' business operations more responsive to animal welfare and environmental concerns, including providing sustainable seafood and other food offerings that reflect an awareness of animal welfare, such as crate-free pork, cage-free eggs, and more vegetarian options (Lange, 2016).

586. This funding was granted to the National Fish and Wildlife Foundation. SeaWorld contributed an additional US$1.5 million in May 2018 (National Fish and Wildlife Foundation, 2018). The money is administered independent of SeaWorld.

587. Hodgins (2014). Given SeaWorld's historical participation in live captures (which were among the factors contributing to the Southern Resident ESA listing and the population's inability to recover) (National Marine Fisheries Service, 2008b; 2016), this lack of direct assistance prior to the 2016 decision to contribute funding to the Southern Resident recovery effort—despite SeaWorld's standard rhetoric about its work to conserve free-ranging cetaceans—was particularly notable.

A recent investigative article in the *Seattle Times* (Mapes, 2018a) described the captures from the US Pacific Northwest populations. Between 1962 and 1976 (when Washington State officials prohibited the captures), 270 orcas were captured—many multiple times—in the Salish Sea in order to take young animals for the public display industry. The captures involved encircling animals with nets (where they at times became entangled) and even dropping explosive charges into the water to herd the whales. At least 12 orcas died during the capture process, and at least 53 animals, mostly from the Southern Residents, were removed for display (the rest were released) (Goldsberry *et al.*, 1976); see Chapter 3, "Live Captures." All the whales—almost all juveniles—who were taken into captivity from the Southern Residents are dead now, except for Lolita at Miami Seaquarium. Only one Northern Resident is still alive; Corky II at SeaWorld San Diego.

588. Fry (2016).

589. SeaWorld reported a US$30 million decline in revenue in 2016 in contrast to 2015, and 471,000 fewer visitors over the same time frame (SeaWorld, 2017b). Stock hit an all-time low in November 2017, at less than US$11 per share (down from a high of nearly US$40 per share in May 2013).

590. Agar (2018). As an additional example of a marine theme park transitioning to a new business model, Dolfinarium Harderwijk announced at the beginning of 2019 that it would begin emphasizing its rides and other non-animal attractions over its marine mammal exhibits. It would remain a zoo for the near term, but withdrew from the Netherlands Zoo Association, as it will no longer take in new wildlife for display (Omroep GLD, 2019).

591. SeaWorld went public in early 2013, after being privately held for decades. Its IPO price for one share of its stock was US$27.

592. In the first quarter of 2018, SeaWorld's revenue increased by US$30.8 million compared to the previous quarter, putting it at approximately 2016 levels. Attendance also increased by 400,000 visitors, returning visitorship nearly to levels seen in the first quarter of 2016 (SeaWorld, 2018a). In addition to the promised conservation funding (see endnotes 585 and 586), SeaWorld opened (and continues to build and advertise) new rides and decreased its admission fee (although food and other prices within the park increased to compensate, so there was no net benefit to visitors)—it even offered free beer as a way to attract visitors (SeaWorld, 2018b).

Seaside Sanctuaries: The Future for Captive Cetaceans?

593. See Chapter 1 ("Education") and Naylor and Parsons (2018).

594. See *https://www.virginholidays.co.uk/cetaceans and http://ir.tripadvisor.com/news-releases/news-release-details/tripadvisor-announces-commitment-improve-wildlife-welfare*. Virgin Holidays also has come out against live captures of cetaceans and is supporting the idea of establishing seaside sanctuaries for cetaceans. See endnote 465.

595. Slattery (2017). The vote was largely the result of the recent deaths of two beluga whales at the facility in December 2016 (Azpiri, 2016), and the resulting public outcry. While the Vancouver Aquarium successfully challenged this decision in court, it also voluntarily agreed to end the display of cetaceans after its last cetacean, a Pacific white-sided dolphin named Helen, dies (Vancouver Courier, 2018).

596. In May 2017, France issued a "decree" that banned the acquisition of more cetaceans for public display, banned the breeding of captive cetaceans, prohibited swimming with captive dolphins and other forms of interaction, and mandated that tank size should be increased by 50 percent (with facilities being given six months to comply) (BBC News, 2017). However, the decree was overturned by a judge in January 2018, as it was ruled that there had been insufficient public input on some of the restrictions (The Local, 2018). Animal protection groups continue to work to reinstate these proscriptions and requirements, although their efforts were made more difficult when the French government issued another decree, in October 2018, that specifically allows the holding of cetaceans (see *https://www.legifrance.gouv.fr/eli/arrete/2018/10/8/TREL1806374A/jo/texte/fr* (in French), Annexe 2).

In August 2017, Mexico City banned captive dolphin display, which covered a dolphinarium within the city limits. This facility has been ordered to close and send its dolphins to another facility (Green, 2017). In November 2017, a proposed dolphinarium project was canceled in Danang, Vietnam, after public protests (Animals Asia, 2017).

In a case concerning the prohibition of dolphinaria and otherwise protecting animals in captivity in Ukraine, the Grand Chamber of the Supreme Court (Resolution of 11 December 2018, Case No. 910/8122/17) concluded that a charitable environmental organization is authorized to represent society's environmental interests and the interests of its members in court in order to protect environmental rights or remedy violations of environmental law (see *https://court.gov.ua/eng/supreme/pres-centr/news/618734/*).

597. The term "seaside" is used to distinguish such captive marine mammal sanctuaries from marine protected areas (sometimes referred to as marine sanctuaries, including in US law), large areas of ocean within which certain human activities are limited or prohibited, in order to protect and conserve entire marine ecosystems.

598. See *http://www.whalesanctuaryproject.org/release/whale-sanctuary-project-to-create-seaside-sanctuary-for-whales-and-dolphins/*.

599. See *http://dfe.ngo/seaside-sanctuaries-a-concept-review/* for a discussion of the seaside sanctuary concept.

600. See Whale and Dolphin Conservation (2018) for more information.

601. Racanelli (2016).

602. One of the animal protection groups working on the feasibility study is WAP (Martin and Bali, 2018).

603. The intent is to provide conditions similar to existing wildlife sanctuaries for former circus and zoo elephants, primates, big cats, and other terrestrial species—see, e.g., *http://dfe.ngo/seaside-sanctuaries-a-concept-review/*.

CONCLUSION

604. Kirby (2014b).

605. Hungary currently prohibits the import of cetaceans for public display and indeed has no dolphinaria. However, the owner of an existing aquarium is now appealing to the government for permission to include dolphins among its exhibits, which would mean overturning the trade ban or making this import an exception (Index, 2018). Animal protection groups are working to prevent this.

606. Diebel (2015).

607. Hillhouse (2004). As another example of this type of reversal, the government of Jordan had issued a permit to developers wishing to build a dolphinarium (the country currently has no dolphinaria), but in response to public pressure, including a letter from the animal protection coalition Dolphinaria-Free Europe (M. Dodds, letter to Minister of Tourism and Antiquities Lina Anab, 30 July 2018), the permit was revoked.

608. These include the city of Vodnjan, Croatia; the city of Virginia Beach, Virginia, United States; and the city of Denver, Colorado, United States. The government of Panama, after two years of debate and controversy, decided not only against the building of a dolphinarium, but also against allowing the capture of dolphins from its waters (see endnote 74).

609. Kirby (2014b).

610. The regulations did not grandfather in existing facilities, so within a short period of time they closed, as they could not meet the new standards without significant capital outlay.

611. Rose *et al.* (2017).

612. *Born to be Free*, released in 2016, is yet another documentary film that fits this trend. It describes the trade in belugas captured in Russia—the Russian filmmakers were inspired by the 2012 import request by Georgia Aquarium (see Chapter 3, "Live Captures—Belugas" and *https://www.imdb.com/title/tt6619064/?ref_=fn_al_tt_1*).

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