The Case Against

MARINE MAMMALS IN CAPTIVITY

ANIMAL WELFARE INSTITUTE + WORLD ANIMAL PROTECTION

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DEDICATION

We wish to dedicate this edition of *The Case Against Marine Mammals in Captivity* to beloved colleagues—gone, well before their time, since the 5th edition was published.

Richard Farinato, who co-authored earlier editions of this report; Samantha Lipman, who offered input, including photographs, to the 5th edition of this report; Donald Baur, defender of marine mammals in captivity and the wild; and David Kirby, author of *Death at SeaWorld*.

Marine mammals have lost champions and we have lost good friends.

We miss you.

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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

CCC California Coastal Commission

CEO Chief Executive Officer

CFR Code of Federal Regulations

CIRVA Comité Internacional para la Recuperación de la Vaquita

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

COVID-19 coronavirus disease of 2019

CSG Cetacean Specialist Group

DAT dolphin-assisted therapy

DOJ Department of Justice

ESA Endangered Species Act

EU European Union

Fed. Reg. Federal Register

FWS Fish and Wildlife Service

ICPC Integrated Conservation Planning for Cetaceans

IPO initial public offering

IUCN International Union for Conservation of Nature

IWC International Whaling Commission

JAZA Japanese Association of Zoos and Aquariums

KBMML Kewalo Basin Marine Mammal Laboratory

MHD minimum horizontal dimension

MMC Marine Mammal Commission

MMPA Marine Mammal Protection Act

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

NDF non-detriment finding

NMFS National Marine Fisheries Service

ORCA ACT Orca Responsibility and Care Advancement Act

OSHA Occupational Safety and Health Administration

SEC Securities and Exchange Commission

SPAW Specially Protected Areas and Wildlife

SWD swim-with-dolphin

SWIMS ACT Strengthening Welfare in Marine Settings Act

TINRO Pacific Fisheries Research Center (in Russian)

US United States

USC United States Code

UST United States Treaty

Vaquita CPR Vaquita Conservation, Protection, and Recovery Program

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

This is the 6th edition of this report. Over the past decade, 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 people learn important information from seeing live animals in zoos and aquaria. Animal protection groups, and a growing number of scientists, counter that the lives of captive marine mammals are impoverished. In addition, most facilities train marine mammals—especially sea lions and dolphins—to perform circus-like shows that do not showcase natural behavior. Therefore, visitors do not receive an accurate picture of a marine mammal species from captive representatives in tanks or pens.

A growing number of facilities seek to promote themselves as conservation centers. They claim to serve a valuable—and, according to them, increasingly important—conservation function. This is despite the fact that few if any public display facilities with marine mammals are breeding any of them for reintroduction to the wild to augment depleted populations. In fact, 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. Indeed, only a few marine mammal facilities are involved in substantial marine mammal conservation efforts, and they have had mixed success.

Public display facilities also 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 or reproductive output. A recent research and publication boom by the industry, some of it of dubious objectivity (despite peer review), appears to be a post-*Blackfish* effort to have their actions match their rhetoric. Few studies using marine mammals in public display facilities, however, address crucial conservation questions. The number of studies addressing animal welfare—most published in the past decade—is only slightly larger.

Captures of marine mammals from the wild are not a thing of the past. Live captures of whales and dolphins continue in hotspot locations around the world, in regions where little is known about the status of populations. Several dolphin species are captured in Japan. Bottlenose dolphins are captured in Cuba. Beluga whales have been captured and traded in Russia since the late 1980s. Orcas (also known as killer whales) also suffered capture and trade in Russia between 2012 and 2018, until a change in the law ended both. 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. The trade in these live-captured animals occurs across the globe and may negatively affect populations and habitats. 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.

The industry has always insisted that captive marine mammals live a good life. Yet the design of performance stadiums put the needs of the visiting public 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.

Eye problems, hearing loss, and diseases rarely or never encountered in the wild plague captive marine mammals. Wild-caught marine mammals gradually experience the atrophy of many of their natural behaviors; those associated with dominance, mating, and maternal care are altered in captivity, which can have substantial negative impacts on the animals' welfare. Captive marine mammals are cut off from the conditions that allow the expression of cultural traits such as specialized vocalizations and unique foraging and hunting techniques. Whatever "enrichment" trainer and visitor interactions provide does not adequately replace the expression of natural behaviors.

Viewing captive animals 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. Stress-related conditions such as ulcers, behaviors such as pacing and self-mutilation, and abnormal aggression within groups frequently develop in predators denied the opportunity to hunt.

The ethical concerns raised by marine mammal captivity are especially marked for cetaceans. Although public display proponents will argue that claiming cetaceans have "rights" is based solely on emotion, 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.

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 in captivity 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 often do not 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 most of these species are 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 present. 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 publicly killed his trainer at a marine theme park in Florida in the United States and a paradigm shift, already underway, accelerated exponentially. *Blackfish* had a massive impact on the public's perception of captive orcas and, by association, other cetaceans and marine mammals. Now, 10 years later, the social acceptability of cetacean captivity is considerably lessened. 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 parse the captive experience and debate which aspects are more or less damaging to the animals, 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 facade 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 was only much later that research efforts caught up with and began to debunk the claims made by those who were 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 are asking 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. Some consider the overall effect of marine mammal displays on public perceptions of these species to be misleading and negative rather than having a positive effect on education and conservation. AWI and WAP agree.

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

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 10, "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.

There is disturbingly little information on life history parameters of captive marine mammals, as there are no international oversight mechanisms, and only a few countries have adequate requirements for maintaining veterinary records (and there are virtually no requirements for making such records readily available to outside researchers). The public display industry itself is not transparent about these data and historically published 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 cetaceans, are held in a number of lower-income nations and locations that, until recently, had never before displayed these species—places where money, technology, and/or expertise are often lacking.[7] The information that is available suggests that survival of captive marine mammals outside North America and Europe is 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" movement—modern dolphinaria, first established 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, the documentary *Blackfish* was released, focusing on this incident and the lives of captive orcas (see Chapter 13, "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, that of other cetaceans and even marine mammals in general—has gained momentum and can now be said to be solidly mainstream.[9]

In the debate over whether marine mammals are uniquely unsuited to be confined in relatively small enclosures, it is important to answer several key questions: First, does public display of marine mammals accurately educate people about these animals? Second, does public display foster or actually impede conservation efforts? And third, from a welfare perspective, are the lives of marine mammals merely different in captivity from those they lead in the wild or worse? 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, academics, and policymakers, 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 various countries to provide an educational component in exhibits,[10] there is little objective evidence to indicate that it is furthering the public's knowledge of marine mammals and their habitats.[11] While some zoos and aquaria among the approximately 2,000 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.[12] 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.[13] Commercial public display facilities in particular are going to offer their customers what they want. 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.[14] This hearing in the US House of Representatives highlighted that NMFS—the US agency responsible for managing most free-ranging[15] 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.[16] 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.[17] Author Rose, who was a witness at this hearing, pointed out the logical flaw in this claim; several countries that have a strong marine conservation ethos—arguably, one greater than that of the United States (for example, the United Kingdom, New Zealand, and Costa Rica)—have 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, often with no data supporting the quotas set for these hunts.[18]

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.[19] Sixteen years later, a survey of millennials (people born between 1981 and 1996) 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).[20] Concern for charismatic species and ocean impacts was also noted. Therefore, the welfare impacts of captivity on cetaceans are 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.[21] 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; a 2018 survey found that Canadians supported a ban on cetaceans in captivity by a two-to-one margin.[22] 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.[23] A 2014 survey of Britons found that 86 percent of respondents would not visit a captive whale or dolphin facility when on holiday.[24] 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.[25] About a fifth of respondents indicated that watching either the documentary *Blackfish* (see Chapter 13, "The *Blackfish* Legacy") or other media had influenced their views. Of those who were interested in attending an orca show and explained why, none

A 2018 survey found that Canadians supported a ban on cetaceans in captivity by a two-to-one margin.

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

Survey 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.

mentioned education; all identified "entertainment" as the basis for their interest.

An international survey published in 2019 echoed these results, with respondents being significantly more likely to oppose, rather than support, displaying cetaceans in marine theme parks and dolphinaria.[26] 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 cetaceans on whale watching trips, for example, rather than in captive facilities, a preference exhibited by respondents from several countries.[27]

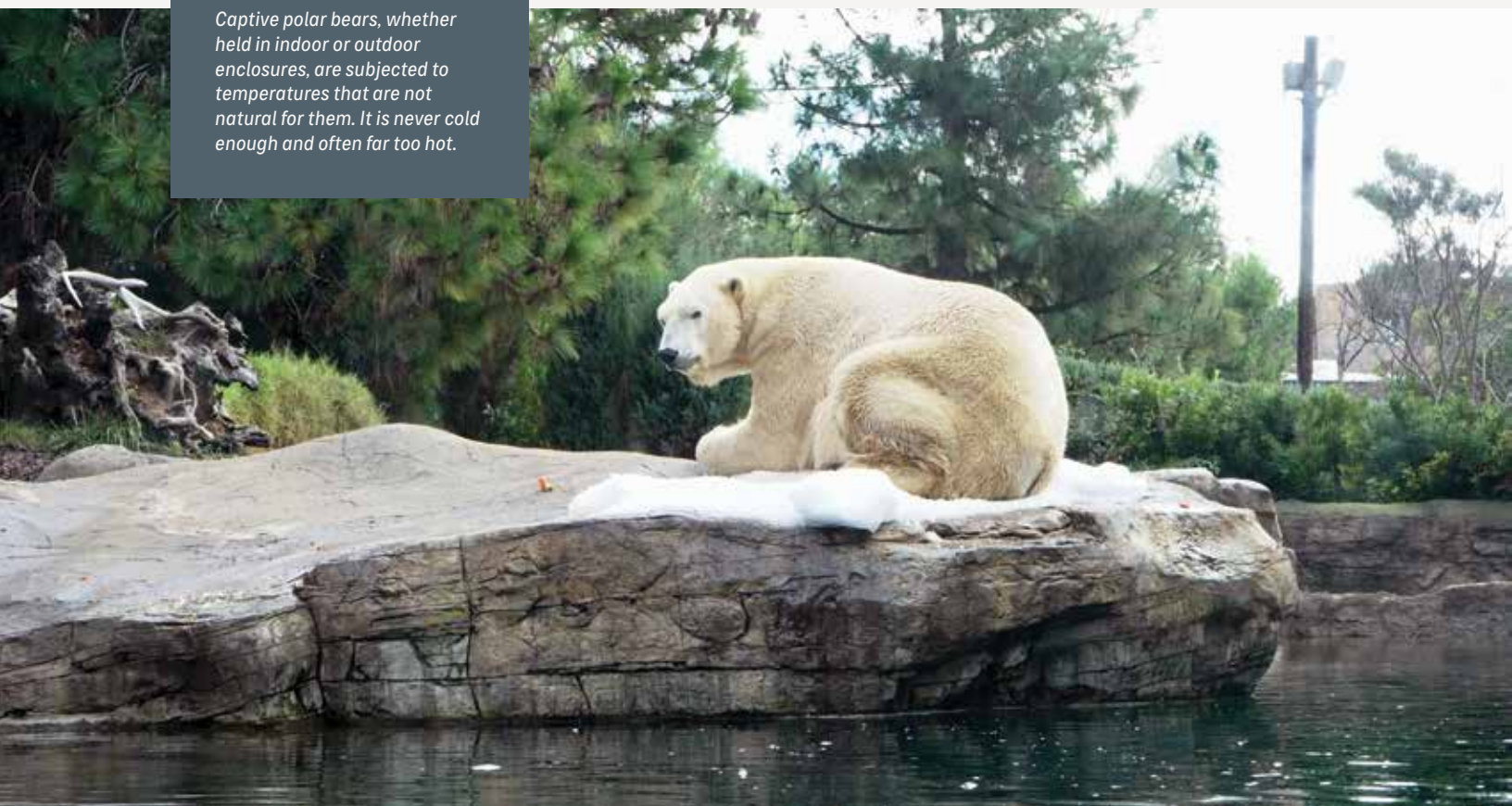
Over the years, dolphinaria have shared little information during marine mammal shows about natural behaviors, ecology, demographics, or population distribution.[28] Indeed, shows have tended to emphasize unnatural behaviors, such as dolphins "tail-walking" or sea lions doing handstands. Any natural 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 18 orcas as of June 2023. 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. Its "One Ocean" show was slightly more informative regarding orca biology and ran until 2019, although it still featured exaggerated, acrobatic behaviors; its current show is called "Orca Encounter."[29]

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.[30] Furthermore, some of the information dolphinaria present is simply scientifically incorrect or distorted to portray a facility in a better light.[31] 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;[32] its historical explanation of the "drooping fin" syndrome, which the company claimed was "normal";[33] and its current description of the life spans of captive orcas, which it misleadingly claims match those in the wild.[34]

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).[35] 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,[36] and virtual reality simulations could and should replace dolphin and sea lion shows and, in many cases, live wildlife exhibits altogether.[37]

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,[38] 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.[39] We would argue that it is the industry—with these cartoonish portrayals of wildlife in performances and in outreach to potential



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 the opposite of what public display industry rhetoric claims; instead of sensitizing visitors to marine mammals and their habitats, it desensitizes people to the suffering inherent in isolating these animals from their natural environment.

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 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.[40] 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 shaking of the head up and down, along with opening and closing of the mouth, or 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,[41] 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 or passive, the latter of which is not as effective at increasing knowledge or changing behavior.[42] 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.[43]

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 studies showing that visits to zoos lead to minimal, if any, actual change in visitor behavior when it comes to conservation.[44] Some in the public display industry have recognized this for some time; fully 35 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."[45]

AWI and WAP maintain that exposure to captive marine mammals does the opposite of what the industry rhetoric claims; instead of sensitizing visitors to marine mammals and their habitats, it desensitizes people to the suffering inherent in isolating these animals from their natural environment.[46] 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[47] rather than as integral elements of ecosystems with their own intrinsic value.[48]

CHAPTER 2

THE CONSERVATION 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.[49] 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,[50] these zoos are small in number, and their contribution to restocking depleted populations is minor.[51] 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*)[52]—and no calf was ever born, let alone released to the wild. This species became the first cetacean to be declared extinct in the modern era.[53] In fact, only two members of the Alliance of Marine Mammal Parks and Aquariums (AMMPA)—an industry association that represents selected dolphinaria—

The claim that conservation is a primary purpose of the public display industry as a whole is highly misleading, at best. Less 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.

routinely provide funding or grants to promote the *in situ* (in natural habitat) conservation of critically endangered river dolphin species.[54]

The public display industry's response to the critically endangered vaquita (*Phocoena sinus*), a small porpoise found only in the Gulf of California, Mexico,[55] has also been criticized for being lackluster.[56] Captive facilities contributed a substantial amount of funding[57] only after receiving considerable public criticism for their lack of support. By the time any significant funding materialized, the vaquita population had dropped to fewer than 30 individuals. Moreover, the public display industry's involvement in the ill-fated attempt to capture and captive-breed the vaquita—known as the Vaquita Conservation, Protection, and Recovery (CPR) program—ultimately led to the death of an adult and the probable death of a juvenile (both females), actually hastening the extinction of the species.[58]

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 relatively few in number.[59] 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).[60] Therefore, the claim that conservation is a primary purpose of zoos and aquaria as a whole is misleading, at best. Less 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 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.[61]

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.[62] 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[63] (and false at worst); the overwhelming majority of marine mammal species currently being bred in captivity are neither threatened nor endangered.[64]

What is worse is that many dolphinaria and aquaria, particularly in Asia and Russia, including facilities that actively market themselves as centers for conservation, have actually been depleting cetacean populations in their natural habitats. Facilities

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

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

worldwide still acquire certain marine mammal species directly from the wild,[65] although the number of captures has been declining globally. Contrary to conservation principles, little serious work has been done to ascertain what effect these captures have had on the populations from which these animals are taken[66] 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,[67] 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 4, "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 policymakers believe that the IWC should regulate the hunts targeting small cetaceans.[68] 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 (the industry term for captive populations) in various locations around the world.[69]

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.[70] Species enhancement programs have become the focus of a number of zoos in higher-income countries; 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.[71]

If species enhancement programs were truly a primary purpose of dolphinaria, they would be (1) targeting species that are at risk in the wild or are from depleted populations,[72] (2) raising and maintaining these animals such that they retain vital survival skills needed in the wild, and (3) working directly to preserve remaining natural habitat into which to release the species.[73] Until very recently, there was little or no focus on any of these.

There were potential species enhancement/captive breeding programs involving the baiji and the vaquita (see above), but neither were successful. There has been a successful breeding program—perhaps the only one—for the critically endangered Yangtze finless porpoise (*Neophocaena asiaeorientalis asiaeorientalis*),[74] but this has largely been conducted in oxbow lakes next to the river; i.e., in semi-natural settings rather than captive facilities.[75] The need to involve dolphinaria in this program at all is questionable. The Yangtze finless porpoise captive breeding effort is done without human intervention—the animals are held within the oxbow lakes in numbers sufficient to allow them to reproduce on their own, choosing with whom and when to breed.

Aquaria and research facilities also attempted a pilot project to capture and breed Hawaiian monk seals (*Neomonachus schauinslandi*)[76]—this is the only endangered pinniped breeding project we could identify. While some threatened and endangered small cetacean species have been held in captivity, including Asian river dolphins (*Platanista* species),[77] South American dolphins (*Sotalia* species),[78] the Amazon river dolphin (*Inia geoffrensis*),[79] and the Irrawaddy dolphin (*Orcaella brevirostris*),[80] mortality rates during, and immediately after, capture were typically high, and no individuals have been successfully returned to the wild. 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 at all.[81]

Some populations of belugas (*Delphinapterus leucas*), orcas, and common bottlenose dolphins (*Tursiops truncatus*) are in fact depleted or endangered, and this status may be due in part to removals by the public display industry.[82] These species typically breed readily in the wild—their numbers are limited in natural habitat not 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 these captive breeding programs being "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 they would need many more individuals of most species than they typically hold to maintain the appropriate amount of genetic diversity.[83] Rather than for conservation, cetaceans are instead bred to provide replacement animals for public display[84]—an ongoing need given the high rate of mortality in captivity (see Chapter 10, "Mortality and Birth Rates").[85]

Finally, the core of any successful species enhancement program is the ability to reintroduce

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

captive-bred progeny (offspring) into the wild,[86] an action that has actually had limited success in the recovery of any threatened species[87] and is especially unlikely to be effective for cetaceans.[88] Indeed, the efforts of the public display industry to prevent captive cetaceans from being returned to the wild[89] (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.[90]

In direct contrast to the industry's historical opposition to releasing captive-bred and long-term captive cetaceans into the wild, a group of public display facilities joined forces with conservation biologists at the International Union for Conservation of Nature (IUCN) in 2018 to assess, among other things, whether some threatened or endangered cetacean species or populations could be bred in captivity for eventual reintroduction to the wild.[91] This project began after the failure of the Vaquita CPR program (see above). AWI and WAP believe the appropriate response to that failure would have been to recognize that the reason many small cetacean species, including the majority of those that are currently threatened or endangered, are not routinely held in captivity is largely because efforts to keep them in captivity in the past have been unsuccessful.[92] In short, the appropriate response would have been to abandon expensive and highly-likely-to-fail efforts to undertake species enhancement programs for endangered cetaceans. Captive breeding is not the solution to small cetacean population declines;[93] only habitat protection will save them.

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 be trying to ensure that their captive-bred animals could be reintroduced, and survive, in the wild.[94]

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,[95] which can never 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.

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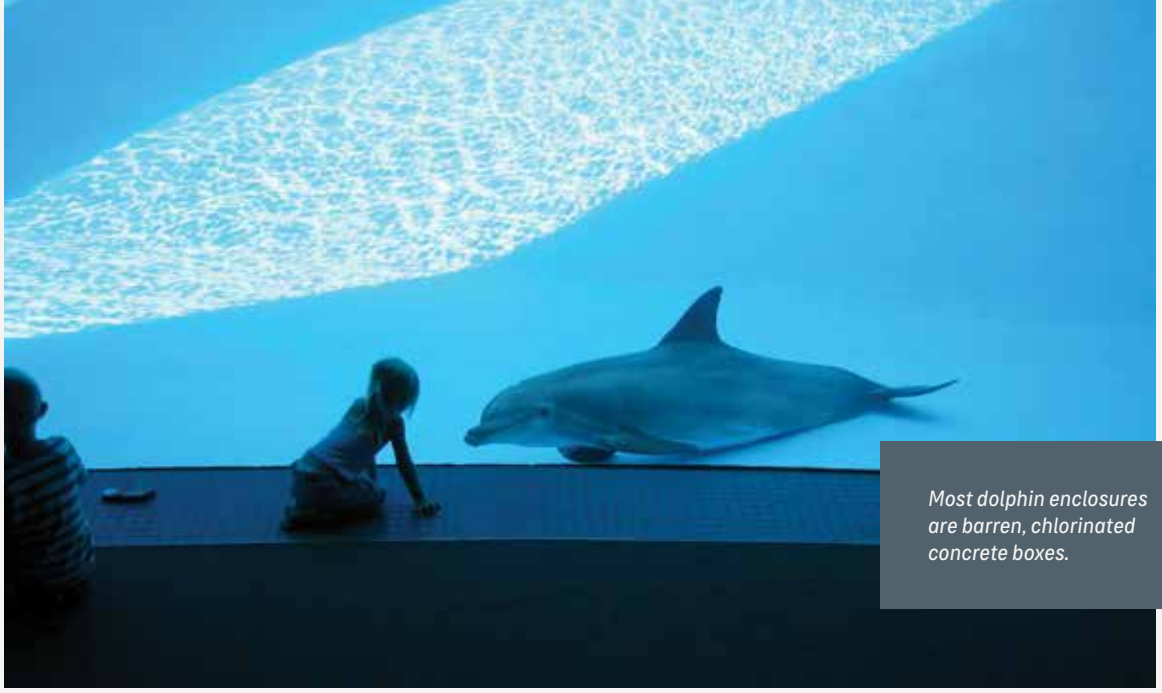

Most dolphin enclosures are barren, chlorinated concrete boxes.

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.

CETACEANS AND CULTURE

It is becoming increasingly clear that culture exists within many marine mammal populations, particularly small cetaceans. Culture is "information or behavior—shared by a population or subpopulation—which is acquired from conspecifics [members of the same species] through some form of social learning."[96] 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[97] and unique vocalizations—dialects, in effect—that apparently serve to enhance group cohesion, identity, and recognition.[98] Research has highlighted the importance of culture in the conservation of marine mammals, calling it a source of fundamental survival skills.[99] It has long been known that many marine mammals learn essential life skills from their mothers and other group members.[100] 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.[101]

Despite the importance of culture in marine mammals, captive facilities do not take this into account in the husbandry (care, maintenance, and breeding 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.[102] Also, because the skills and norms are passed from adults to calves, 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 six months of age and was moved to California when he was less than 10 months old. Similar cases have been recorded for other orcas.[103]

Separating cetacean calves at too early an age from their mothers, 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 2022.

There are instances where captive cetaceans have acquired abnormal behaviors that would not be seen in the wild, where similar behaviors and skills are culturally transmitted. Keiko—the orca made famous by the movie *Free Willy* and later the subject of an attempted return to the wild[104]—mimicked the calls of his bottlenose dolphin companion and other non-natural sounds he could hear in his tank.[105] 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.[106]

Bottlenose dolphins in captivity have been reported to adopt and produce sounds such as their trainers' whistles.[107] 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.[108] 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 marine mammal mortality. Female cetaceans learn essential maternal skills from their mothers and other females in their population. Separating calves at too early an age from their mothers, or forcing animals to become pregnant when too young to have acquired essential skills or the maturity level needed to rear a calf,[109] can lead to high levels of infant mortality.[110]

THE PUBLIC DISPLAY INDUSTRY DOUBLE STANDARD

While the public display industry represents its captive breeding programs as "species enhancement" and a major reason for its continued existence and relevance, 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 long-term captivity, let alone captive-bred progeny, cannot be rehabilitated and returned to the wild.[111] 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, 16 percent of all free-ranging golden lion tamarins were reintroduced captive-born animals or their descendants; that percentage had doubled by 2014.[112] However, through the decades that bottlenose dolphins have been kept in captivity, only a few captive-bred individuals 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,[113] and two animals released in the Black Sea in 2004. However, the release of these latter two animals was controversial, due to a number of factors, including poor post-release monitoring.[114]

Few captive whales and dolphins originally captured in the wild have been deliberately rehabilitated and released after long-term captivity either.[115] 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,[116] three bottlenose dolphins from UK facilities,[117] nine dolphins in Australia (see above),[118] two dolphins in Guatemala,[119] two dolphins in Nicaragua,[120] two dolphins in Turkey,[121] and two dolphins in Indonesia.[122] Eight dolphins were released in South Korea, as the result of a court case that determined they were acquired illegally.[123] In the United States, four bottlenose dolphins have been released from captive research facilities,[124] 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 South 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.[125]

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, governments, animal protection groups,

There is a marked lack of industry-backed rehabilitation and release programs for captive cetaceans or industry funding for the development of such programs.

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

and private donors, rather than by public display facilities. There is a marked lack of industry-backed rehabilitation and release programs for captive cetaceans or industry funding for the development of such programs.

In the past, 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.[126] 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 public display industry's opposition to the rehabilitation and release of captive cetaceans. Research might prove that wild-born cetaceans who have been long-term captives (or even captive-born individuals) can be successfully rehabilitated, returned to the wild, and reintegrated into a social group. 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 the release of all eligible candidates.

Two typical arguments the industry makes against subjecting captive cetaceans to the admitted risks of reintroduction[127] 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,[128] so it is foolhardy to try it. Neither of these arguments stands up to scrutiny.

The first argument again illustrates the double standard. The industry did not show the same reluctance when, for example, dozens of orcas and belugas (and other species no longer held in captivity because they quickly died) were originally brought into captivity decades ago. Those animals—exposed to unknown, and in many cases fatal, risks—were treated as subjects in an ongoing trial-and-error experiment. The second argument, aside from no longer being factually correct (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.[129] This is not possible with regard to captive marine mammals (see Chapter 5, "The Physical and Social Environment").

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.[130] However, with marine mammals, little—if any—research has been conducted on the habitats from which marine mammals are routinely removed for public display, so it is difficult to impossible to determine these habitats' conservation status.[131] 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 current captive breeding programs among dolphinaria qualify as species enhancement programs once again fails in practice, as well as on 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 mammals. Indeed, there are some 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).[132]

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.

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,[133] 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,[134] 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

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.

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. Indeed, only a small fraction of cetaceans survive rescue and rehabilitation,[135] an outcome decidedly underemphasized by the facilities actively involved in stranding networks.

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.[136] 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.[137]

It is also disturbing that public display facilities that rescue stranded animals appear to evaluate each animal's *release* potential in terms of the animal's *display* potential. They may determine that highly desirable species, such as orcas,[138] or those rarely observed in captivity, such as Atlantic spotted dolphins (*Stenella frontalis*) or pilot whales (*Globicephala spp.*), are unsuitable for release;[139] 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.[140]

CHAPTER 3

INDUSTRY RESEARCH

The majority of the public in the global West, 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 unless there are major educational or scientific benefits.[141] As a result, dolphinaria and aquaria have often claimed 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.[142]

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, various types of radio and satellite tags, drones, feces (and blow) collection and genetic analysis, and remotely operated underwater vehicles, as well as improvements in capture and release techniques[143]—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 behavioral research using captive animals has historically related to husbandry concerns.[144] It has done little to benefit free-ranging animals or their conservation[145] and can provide dubious results.[146]

Behavioral ecologists do not in general look to public display facilities to conduct their studies. The future of 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,[147] 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.[148]

SeaWorld in particular has claimed to be a significant contributor to scientific research that is invaluable for the conservation of free-ranging marine mammals,[149] but in reality their research output on cetaceans, particularly orcas, has been limited.[150] 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. 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, and in 2019, its total revenue was US$6 million, US$4.5 million of which was in ticket sales.[151] Despite having an annual income that would rival some marine laboratories, the actual research conducted here has been minimal and only recently increased.[152]

POST-*BLACKFISH* INDUSTRY RESEARCH

In the 4th edition of this report, published in 2009, 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

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Data from captive animals are often not applicable to wild populations.

given at the foremost international conference on marine mammal science—the Biennial Conference on the Biology of Marine Mammals, sponsored by the Society for Marine Mammalogy, the world's largest marine mammal research society.[153] In 2007, before the 2009 documentary *The Cove* (see Chapter 4, "Live Captures") and then *Blackfish* brought major attention to the public display of cetaceans, about 5 percent of the conference presentations on cetaceans were of research done on captive subjects. Of these few studies, more than a third were conducted through research institutions that are not open to the public. There were only two abstracts submitted by SeaWorld, the largest holder of captive marine mammals in the world.[154] At previous Biennial Conferences, there were no presentations at all from major North American facilities.

In 2010, other researchers (who had conducted research in cooperation with public display facilities in the past) found similar results, reporting that only 1.2 percent of scientific articles on orcas involved captive animals.[155] At the 2017 Biennial Conference, 6.2 percent of presentations were related to research on marine mammals in a captive setting; thus, the contribution by public display facilities to the field of marine mammal science had not appreciably changed in the preceding decade. Surprisingly, the percentage of cetacean presentations at the 2022 Biennial Conference (the COVID-19 pandemic led to a postponement of the conference in 2021) using captive individuals as research subjects remained about 5 percent.[156]

In contrast to conference presentations, more than a dozen papers on captive cetacean welfare were published in peer-reviewed journals from 2015 to 2019.[157] This is a considerable output compared to previous years. However, in 2018, in what can only be perceived as a reaction to the shift in public opinion brought about by *Blackfish* (see Chapter 13, "The *Blackfish* Legacy"), an unprecedented multi-facility study undertaken by 44 dolphinaria began (one dropped out early on, leaving 43 participating facilities).[158] This study was called "Towards understanding of the welfare of cetaceans in zoos and aquariums,"[159] colloquially known as the "Cetacean Welfare Study."[160] The results from this work began to be published in 2020, including in a special issue of a peer-reviewed journal in 2021.[161]

The Association of Zoos and Aquariums (AZA) stated, "This is the largest-ever multi-institutional study on the impacts that habitat, environmental

enrichment, and animal training have on cetacean welfare inside accredited zoos and aquariums."[162] The organization added, "The findings themselves may not be particularly surprising to most people who have cared for these animals for years."[163] This statement, while meant to indicate satisfaction with the status quo regarding cetacean welfare, raises two questions: One, why did the industry not conduct and publish this type of research sooner, if they were so certain of the results? And two, would the facilities have allowed the results to be published if they had not been satisfied with the results?

The study found overall that cetaceans who showed fewer stereotypical behaviors were less stressed.[164] Dolphins provided with enrichment activities[165] also swam faster,[166] utilized more of their enclosures,[167] showed more behavioral diversity,[168] and interacted more with each other.[169] The study also found that if enrichment activities were regularly scheduled, social interactions and swimming speed increased, apparently because, if they were randomly provided, the dolphins would wait in one place for these activities to start.[170] Of course, "enrichment" in the ocean is relatively stochastic (random), at least on a daily basis (e.g., weather varies, prey moves evasively, location within a large home range shifts). It is stochasticity that is lacking in the highly controlled captive environment, leading to a counterintuitive response in captive-raised animals to whom it is introduced.

One paper noted that dolphins in larger enclosures, with more space and the ability to choose to avoid tank-mates, showed fewer stereotypical behaviors and aggression, and were presumably less stressed.[171] This is an intuitive result; however, the authors, in their discussion, never recommended providing these species with larger enclosures. Recommendations for improving welfare in general in this study's multiple papers were notably lacking. Conclusions tended to be self-congratulatory, noting how valuable the studies were, when in fact the results were often either obvious (e.g., enrichment activities reduce stress; stereotypical behavior is a sign of stress) or redundant.[172] Few practical suggestions for improving welfare, beyond continuing to provide established enrichment activities, arose from the study.[173] This makes the AZA's claim that "This study was significant on the world stage for several reasons"[174] an exaggeration.

From a welfare perspective, it would have been far more useful to collect data on *poor* welfare indicators (e.g., how frequently animals engage in stereotypical behaviors or the percentage of time animals are sedentary/inactive and what factors influence this) and whether the results varied by species or facility. However, in our opinion, this was not done because the researchers did not want to imply, even in their approach to the study design, that animals in any of these accredited facilities with which they cooperated might exhibit signs of poor welfare.[175] In short, the research project at no time questioned the need for captive environments in principle or the value of cetacean public display. This demonstrates a bias on the part of the researchers and calls into question whether the findings of the various studies were interpreted objectively.

A number of other papers aside from those reporting on the results of the Cetacean Welfare Study were published from 2020 to the time of this report's publication.[176] Perhaps not surprisingly, studies that reported potential negative impacts of standard captivity practices on dolphins (e.g., captive dolphins may be stressed, as measured by fecal hormones, when there are few or no people, or when there are many people, outside of their enclosure; they appear least stressed when a moderate number of people are present[177]) were by and large conducted in non-western dolphinaria.[178] In addition, some considered more practical questions than the Cetacean Welfare Study did, such as which types of enrichment result in the highest levels of positive welfare indicators in dolphins.[179] Notably, however, researchers working with captive cetaceans have yet to ask some rather obvious welfare questions, such as whether poor

Notably, however, researchers working with captive cetaceans have yet to ask some rather obvious welfare questions, such as whether poor dentition, a common feature in captive cetaceans, has a negative impact on an individual's health.

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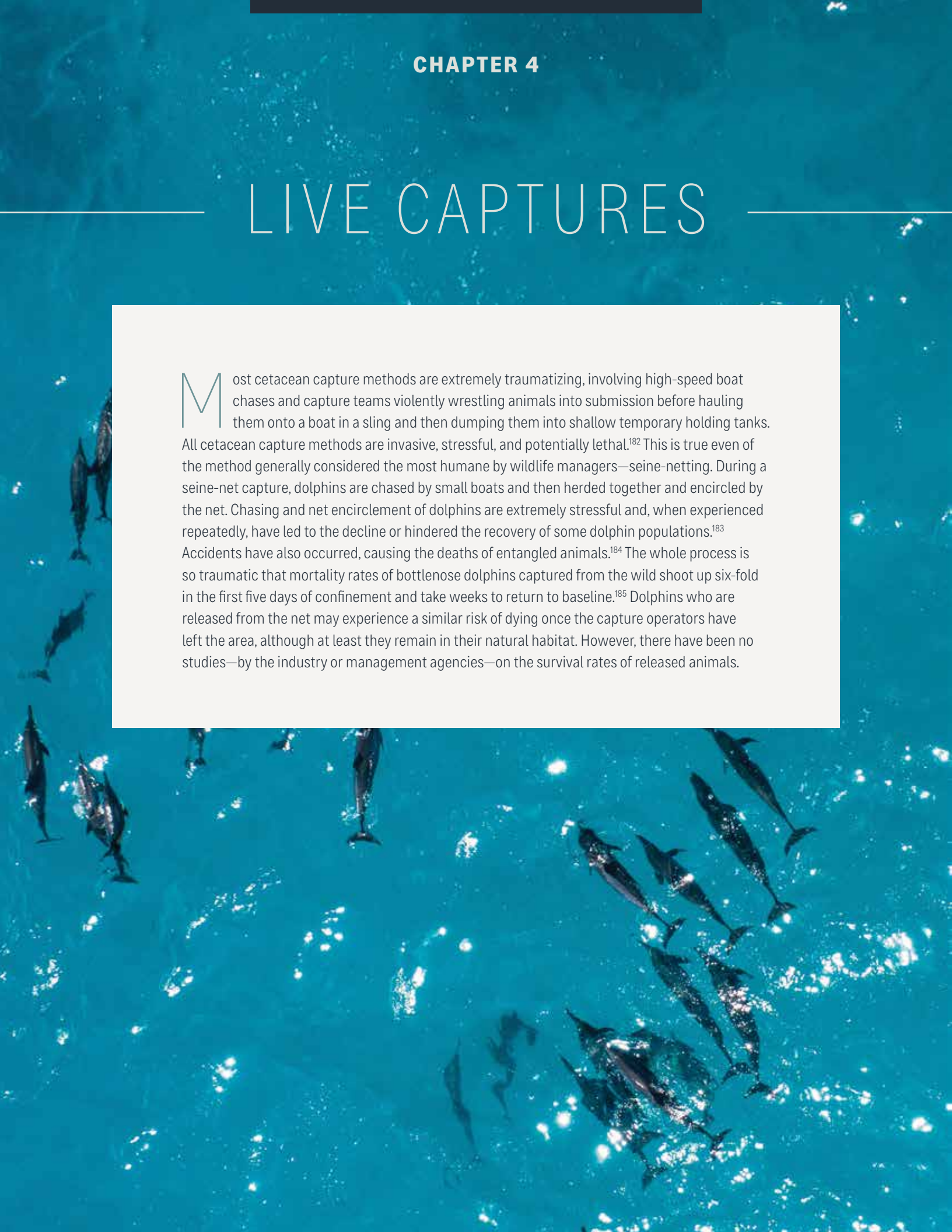
CONCLUSION

Despite a recent increase in animal welfare research with captive cetaceans, some of which offers helpful insight into improving animal welfare in dolphinaria, the language used in the vast majority of these publications—including the Cetacean Welfare Study referenced above— suggests that there is a cost to researchers' objectivity when they secure access to their study subjects. In addition, some obvious and important questions regarding captive cetacean welfare continue to be ignored by the public display industry and the researchers granted this access. This casts a long shadow of bias across much of this work. Certainly, it seems that the most objective of these recent studies are being conducted in facilities that are not part of the established (western) industry network. In general, the publications in this recent spate approach the research from the point of view that the welfare of captive dolphins in accredited facilities is already excellent, rather than as a way to evaluate whether, in fact, it is or is not.

AWI and WAP believe that research on captive marine mammals 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 13, "The *Blackfish* Legacy"). Sabbatical programs have been pioneered successfully by marine mammal researchers.[181] Commercial facilities are not essential to the continuation of research on captive marine mammals.

CHAPTER 4

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. All cetacean capture methods are invasive, stressful, and potentially lethal.[182] 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.[183] Accidents have also occurred, causing the deaths of entangled animals.[184] 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.[185] Dolphins who are 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 for this purpose only in Taiji, Japan. This hunt involves a flotilla of small boats that—through loud noises produced by the crews banging on hulls or clanging 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;[186] 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*,[187] which highlighted both the hunt and the trade in dolphins to aquaria.[188]

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)[189] or fertilizer, but live animals fetch up to tens of thousands of dollars[190]—the large profits from the few live animals sold from each hunt have helped to subsidize and maintain the drives.[191]

Many drive-caught animals, of several species, are found in Japanese and other Asian dolphinaria—the fastest expanding market is mainland China.[192] At least 105 facilities in 20 countries have sourced dolphins from Taiji for public display over the years.[193] When Hong Kong was still governed by the United Kingdom, its Ocean Park facility obtained animals from drive fisheries in Japan.[194] Ocean Adventures, a facility in Subic, Philippines, received a shipment of false killer whales (*Pseudorca crassidens*) from a Taiji drive in March 2004. The person who procured these animals for Ocean Adventures was an American.[195] Even though the vast majority of sales outside Asia occurred last century, the problem has continued elsewhere—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.[196] At least 20 false killer whales caught in Japanese drives were imported into the United States prior to 1993; however, since that year, no permits have been issued to US facilities to import cetaceans collected from Japanese drive fisheries.[197]

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

Although drive-caught animals have not been directly imported into the United States for 30 years, the US government allowed the export of marine mammals caught in US waters to facilities in Japan that held drive-caught animals through the early 2000s.[198] In addition, it considered a research permit request by SeaWorld to collect reproductive and other tissues from animals captured and killed in drive fisheries.[199]

However, the Taiji drive fishery has become so infamous and public pressure so great that the AZA and the World Association of Zoos and Aquariums (WAZA) issued statements condemning the hunts in 2004,[200] and the Japanese Association of Zoos and Aquariums (JAZA) prohibited its members from sourcing their animals from these hunts in 2015.[201] Despite this, transfers continue to non-JAZA facilities in Japan, and exports have occurred to non-WAZA facilities in countries such as China,[202] Saudi Arabia, and the United Arab Emirates.[203]

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.[204] This dispersal could have serious survival implications for the remaining animals, as having a well-organized group is crucial when small cetaceans forage for food or have to defend themselves against predators or competitors. Removing individuals can also be highly disruptive to the culture of the remaining group (see Chapter 2, "The Conservation Fallacy—Cetaceans and Culture").

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, are 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 also a "second wave," which may strike years after captures end, manifesting as a decline in birth rate and harmful inbreeding.[205]

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.[206] The 2007 survey of the US public found almost 90 percent of respondents viewed the capture of wild dolphins for display unacceptable.[207] Even the broader zoo and aquarium community discourages live capture,[208] 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 by hunts (for example, polar bears) or strandings. However, some pinniped species, particularly from the Southern Hemisphere for Asian facilities, are still taken from the wild.[209]

Thus, deliberately organized live captures of marine mammals for public display remain a serious conservation and welfare problem, primarily for

More facilities are opening in China, which is now the main market for wild-caught marine mammals. There are currently 96 operational dolphinaria and marine theme parks in China, with as many as 11 more under construction. Approximately 1,300 cetaceans, of at least 15 species, are displayed in China, with most of these originally captured from the wild and imported, primarily from Japan and Russia.

cetaceans—a problem that is increasing as more facilities are opening in China, which is now the main market for wild-caught marine mammals. As of June 2023, there were 96 operational dolphinaria and marine theme parks in China, with as many as 11 more under construction. Approximately 1,300 cetaceans, of at least 15 species, are currently displayed in China, with most of these originally captured from the wild and imported, primarily from Japan and Russia.[210]

The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), the treaty that governs international trade in animal and plant species taken from the wild (or bred or propagated *ex situ*), requires an exporting country to make a "non-detriment finding" (NDF) to support trade involving certain species (including all cetaceans).[211] 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 or plants are taken, as well as a scientific assessment that shows that trading in these animals or plants 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.[212] 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 IUCN's *2002–2010 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.*[213]

The Small Cetaceans Sub-Committee of the IWC's Scientific Committee has expressed similar concerns.[214] 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 making NDFs to treaty Parties, it has no process to objectively verify the validity of an NDF that has already been made.[215] For many

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.

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

Cuba has long been a hotspot for bottlenose dolphin captures.[216] These captures have been for both domestic[217] and international trade. Exports in this century include six dolphins sent in 2007 to the Dolphin Academy on the Caribbean island of Curaçao and nine animals sent to Venezuela in 2011 and 2013.[218] Four went to Saudi Arabia in 2020.[219] 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.[220] Captured Cuban dolphins have often been sold to other facilities in the Caribbean,[221] as with the Dolphin Academy, while others have been exported to Europe, Mexico, and the Middle East.[222] Given that Cuban NDFs to support these trades have not been science based, these exports should not have been allowed under CITES.[223]

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."[224] The number of dolphins captured for domestic use is unknown.[225]

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.[226] 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.[227]

Bottlenose dolphin captures have occurred in other parts of the world as well. Examples include another capture in Mexico, in December 2000, when eight bottlenose dolphins were captured off the Pacific coast of Baja California.[228] 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 the Parque Nacional del Este (National Park of the East) in the Dominican Republic and sent to a local facility, Manatí Park.[229] This capture was illegal under both national and international law.[230] By 2006, only three of these dolphins were known to be still alive; by 2009, there were only two.[231] Action by the government of the Dominican Republic 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.[232]

Another capture, in the South Pacific, occurred over several months in 2003.[233] 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).[234] There was a subsequent capture from the same area in summer 2007. The government issued capture permits to a few operators and established a capture/export quota of 100 dolphins per year. Despite a lack of science to ascertain the sustainability of these removals,[235] many animals were exported internationally.[236] 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.[237] In addition, the CITES Trade Database records 56 live wild-caught dolphins being exported from Solomon Islands to China from 2016 through 2018;[238] it is possible that these were dolphins captured and held within Solomon Islands prior to the ban.

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 occurring in 2004.[239] 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[240] and 15 dolphins near Roatán Island, Honduras, in March 2005. The ultimate disposition of these 27 animals (released, died, retained, or exported) was not reported.[241] The sustainability of these captures was not assessed before they took place.[242]

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.[243] 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.

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.

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.[244] 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.[245] 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.[246]

On a more positive note, at the 2002 meeting of the CITES Conference of the Parties (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.[247] 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 47 orcas were captured from the "Southern Resident" population in Washington for public display, perhaps 40 percent of the existing animals at the time.[248] At least 12 animals died during capture,[249] and the survivors were shipped to aquaria and dolphinaria, of which only one animal survives.[250] The population—only 73 individuals as of July 2022[251]—was listed as endangered under the US Endangered Species Act (ESA) in November 2005, partially because of the impacts of these removals.[252]

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 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.[253] 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 10, "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 young female died 23 days later.[254] Between 2005 and 2010, several failed attempts were made to capture orcas

These juvenile orcas, captured from a mammal-eating population and held at the same Russian Far East facility shown on page 40 (although held in separate pens), were eventually released to an unknown fate.

in the northern Sea of Okhotsk.[255] 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.[256]

In the western Sea of Okhotsk, one successful capture occurred in 2012 and three in 2013. (Seven whales were taken in total, but the fate of three is unknown.) Of the remaining four, two were exported to China and two were sent to Moscow's brand-new Moskvarium.[257] 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.[258] Another orca was also observed in captivity, after allegedly being bycaught in fishing gear. This animal, who supposedly had been released, was discovered on a cargo boat later in the year with two other young orcas..[259] 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).[260] Officially, no captured orcas were 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).[261] 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 orcas. 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.[262]

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.

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 posted on social media and quickly went viral.[263] The facility was dubbed the "whale jail." The public backlash, in addition to lobbying pressure from Russian and international animal protection groups, and a letter of concern from a group of international scientists,[264] led Russian authorities to review the situation.[265] Public concern increased as the enclosure froze over during winter 2018–2019.[266]

The Russian government amended a law earlier in 2018 to require cetaceans captured under permit for cultural and educational purposes (that is, captive display) to be retained within the Russian Federation.[267] It was thus illegal to export them by the time the whale jail was revealed, and yet these capture operators were expressly taking 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 (which is normal for cetacean captures; juveniles are preferred) and 15 of the belugas were almost certainly less than a year old (their teeth had not erupted), and thus still dependent on their mothers, which violated Russian regulations. The company that captured the whales was fined the equivalent of US$2.5 million for capturing animals younger than regulations allowed.[268]

President Vladimir Putin, influenced by the international attention, publicly promised to close the whale jail. This led to a rushed attempt to release the animals. The Russian Research Institute of Fisheries and Oceanography was put in charge of the releases and hired the same company that had conducted the captures to perform the task (this company was paid twice as much as it had been fined to release the whales).[269] The orcas and 30–40 of the belugas who survived the winter were transported over 1,900 km (1,180 miles) via barges, down the Amur River, to the Sea of Okhotsk near the original capture site and were released over the course of six months or so during 2019.

The tag failed on one young orca, but the device remained attached; this tagged whale was spotted

It was announced that no captures of cetaceans for any purpose other than science would be permitted in 2019. This ban on captures in Russian waters for captive display may (or may not) become permanent.

near the capture site with free-ranging orcas in September 2022 (three years after release) by a BBC crew filming the documentary *Frozen Planet II*.[270] This juvenile female was swimming in echelon formation (the position a juvenile cetacean takes with his or her mother or other family members, next to and slightly behind the head of the larger animal) with an adult female in the pod;[271] it is possible this adult was her mother.

However, the final 50 or so beluga whales were simply released in local waters in Srednyaya Bay near the site of the whale jail in late 2019, hundreds of miles from the nearest known beluga habitat.[272] Despite being far from home, a number of animals have subsequently been observed surviving in the area. The government dismantled the whale jail entirely in 2021.[273]

It was announced that no captures of cetaceans for any purpose other than science would be permitted in 2019;[274] this ban on captures in Russian waters for captive display may (or may not) become permanent, but has continued through the COVID-19 pandemic period and, to our knowledge, remains in place. There is a major international collaborative research 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.[275] The impact of the captures since 2012 is therefore currently unknown.

BELUGAS

From 1999 to 2005, Marineland, in Niagara Falls, Ontario, Canada, imported 10 wild-caught Black Sea bottlenose dolphins (a practice now prohibited—see above) and 28 wild-caught beluga whales from Russia,[276] for a total of 38 wild-caught cetaceans in just six years.[277] Eight more wild-caught belugas from Russia, all females, were imported in December 2008.[278] 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 wild-caught cetaceans during a time when the practice of keeping 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.[279] These viewpoints led to the passage in June 2019 of Bill S-203, which ended the display of captive cetaceans in Canada (see Chapter 13, "The *Blackfish* Legacy"). Marineland's animals were grandfathered in, but cannot be bred, meaning eventually there will be no cetaceans there.

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

Several wild-caught juvenile beluga whales languish in holding pens. These whales were eventually released, but they were not monitored, and only some are known to have survived.

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 (Mystic Aquarium later withdrew from the process). 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.[280] This would have been the first import into the United States of wild-caught cetaceans in 20 years.[281] However, NMFS denied the permit application in July 2013, as the beluga whales came from a likely depleted population.[282] Georgia Aquarium sued to overturn this denial in 2013, but a 2015 court ruling upheld NMFS' original decision.[283] 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[284] and the adverse publicity arising from these deaths, the permit application, and the subsequent legal proceedings.

Wild-caught belugas have also been imported from Russia by China, Thailand, Taiwan, Bahrain, and Turkey over the past 20 or so years.[285] 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, or their progeny, from a depleted stock for the purpose of public display, meaning the United States will now never become a commercial trading partner in live belugas with Russia.[286] However, after the release of the drone footage of the whale jail 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 5

THE PHYSICAL AND SOCIAL ENVIRONMENT

The discussion in Chapters 1–3 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 certain 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.[287]

CONCRETE ENCLOSURES[288]

In any design of a dolphinarium or aquarium, satisfying the needs of the visiting public and the facility's budget come 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.[289]

The tanks speak for themselves. Their overall size, shape, and depth are determined by the need for maximum visibility from the surrounding seats and underwater viewing windows.[290] 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.[291] 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.[292] Economics also influences design; it becomes prohibitively expensive to build larger enclosures.[293] 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.[294] These enclosures can in no way accommodate the biological needs or waste products of these species.[295]

In addition, unlike many other species kept at zoos and aquaria, captive marine mammals often have no provision to go "off display" (to retreat 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 aggressive interactions between animals, in at least some cases resulting in serious injury and even death.[296]

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.[297] 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. The animals are held in natural seawater, as opposed to chemically treated, filtered, and/or artificial seawater. (A small number of freshwater river dolphins are maintained in river pens.) 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).[298] 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 shallow coastal seabeds, 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.[299]

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.[300] Hurricanes can also lead to animals escaping from the enclosures.[301] 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.[302] Probably the best-known incident involving captive marine mammals and hurricane impacts (not a sea pen facility, but an on-land concrete tank complex) 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.[303] Hurricane Wilma hit the Yucatan Peninsula only a few weeks later and devastated several sea pen dolphinaria in Cancun and Cozumel.[304] The 2017 hurricane season, which included Hurricanes Irma and Maria, damaged other sea pen dolphinaria in the Caribbean, including Dolphin Discovery in Tortola, British Virgin Islands.[305]

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 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.[306] 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.[307] The widespread occurrence of dolphin sea pens in the Caribbean is a particular cause for concern, as this area is at high risk for hurricanes and tsunamis, and dolphin sea pens have further diminished natural barriers already degraded by high levels of coastal development.[308]

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.[309]

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.[310] Public display facilities that house pinnipeds generally provide them with only a small tank filled with

The widespread occurrence of dolphin sea pens in the Caribbean is a particular cause for concern, as this area is at high risk for hurricanes and tsunamis, and dolphin sea pens have further diminished natural barriers already degraded by high levels of coastal development.

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.[311] Chlorine precludes live plants and fish in the tank and can cause skin and eye complications for marine mammals.[312] 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, 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 for pinnipeds is profoundly limited and impoverished.[313]

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 or ice floes with their bodies. Many pinniped species are territorial or maintain dominance hierarchies;

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.

relationships with conspecifics are often complex and can take years to develop.[314] 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 for pinnipeds.

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.[315]

Scientific analyses[316] show that wide-ranging predators more frequently exhibit poor health, stereotypical behavior,[317] 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.[318]

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).[319] 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 problems, 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 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, or understand the animals' natural

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

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.[320] 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.[321] 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.[322]

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.[323] 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, Manitoba, 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.[324]

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.[325] In 2002 Manitoba's Polar Bear Protection Act was passed.[326] The act restricted the capture of polar bears to orphaned cubs only (i.e., no "nuisance" adults) and then only under certain conditions.[327]

SIRENIANS 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.[328] Because sirenians are warm-water herbivores and have slower metabolisms, it appears to be easier to keep their enclosures

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.

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, because most of the permanent captives are animals who have been injured and deemed unable to be returned to the wild.[329] They are herbivorous marine mammals who are endangered throughout their range; therefore, their treatment has been unique. In fact, there are probably fewer than 10 dugongs held in captivity globally.[330] 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.

At first glance, due to their small size and tendency to rest for long periods, it seems sea otters (*Enhydra lutris*) should be even easier to keep in captivity. However, most sea otter exhibits are small and cannot provide features that simulate natural habitat.[331] In addition, sea otters are known to be particularly vulnerable to fatal shock as a result of handling and during transportation.[332]

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 captive-born pups, have been high.[333] In the 1990s, the majority of captive sea otters was held in Japan (there were over 120 animals at one time, although the number has probably dropped below five),[334] but there is scant information on survival rates. Japanese aquaria and zoos have reported poor success in captive breeding—resulting in requests for permits to capture sea otters in Alaska.[335] A program in California to rescue orphaned pups of the threatened southern sea otter (*Enhydra lutris nereis*) population has increased its success at returning these animals to the wild by minimizing human interaction with them.[336]

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 can dive from 500 to 1,000 m (1,640 to 3,280 ft) deep. These cetaceans are highly intelligent and socially and behaviorally complex.[337] 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.

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

Dolphinaria and aquaria cannot even begin to simulate the natural habitats of these species, any more than they can that of the polar bear.[338] 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.[339] 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 (39 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.[340] 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.[341] 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[342] (see also Chapter 3, "Industry Research: Post-*Blackfish* Industry Research").

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.[343] When one considers that orcas routinely swim multiple kilometers in straight lines, and are capable of traveling as many as 225 km (140 miles) a day for up to 30–40 days without rest,[344] while routinely diving to depths of 100–500 m (325–1,640 ft),[345] an enclosure this size is truly tiny from their perspective.

It is widely known in the public display industry that larger tanks decrease aggression and increase breeding success,[346] yet the industry continues to lobby against any regulatory revisions that would increase the minimum space requirements.[347] However, even in the largest facilities, a cetacean's room to move is decreased enormously, allowing access to less than one ten-thousandth of 1 percent of the animal's 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.[348] As noted

above, this makes little sense from a biological and evolutionary perspective.

Indeed, 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 (as does common sense). Orcas leave Johnstone Strait daily, often traveling 40 km (25 miles) north or south of this area in one night.[349] 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.[350] 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[351] 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.[352]

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.[353] 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,

The orca Tokitae'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.

including size and eye patch types; and other genetic differences). As noted earlier, calves are typically removed from their mothers to separate quarters after only three or four years, if not sooner.[354]

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[355] 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,[356] although these polar animals still languished in desert heat,[357] until one of the animals died, and the other was exported back to Russia.

CONCLUSION

Creating adequate captive enclosures for terrestrial mammals is a persistent challenge. This difficulty is amplified with respect to captive enclosures for marine mammals, 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 recreated; 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 recreated. 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 6

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.[358] The constant administration of supplements has been 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.[359] However, some animals, such as sexually mature males, hand-reared calves, or aggressive individuals of either sex, are often sequestered in these tiny tanks on a routine basis.[360] 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.[361] 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.[362] 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).[363] The most commonly cited cause of death in the NMFS *National Inventory of Marine Mammals* is pneumonia—generally a secondary condition resulting from some initial condition such as stress or a compromised immune system.[364] Rarely do necropsy (animal autopsy) reports identify the cause of the pneumonia.[365] 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.[366]

Approximately 10 to 20 percent of captive marine mammal deaths are reported as from undetermined causes. Cetaceans are difficult to diagnose;[367] their lack of mobile facial expressions[368] and body language with which humans can empathize (such as shivering or cowering) make it difficult to recognize developing health problems.[369] 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.[370] 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.[371]

In addition, there are diseases that afflict captive marine mammals more frequently or more intensely than their free-ranging counterparts. For example, in bottlenose dolphins, hemochromatosis, a disease

Cetaceans are difficult to diagnose; their lack of mobile facial expressions and body language with which humans can empathize (such as shivering or cowering) make it difficult to recognize developing health problems. 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.

resulting from excess accumulation of iron in the body, occurs at a much higher rate in captivity than in the wild,[372] possibly because of factors associated with diet or the inability of captive dolphins to dive beyond a few meters in captivity.[373] Kidney stones are also seen more frequently in captive versus free-ranging dolphins.[374] "Tattoo lesions"[375] are also common in captive bottlenose dolphins;[376] in free-ranging dolphins, such lesions are considered an indicator of poor health and immune system suppression.[377]

At least two captive dolphins are known to have died due to infections after being raked by another dolphin in the same enclosure.[378] This particularly violent level of aggression has also been seen in captive orcas,[379] and is likely a result of animals being kept in small enclosures and the inability of animals to escape from dominant, aggressive individuals.[380] Again, this is largely the result of the artificial environment in which captive cetaceans are maintained.[381] Even more concerning, some marine mammals suffer and even die due to self-injury.[382]

At least two captive orcas have died from mosquito-borne illness.[383] 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. Captive cetaceans, especially orcas, spend a great deal of time sedentary, floating motionless at the surface like logs (this behavior is in fact called "logging"), in climates or areas (e.g., inland) where mosquitoes are almost certainly more prevalent than they are over water. Therefore, 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.[384]

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

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,[385] 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 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 (often into the sun) for fish to drop into their mouths. This "stationing" posture is uniquely

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.[386]

Methicillin-resistant *Staphylococcus aureus* (MRSA; methicillin, also called meticillin, 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.[387]

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.[388] 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 fillings.[389] 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 specialized prey type or feeding method (and thus is a feature of populations in specific ecosystems)[390] 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 minimal tooth wear, similar to the near-pristine teeth seen in salmon-eating resident orcas in the northeast Pacific, for example.[391] Yet this is not the case. Therefore, the public display industry's claim that tooth wear and breakage in captive orcas are "normal"—the result of routine manipulation of objects in their enclosures[392]—is simply false. This pattern of wear and degree of damage to the teeth are not normal and may factor into the shortened life spans of captive orcas[393] (see Chapter 10, "Mortality and Birth Rates").

CHAPTER 7

BEHAVIOR

The natural foraging behaviors of most predators in captivity are severely compromised.[394] 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.[395]

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."[396] 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 few 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.[397] 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 as well. 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 (as opposed to being told what to do when being trained for performance or interaction with visitors).[398] 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 kilometers 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; sometimes, 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.[399] 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,[400] 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 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 at the front of the head) or animals taking fish from a trainer's mouth. 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 the availability of space.[401] The needs of the animals

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

are considered secondary. For example, 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,[402] 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, as well as the lack of escape routes.

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, mental, psychological, and social development.[403] 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 8

STRESS

Stress[404] has been recognized and discussed in this report as a factor that can severely affect the health of captive wildlife,[405] including marine mammals.[406] Stress in mammals can manifest in many ways, including weight loss, lack of appetite, anti-social behavior, reduced reproductive success, arteriosclerosis (hardening of the arteries), stomach ulcers, changes in blood cell counts, increased susceptibility to diseases (reduced immune response), and even death.[407] Short-term acute stress will occur as the result of pursuit, confinement, sudden loss or change in social relationships, and physical handling[408] experienced during capture or the transport process.[409] Long-term chronic stress would result once an animal is permanently confined in captivity.[410]

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.[411] Studies have noted significant physiological impacts from pursuit and handling, particularly in cetaceans.[412] 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 10, "Mortality and Birth Rates"), and a similar mortality spike is seen after every transport between facilities.[413] 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.[414]

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.[415]

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.[416] 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.[417] 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.[418] In an attempt to mitigate these problems, the researchers suggested that dolphin enclosures should be expanded to allow less restricted movement of animals.[419] 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).[420] 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 9

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.[421] 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 cognitive and social sophistication of small cetaceans.[422] In addition, these

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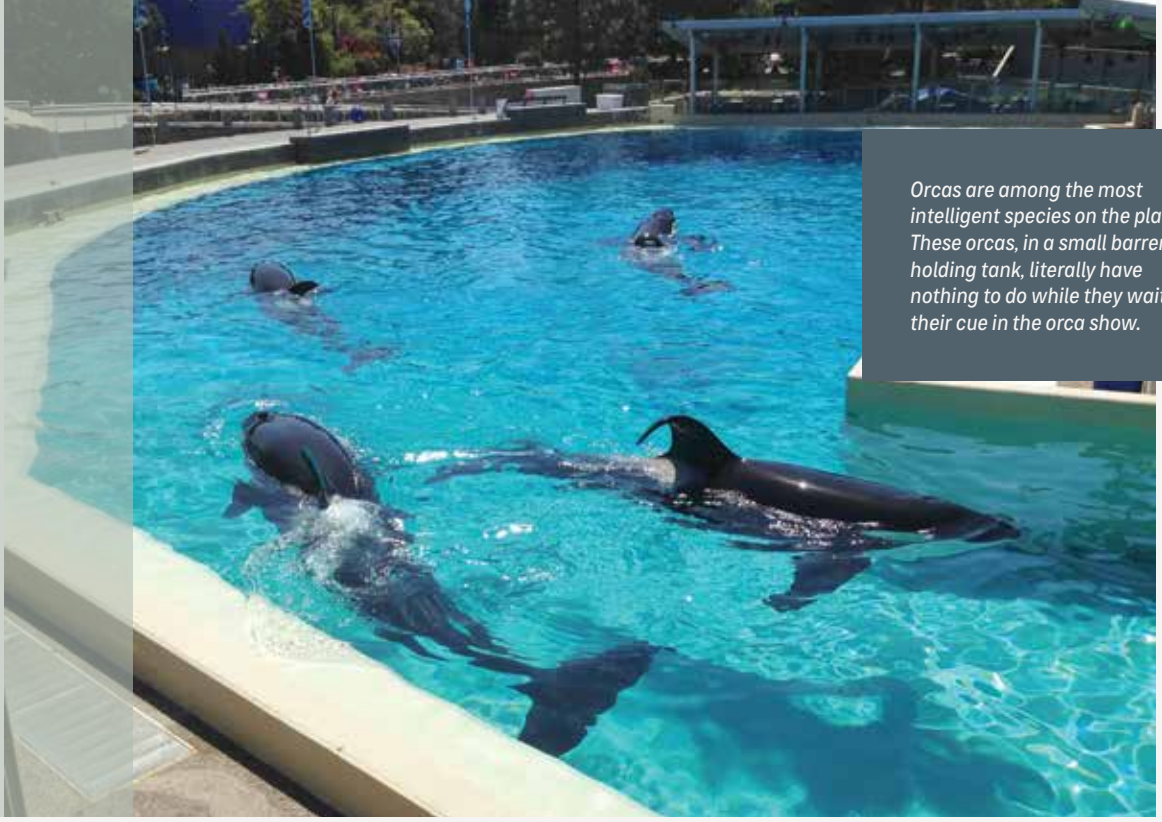
researchers noted the temperature regulation hypothesis required a series of geologic events during the dolphin's evolution that did not match the paleontological record. Essentially Manger's hypothesis requires either misinterpreting or ignoring a considerable body of evidence addressing cetacean intelligence 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 and many researchers believe.[423] 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 of diminishing the significance of dolphin cognitive abilities, although he later asserted his goal in doing so was to show that other species are more cognitively sophisticated than generally supposed. 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."[425]

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."[426] This ignores that until recently in human evolutionary history, we were unable to do the same. For the majority of the roughly two million years of existence of the genus *Homo*, we had levels of tool use equivalent to that of sea otters.[427] The book was widely reported in the press; however, Gregg's assertions were criticized for employing faulty logic, ignoring studies that undermined his hypotheses, and otherwise being biased.[428] Indeed, it is telling that most of the few 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 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.[429] Although dolphins have smaller brains relative to their size than modern humans have, they would be at least as intelligent as our *Homo* ancestors according to this measure. However, this measure does not take into account a number of issues, one being that



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.

the structure of the dolphin brain is 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.[430] 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 based on this criterion becomes far more comparable to that of modern humans.

The behavioral ecology of cetaceans also implies high intelligence; for example, bottlenose dolphins are widely believed to possess individual, or signature, whistles,[431] which are thought to be important for individual recognition or keeping groups together.[432] 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;"[433] 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.[434] Similar calls, although not as obviously specific to individuals, have also been reported in comparable contexts in orcas.[435]

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.[436] 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.[437] 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.[438]

One of the most successful and illuminating cetacean linguistic studies was conducted by Louis Herman,[439] who taught bottlenose dolphins a simple sign language and a computer-generated

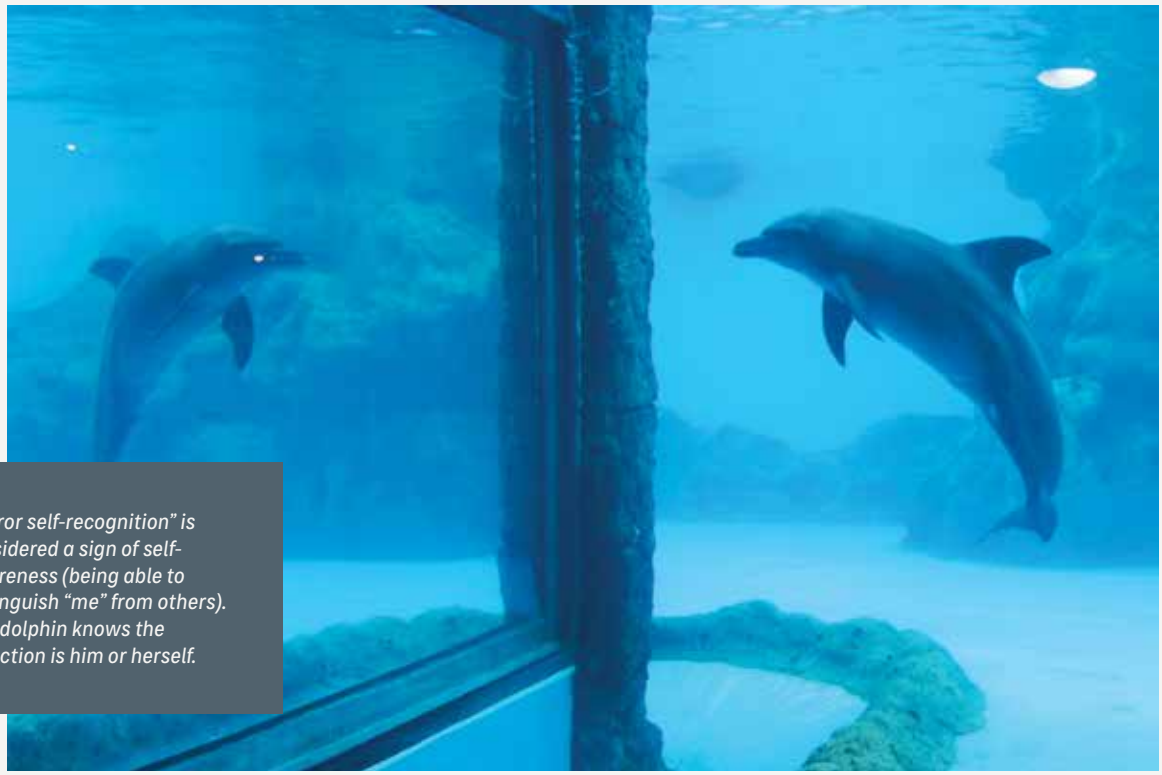
sound language.[440] This study determined that, using these artificial symbolic languages, dolphins could understand simple sentences and novel combinations of words, but most importantly that cetaceans comprehended sentence structure (syntax)—an advanced linguistic concept. Interestingly, while we have been able to teach dolphins relatively sophisticated artificial languages, we have been unable to decode their many vocalizations, which may 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,[441] similar to many higher primates,[442] and they are able to grasp abstract concepts.[443] Orcas have been observed mimicking novel behaviors of other orcas, another sophisticated behavior.[444] 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[445] and numerically "less."[446] 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.[447]

Perhaps the most compelling evidence for a high level of intelligence in cetaceans is the demonstration that cetaceans are self-aware.[448] These studies include those demonstrating that cetaceans recognize their image in a mirror and, in addition, use that image to investigate their body.[449] 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.[450] Previously, only the great apes had demonstrated self-recognition, and these results were not consistent for all subjects.[451] In humans, the ability to recognize one's own image in a mirror does not appear until the age of two.[452] Therefore, it can be argued that bottlenose dolphins have a cognitive level comparable to that of a 2-year-old child,[453] 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.[454] 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 at least 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.[455] 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.[456] 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 10

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 public 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,[457] has been lax in clarifying 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.[458]

Animals are also born, in captivity and in the wild. However, the relative success of a captive breeding program should not be considered definitive evidence of good welfare.[459] 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,[460] 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.[461]

PINNIPEDS, SIRENIANS, POLAR BEARS, AND SEA OTTERS

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*).[462] 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 free-ranging counterparts.[463] Two-thirds of captive South American sea lions (*Otaria byronia*) and northern fur seals die in their first year,[464] 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.[465] 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.[466] Mortality rates of these species' captive-born pups may be lower than in the wild.[467] 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.[468] Some of the currently available methods used to control reproduction may have long-term detrimental effects, and further research is needed to develop contraceptive methods that are long-term as well as safe and effective.[469]

Most aquaria and zoos currently obtain polar bears from captive breeding, although the relatively poor survivorship of captive-born cubs[470] leads to some zoos still seeking to acquire orphans from hunts, both subsistence and trophy, as well as kills in defense of property and life.[471] 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.

BOTTLENOSE DOLPHINS

Some studies indicate that captive bottlenose dolphins in dolphinaria live as long and have the

Surplus captive-bred animals have now become a problem in many cases, and facilities are concerned with reducing the fecundity of these species.

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

same mortality rates as their counterparts in the wild.[472] However, the failure of captive dolphins to definitively exhibit a higher survival rate than in the wild, despite 85 years of maintaining this species in captivity, disputes the public display industry's oft-stated contention that captivity enhances survival by keeping these animals safe from predators, parasites, and pollution and by providing animals with regular feeding and ever-improving veterinary care.

A 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 over the years.[473] However, as noted in Chapter 5, "The Physical and Social Environment," sea pens have some advantages over concrete tanks. A 2018 evaluation by an animal protection group of bottlenose dolphins held in captivity in 67 facilities (mostly in concrete tanks in the United States and Europe) found that the average survival time in captivity (for all bottlenose dolphin individuals who were then deceased but had survived for more than one year) was 12.75 years,[474] which is lower than that of most populations of free-ranging dolphins where this parameter has been calculated.[475]

More recently, a study endorsed by the public display industry concluded "survival rates and life expectancies for dolphins in US zoological facilities today are at least as high as those for the wild dolphin populations for which there are comparable data."[476] However, the free-ranging dolphin population to which these authors primarily compared their captive dolphin data is in a relatively "urban" environment, subject to disease outbreaks and a variety of threats from human activities (including disturbance and collisions from boat traffic; entanglement in, and ingestion of, recreational fishing gear; entanglement in crab traps; human feeding of dolphins; habitat alteration through loss of mangrove and seagrass; and harmful algal blooms and pollution),[477] as well as natural threats such as shark attacks. The other wild populations used for comparison are known to have skewed age distributions, ironically in large part due to the number of dolphins removed by captures for the public display industry.[478] Therefore, at best, the survivorship rate of the captive dolphin population in the United States is similar to those of free-ranging populations that have experienced heavy impacts from a wide variety of human-caused threats and activities. It should be noted that some other well-studied free-ranging dolphin populations have

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.

relatively low mortality rates, even though they too face anthropogenic threats to varying degrees.[479]

The reproductive history of captive 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.[480] 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 from other animals in artificial social environments and confined spaces.[481]

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[482]—which is two to three times the mortality rate seen in the wild.[483] 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.[484]

ORCAS

All but one of the orcas in the United States, and about a third of the captive orcas held worldwide, are owned by SeaWorld Parks and Entertainment. For decades, the company persistently and erroneously maintained that the maximum life span of orcas was 35 years.[485] In fact, some of its materials still claim that this is the maximum life span for free-ranging orcas in the North Atlantic.[486]

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.[487] A long-term study using established methods of photo-identification has identified three female orcas in the Northern Resident population in British Columbia who were adult-sized (at least 15 years of age) when the study started in 1973 and were still alive in 2019 (the last year the catalog of all the whales in the population was updated), making them a minimum 60 years of age that year.[488] In contrast, captive orcas of either sex rarely live longer than 30 years, with many dying in their teens and 20s.[489]

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.[490] 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 in clinical trials who survive post-treatment. The work was undertaken by two former orca trainers featured in *Blackfish* who went on to become a scientist and a medical professional, 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."[491]

Another article published the same year, by authors affiliated with the public display industry,[492] 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 that generated this value was invalid;[493] the most obvious evidence that their approach was flawed is that no captive-born whale at SeaWorld has yet exceeded 35 years of age, let alone achieved the age of 48.[494]

The authors of this paper ultimately claimed that captive orcas had survivorship rates equivalent to those of free-ranging populations. This claim has been echoed in SeaWorld's publicity.[495] 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,[496] with the endangered Southern Resident population being in particularly dire straits. That captive orcas have survivorship rates comparable to free-ranging populations threatened with extinction strongly suggests that captive conditions have impacts similar to serious human-caused threats in the wild.

Thirty-two orcas have died at SeaWorld parks since 1980.[497] Three were three months of age or younger, with an additional 14 stillbirths or miscarriages.[498] Of those animals who were older than three months when they died, the average age at death was less than 16 years. Only two of these latter animals, both wild-caught, exceeded 30 years of age, and only eight 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 an increased 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.[499]

Of the 103 orcas who have been born in captivity globally since 1985, 73 have already died, with 48 dying in their first year.[500] Therefore, orca birth rates and infant mortality rates have been at best the same or only slightly better in captivity than in the wild.[501] 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.[502]

Female orcas in captivity have been known to reject their offspring, something that is unlikely in

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.

the wild.[503] 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.

OTHER CETACEAN SPECIES

Other small cetacean species are held in captivity. Belugas and false killer whales are among the most commonly displayed and are at the larger end of the size spectrum. Not enough is known about their life history parameters in the wild to make a legitimate comparison between free-ranging and captive populations of these species at this time. However, preliminary analysis of the small database for belugas available in the mid-1990s suggested that this species had higher mortality in captivity.[504] Free-ranging belugas are thought to have a maximum life span of 60 or so years,[505] with a mean life expectancy of 20–30 years.[506] 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,[507] despite the species being displayed in dolphinaria and aquaria since the 1950s.[508]

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 4, "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 captive belugas in North America.[509]

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.[510] 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 solely to establish a viable breeding population, especially when success at maintaining them in captivity has been inconsistent at best.

CONCLUSION

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,[511] that no species does better regarding these parameters in captivity than in the wild,[512] and several do far 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

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 marine mammal is in captivity? One obvious hypothesis is that captive cetaceans suffer a degree and form of chronic stress—one that can be deadly—that is unique to their confined circumstances.

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.[513]

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 marine mammal is in captivity? One obvious hypothesis is that captive cetaceans at least suffer a degree and form of chronic stress—one that can be deadly—that is unique to their confined circumstances.[514]

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.

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.

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 few marine mammal species—and virtually no cetaceans—have done so, even after decades of captive maintenance.

CHAPTER 11

HUMAN–DOLPHIN INTERACTIONS

DOLPHIN-ASSISTED THERAPY

Around the globe, many public display facilities 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 dolphinaria that offer dolphin swims.[515] These claims of therapeutic effects, however, do not hold up well under scrutiny. Researchers in a variety of medical and cognitive disciplines, as well as animal protection groups, have pointed to methodological flaws in studies conducted by such facilities and questioned the scientific validity of claims for therapeutic effectiveness.[516]

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.[517] In fact, even if DAT does have *some* therapeutic benefits, it appears no more effective than using domesticated animals such as puppies or kittens, is far more expensive, and clearly carries higher risks for the patients (see Chapter 12, "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.[518]

SWIM-WITH-DOLPHIN ATTRACTIONS

Globally, there is little oversight of SWD attractions[519]—even when captive marine mammal care and management regulations exist, they often do not include specific provisions to govern SWD attractions.[520] SWD regulations exist in the United States, although they are currently not enforced.[521] 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, including cetaceans.[522] 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.[523] 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.[524] The agency report concluded that to ensure the safety of dolphins and swimmers, SWD interactions should be strictly controlled.[525]

It should be emphasized that the conduct of SWD interactions in most countries is largely unregulated, leading to wide variation in their relative quality and safety, for humans and dolphins.

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

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 could 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;[526] swimmers were not allowed to enter the area and dolphins were supposed to be free to enter the area whenever they chose. One study done in New Zealand found that common dolphins significantly increased their use of such refuge areas when exposed to the public in SWD attractions.[527] However, the NMFS report noted that at one US 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[528] and to injurious interactions with swimmers.[529] 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 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 dolphins (see Chapter 13 "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;[530] 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.[531] Indeed, the industry strongly argues against regulations that would help improve the welfare of cetaceans in SWD facilities.[532]

The growing number of SWD attractions in the Caribbean is a particular concern. There are more than 40 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 or have been recently built on St. Lucia, the Turks and Caicos, Jamaica, and St. Thomas.[533] Almost none of these jurisdictions have appropriate controls for the health or safety of either the dolphins or human participants in these interactions.[534] At least three Caribbean facilities have been allegedly involved in illegal activities.[535] 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.[536] 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.[537] Allowing the public to feed marine mammals sets a bad example.

In acknowledgement of the potential for petting and feeding pools to influence public behavior, NMFS spearheaded the Protect Wild Dolphins campaign to counter the increase in feeding and harassment of free-ranging dolphins, especially in Florida and other

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.

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.

areas of the southeastern United States. This public outreach campaign, combined with pressure from conservation and animal protection groups, resulted in placards being placed at SeaWorld petting pools notifying the public that feeding dolphins in the wild is illegal.[538] As part of this campaign, and because petting pools were seen to be part of the problem, NMFS also helped produce an animated PSA that focused on the harm of feeding wild animals, including dolphins.[539]

For more than a decade, animal protection groups monitored dolphin petting pools in the United States and the risks they posed to both humans[540] and dolphins.[541] 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.[542] 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,[543] 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.[544]

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.[545] If such objects are swallowed, they can cause gastrointestinal injuries, poisoning, and even death.

In addition, the risk of injury to people from being bitten or hit (see below) 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 usually 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. This concern is exacerbated by events such as the COVID-19 pandemic. Diseases could also be spread to humans;[546] a number of pathogens found in marine mammals can be, and have been, transferred to people (see Chapter 12, "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,[547] but the adverse public attention after the documentary *Blackfish* was released (see Chapter 13, "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.[548] 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 12

RISKS TO HUMAN HEALTH

DISEASES

In a 2004 report to the US Marine Mammal Commission (MMC), researchers from the University of California, Davis (UC Davis) 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.[549] Respiratory diseases were also reported in nearly a fifth of marine mammal workers, including diseases such as tuberculosis.[550] Workers in the public display industry are in a high-risk group for infection.[551]

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.[552] 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.[553] Some

of the diseases that can be transmitted from marine mammals to humans are life threatening.[554] 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.[555] 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.[556]

INJURY AND DEATH

The injury 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.[557] 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,[558] 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.[559] The woman suffered a broken rib and vertebrae. The injury required hospitalization for six months. In early 2008, a dolphin breached on top of three swimmers 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 (leaping 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.[560]

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,[561] dolphins may inflict minor to serious injuries on swimmers for various reasons, some of which are neither obvious nor predictable. Even in controlled swim sessions, the

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 operated by entrepreneurs who know little about dolphins but anticipate a large profit from this lucrative tourism activity.

risk is always present and is potentially lethal. It is probable that a human will eventually be killed in these attractions, more likely in one of the many new facilities operated by entrepreneurs who know little about dolphins but anticipate a large profit from this lucrative tourism activity.[562] 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.

In the past, petting pool dolphins also injured members of the public.[563] 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. The public does not interact with chimpanzees or tigers (especially full-grown adults) in reputable zoos; they should not be allowed to interact with marine mammals either.

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,[564] and even attacking and killing conspecific calves.[565] Orcas, another commonly kept cetacean, are well known for their predatory behavior and have been recorded killing a wide variety of marine mammal species.[566]

The MMC survey by UC Davis researchers discovered that more than half of marine mammal

workers had been injured by the animals (251 cases altogether at that time).[567] 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.[568] 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 dolphins biting members of the public.[569] In Hawaii in the 1990s, 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 not to have been drowned, she suffered a bite wound that required nine stitches.[570]

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 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

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.

objects into the dolphin's blowhole), rupturing the man's stomach and causing his death.[571]

Despite the bottlenose dolphin's abilities and propensity for aggression, captive orcas are the marine mammals most associated with human injuries and deaths (Table 2). 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.[572] 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.[573] 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.[574]

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 (Table 2). Keto was owned at the time by SeaWorld, and had been transferred from SeaWorld San Antonio to Loro Parque in February 2006.[575] Interestingly, this incident was not reported publicly at the time, beyond a single, Canary Islands 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 13, "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.[576]

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.[577] 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.[578]

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 were logged at SeaWorld Orlando alone,[579] a number that underestimates the total number of incidents, as it is known that a number of aggressive interactions were not recorded in the log.[580] 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 some situations had resulted in "potentially life-threatening incidents."[581]

Because of the risks to trainers posed by captive orcas, California's Department of Industrial Relations, 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." This, of course, turned out to be prophetic; within four years of the state agency issuing this statement, two trainers were killed by orcas in the space of nine weeks.

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."[583] Moreover, OSHA stated that "SeaWorld trainers had an extensive history of unexpected and potentially dangerous incidents involving killer whales at its various facilities."[584] The citation was accompanied by the maximum possible fine allowed by law.[585]

The high media profile of Brancheau's death coincided with the documentary *The Cove* winning an Academy Award in February 2010.[586] 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.[587] Although this oversight hearing did not result in legislative action (the House majority party changed due to the election 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 13, "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,[588] 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 13

THE *BLACKFISH* LEGACY[589]

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[590] (Table 2). Keto, a whale held at Loro Parque in the Canary Islands (who was, at that time, owned by SeaWorld),[591] had killed his trainer only nine weeks earlier[592] (see Chapter 12, "Risks to Human Health"). 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 up to that point.[593] In contrast, throughout history, there have been no substantiated reports of free-ranging orcas ever killing a human being,[594] and only a handful of reports of human injuries,[595] none life-threatening.

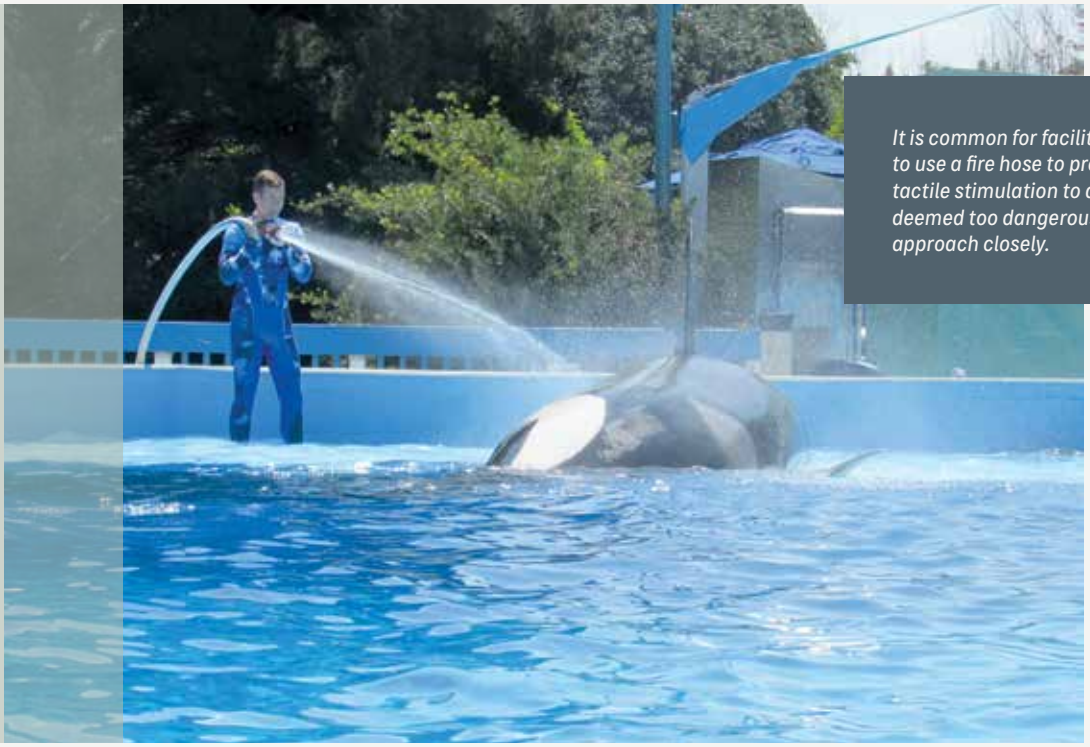
OSHA, the US employee safety agency, cited SeaWorld Orlando for a "willful"[596] violation of the US Occupational Safety and Health Act of 1970.[597] SeaWorld challenged this citation, but during the hearing, log books and reports detailing almost 100 incidents of dangerous orca behavior, resulting in 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[598] (see Chapter 12, "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*[599] and *Beneath the Surface: Killer Whales, SeaWorld, and the Truth Beyond Blackfish*.[600] These books gained considerable media attention; the authors were interviewed on popular US talk shows, including *Anderson Cooper 360* and *The Daily Show*.[601]

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.[602]

Blackfish was screened at the Sundance Film Festival in January 2013. It was released more widely in July by Magnolia Pictures,[603] 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



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

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.

program *Crossfire*, a discussion on a special edition 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.[604] In 2013 alone, 21 million viewers were reported to have watched the documentary on CNN.[605] A DVD was released at the end of 2013, and the documentary was made available on Netflix in 2014. The film was nominated for numerous awards,[606] 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.[607]

Blackfish was produced on a small budget[608] 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.[609] 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,[610] 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.

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.[611] 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.[612] However, these "problems" were, in the end, minor technical issues and were easily rebutted by the filmmakers,[613] 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.[614] However, opponents of the company's orca policies who came forward in the months after *Blackfish*'s debut included cetacean scientists,[615] former orca trainers, professional journalists,[616] 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.[617]

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.[618] Agreements, endorsements, and events were canceled, including an annual event at SeaWorld involving a number of musical acts.[619] After watching *Blackfish* at a studio event, executives and staff at Pixar Studios decided to change the ending of their 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.[620] The blockbuster movie *Jurassic World* sprinkled a few anti-captivity, anti-corporate messages throughout, including an unsubtle visual gag clearly aimed at SeaWorld.[621] SeaWorld was also targeted by hacker activists who changed SeaWorld's Wikipedia page so that the company was listed as a "prison."[622]

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.[623] This campaign operated primarily on social media, including Twitter, where the public was invited to ask "anything"[624] 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*.[625] 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.[626]

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.[627] But in response to the "Ask SeaWorld" publicity campaign, the magazine dramatically increased the number of articles poking fun at SeaWorld and its practices.[628] 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 Noah*.[629] Once a company becomes a widespread object of ridicule in popular media, its image becomes shaped by it, compounding negative impacts.[630]

Unsurprisingly, as a result of this onslaught of negative publicity, attendance at SeaWorld began to drop, with one million fewer people visiting SeaWorld facilities in 2014 compared to the previous year.[631] The company also saw its stock value drop.[632] In all, during 2014, SeaWorld lost more than US$80 million in revenue.[633] SeaWorld's Chief Executive Officer (CEO), Jim Atchison, announced his resignation in December 2014.[634]

Although SeaWorld had assumed that the effect of the negative publicity from *Blackfish* would quickly fade away, this did not happen.[635] 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.[636]

THE LEGAL AND LEGISLATIVE IMPACTS OF *BLACKFISH*

In August 2015, the fourth in a series of lawsuits[637] 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."[638] This case claimed that SeaWorld had used false advertising and had lied to its customers, thereby violating several laws.[639] A lawsuit was also launched on behalf of SeaWorld's shareholders,[640] which claimed that SeaWorld

In October 2015, it was standing room only in the room holding the public hearing on SeaWorld San Diego's application to build a larger orca enclosure.

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.[641] The shareholder court case was temporarily postponed until 2019,[642] 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).[643] The DOJ/SEC case was eventually settled in 2018, with SeaWorld paying US$5 million in fines.[644] The shareholder lawsuit was eventually settled in early 2022, for US$65 million.[645]

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."[646] 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"[647] on the bill and its potential impacts. The bill was reintroduced in March 2016[648] and ultimately passed the legislature as part of another bill,[649] 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.[650] 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.

State bills similar to the California legislation were introduced in New York[651] and Washington, but did not progress.[652] A federal bill was also introduced in 2015, the Orca Responsibility and Care Advancement (ORCA) Act.[653] This bill did not progress in subsequent Congressional sessions; however, in 2022, the

Strengthening Welfare in Marine Settings (SWIMS) Act was introduced by the same legislator, extending the proposed protections for orcas to beluga, pilot, and false killer whales (the larger of the "small" cetaceans commonly held in captivity).[654] Should the SWIMS Act eventually pass, it would result in a phase-out of the public display of orcas, belugas, pilot whales, and false killer whales in all facilities in the United States.[655] In Canada, after a number of years of debate, S-203—a bill to end the display of all cetaceans nationally—passed Parliament in 2019.[656]

THE END OF CAPTIVE ORCAS?

SeaWorld announced in March 2016, at the same time the California bill was reintroduced, that it would end its orca breeding program for all three of its facilities and would hold no orcas at any future facilities it might build.[657] 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.[658] 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 enclosures, with a focus on the whales' natural behaviors and an added emphasis on education and conservation.[659] The company stated that it would be giving US$50 million in funding to marine conservation projects[660] and a further US$1.5 million for research projects related to the conservation of free-ranging cetaceans.[661] As noted in Chapters 2 and 3 ("The Conservation Fallacy" and "Industry Research," respectively), 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.[662] This paradigm shift was a direct result of the *Blackfish* Effect, and the culmination of decades of work by animal protection advocates. Within hours of the March 2016 announcement, SeaWorld's stock went up by 9.5 percent.[663]

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.[664] 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.[665] By late summer 2018, SeaWorld's stock exceeded its IPO share price[666] for the first time since spring 2014.[667] This was strong evidence that SeaWorld, despite its historic reliance on Shamu as its icon, could indeed survive without this signature species on exhibit, by shifting to a new business model that emphasized its true roots as an amusement park, rather than its claim to be a zoo.

Regardless of the increasingly positive outlook for captive cetaceans in the West, the situation

SeaWorld announced in March 2016 that it would end its orca breeding program for all three of its facilities and would hold no orcas at any future facilities it might build. 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.

in the East is in flux. The captures that took place in summer 2018 in Russia garnered worldwide attention and opprobrium. The trade in both belugas and orcas between Russia and China may be ending, but, especially for the former, it remains to be seen if this is a real cessation or merely an artifact of the COVID-19 pandemic (see Chapter 4 "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.[668] 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.[669] In 2017, the Vancouver Park Board voted to end the public display of cetaceans at Vancouver Aquarium,[670] and other 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.[671]

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.[672] The following year, Munchkin Inc. (a baby product company) announced that it would be financing a 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.[673] In addition, OneWhale, an NGO partnered with the municipality of Hammerfest, Norway, is working to establish the Norwegian Whale Reserve to provide a sanctuary for formerly captive whales and dolphins.[674]

More importantly, some industry representatives have also come to support the concept of seaside sanctuaries.[675] Changfeng Ocean World in Shanghai, China, began displaying two beluga whales in 2011. The facility was purchased in 2012 by Merlin Entertainments, which has a policy against holding captive cetaceans. Upon acquiring Changfeng Ocean World, Merlin pursued plans to develop a sanctuary

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.

for the belugas—a large netted-off bay on the island of Heimaey in Iceland. The animals were transferred to Iceland in June 2019, where they can live out the rest of their lives in a natural environment, but protected and under the care of sanctuary staff. The sanctuary was developed by SEA LIFE Trust in partnership with the environmental group Whale and Dolphin Conservation.[676] There are currently no plans to release these beluga whales back to the wild. 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 as soon as possible.[677] 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.[678]

For the most part, seaside sanctuaries will incorporate small-scale tourism, through associated visitor centers and boardwalk viewpoints, and will also have a research and education component. Essentially, the animals will be kept in coastal water bodies (for example, bays, coves, lagoons, quarries, fjords, or inlets) that are netted off from the open ocean, with support buildings for staff, veterinary facilities, 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 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 will not be released and will receive lifetime care. The goal is to provide the animals with more natural surroundings, more space, and more choice in their daily lives. They will be allowed to interact with other sanctuary residents as they wish, rather than strictly under the control of management or per performance schedules. There will 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.[679] With suitable, carefully screened candidates, rehabilitation for release can 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.[680] However, the East, particularly Asia and Russia, is lagging 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, PhD, 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 (or are phasing out) the display of cetaceans for entertainment:[681] Bolivia, Canada, Chile, Costa Rica, Croatia, Cyprus, Hungary (achieved through a trade ban), India, Kazakhstan, Nicaragua, Slovenia, and Switzerland (achieved through a trade ban). States, provinces, counties, and municipalities have done the same, including Barcelona, Spain; California, United States (orcas only); Malibu County, California, United States; Maui County, Hawaii, United States; Mexico City, Mexico; New South Wales, Australia; and South Carolina, United States. Several of these jurisdictions had no dolphinaria to begin with.

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); 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 issued a permit to a foreign company to capture as many as 12 dolphins annually from local waters, but rescinded this permission after activists filed a lawsuit arguing the quota was unsustainable and that it violated regional conservation agreements.[682] In a number of cases, municipal, provincial, and national governments have decided not to allow a dolphinarium or a cetacean exhibit to be built.[683] Furthermore, some countries have implemented strict regulations for the keeping of cetaceans in captivity. Among these are Brazil, Luxembourg, Norway, and the United Kingdom;[684] the United Kingdom used to have as many as 30 dolphinaria and now has none.[685] Italy has banned SWD encounters and other human–dolphin interactions.[686]

All of these developments, as well as those from the past decade described in Chapter 13 ("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*[687] 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.

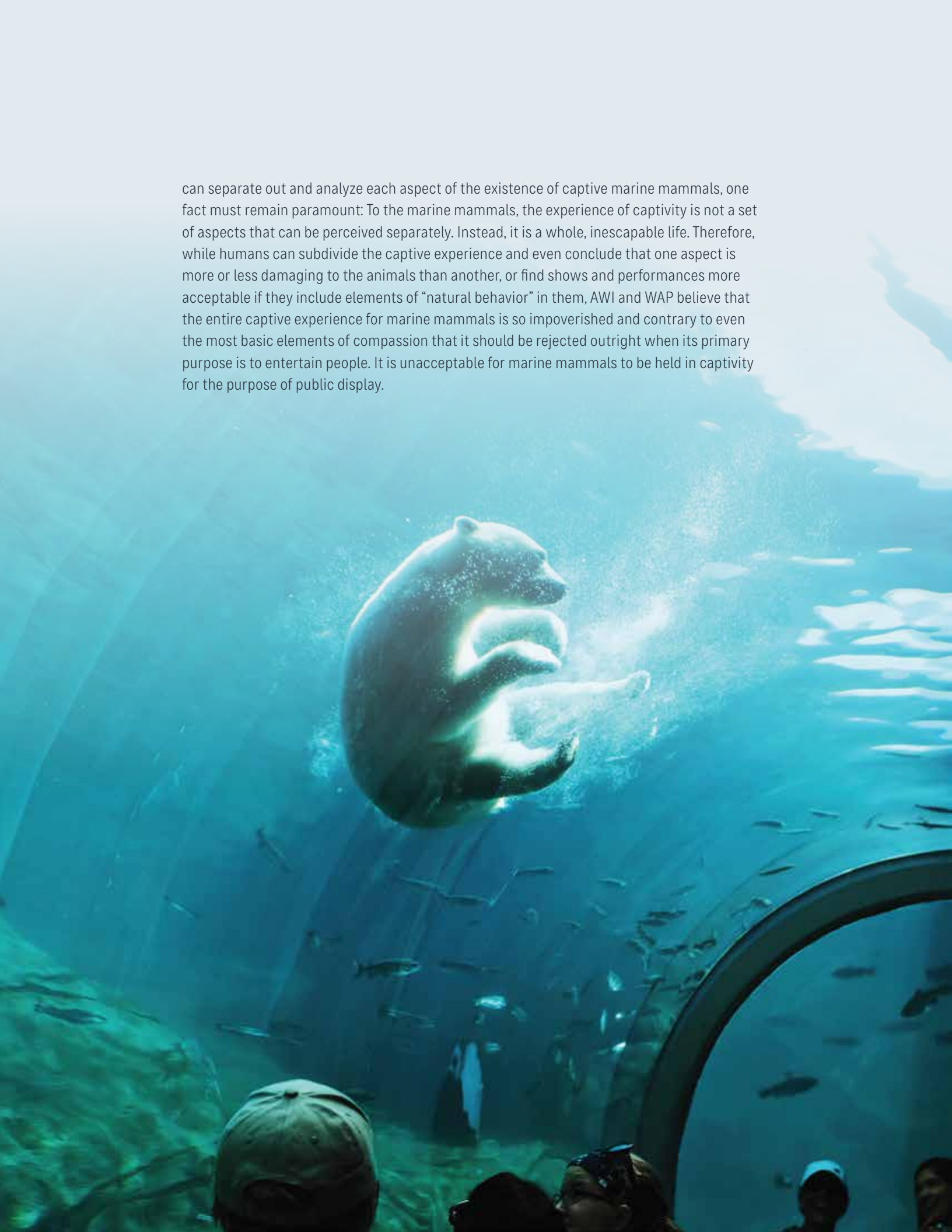


TABLE 1. Captive orcas who have reached or exceeded 30 years of age.

NAME	SEX	FACILITY	APPROX. YEAR OF BIRTH	YEAR OF DEATH	AGE AT DEATH/ AGE IN 2023
Orky	M	SeaWorld San Diego	1958	1988	30
Lolita	F	Miami Seaquarium	1965	-	58
Corky II	F	SeaWorld San Diego	1966	-	57
Katina	F	SeaWorld Orlando	1976	-	47
Kiska	F	Marineland Canada	1976	2023	47
Ulises	M	SeaWorld San Diego	1977	-	46
Kasatka	F	SeaWorld San Diego	1977	2017	40
Tilikum	M	SeaWorld Orlando	1981	2017	36
Bingo	M	Port of Nagoya Aquarium, Japan	1982	2014	32
Stella	F	Port of Nagoya Aquarium, Japan	1986	-	37
Kshamenk	M	Mundo Marino, Argentina	1988	-	35
Kayla	F	SeaWorld Orlando	1988	2019	30
Orkid	F	SeaWorld San Diego	1988	-	35

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

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ENDNOTES

INTRODUCTION

1. US Marine Mammal Protection Act (MMPA), 16 USC §§ 1361–1423h (1972) (https://www.mmc.gov/wp-content/uploads/MMPA_March2019.pdf).

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).

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, "Possession for *primarily* commercial purposes should not be accepted as constituting any educational purpose" (emphasis added; Section 4(b) in Specially Protected Areas and Wildlife, 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 (33–40 ft) in adult length, except the sperm whale (*Physeter macrocephalus*). It 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*, which is updated periodically, as required under the MMPA. The United States appears to be the only country to require such an inventory. Unlike its sister agency NMFS, the Department of Interior's US Fish and Wildlife Service (FWS) has not established a captive inventory for the species under its jurisdiction: polar bears (*Ursus maritimus*), sea otters (*Enhydra lutris*), walruses (*Odobenus rosmarus*), and manatees (*Trichechus manatus*). This is the case despite the MMPA's Section 104 requirement that the Secretary of the Interior "establish and maintain an inventory of all marine mammals possessed pursuant to permits issued under paragraph (2)(A), by persons exercising rights under paragraph (2)(C), and all progeny of such marine mammals" (16 U.S.C. § 1362(12) (defining "Secretary" as both the Secretary of Commerce and the Secretary of the Interior), § 1374(c)(10)).

5. "Husbandry and medical care were learned empirically over the years by trainers and veterinarians" (p. 283 in Couquiaud, 2005). See endnote 290 for more about Couquiaud (2005).

6. The authors of the peer-reviewed papers related to captive marine mammal welfare published within the first years of the 2013 release of the documentary film *Blackfish* often commented that there were few marine mammal welfare–related studies available (see, e.g., Clark, 2013; Clegg *et al.*, 2017; Rose *et al.*, 2017). This has changed somewhat since the publication of the 5th edition of this report (Rose and Parsons, 2019)—see Chapter 3, "Industry Research," for an evaluation of some of the recently published captive marine mammal (primarily cetacean) welfare studies conducted in cooperation with the public display industry. It is important to note that this recent spate of studies came well after the industry first claimed they were producing valuable research with their animals and seems more a reaction to *Blackfish* than the result of any inherent motivation felt by dolphinaria.

7. Cetaceans (the taxonomic group that includes all the whales, dolphins, and porpoises) are exhibited in more than 350 facilities in approximately 60 countries (Schmidt-Burbach and Hartley-Backhouse, 2019).

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 (https://marineland.net/our-history/). It is now called Marineland of Florida.

9. See, e.g., Clegg, 2021, Corkeron, 2022.

CHAPTER 1 • EDUCATION

10. 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); see also S. 1636 (30 Apr. 1994)) and was acceptable to the US Secretaries of Commerce and 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) ; specifically for cetaceans, they state, "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*.

11. 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 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 included "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 its 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 10).

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 schoolchildren 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. This is consistent with our view that zoos stress how hazardous the wild is compared to the safety of a zoo, which does not encourage positive attitudes toward conservation of natural habitat (see Chapter 5, "The Physical and Social Environment").

A review published in 2018 of zoo education studies 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). Malamud *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, "Facing 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.)

12. With respect to whether dolphinaria have a genuine educational or conservation impact, a study conducted at a Canadian marine theme park reported that 61 percent of visitors agreed with the statement, "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 that "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 influential on visitors.

13. 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). A 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 a number of years, China had a controversial one-child population control policy. This policy was recently relaxed (Westcott, 2018) and then repealed altogether (Cheng, 2021).) 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 food and drink vendors—more expensive than shops and restaurants elsewhere in China—seek to maximize the profit these facilities can make from these newly affluent young parents.

14. 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), https://www.c-span.org/video/?293204-1/marine-mammal-education.

15. 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 90). We use "wild" only as a noun.

16. Although education and conservation programs must meet "professionally recognized standards of the public display community" under the MMPA, the 2010 Congressional 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.

17. Scardina (2010) and Stone (2010).

18. Rose (2010). In 2019, Japan in fact withdrew from the International Whaling Commission (IWC), the treaty organization responsible for governing the hunting of great whales, after being a party since the 1950s. The Japanese government was frustrated after decades of pushing for the moratorium on whaling, passed in 1982, to be lifted (Kyodo News, 2019). Clearly, the connection between exposing the public to "ambassador" marine mammals and championing strong marine conservation is not a simple one.

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

20. Edge Research (2015). Millennials are also more likely to be vegetarian and vegan than generations past (Rowland, 2018).

21. 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.

22. A telephone poll of 350 residents of Vancouver and its surrounding areas was conducted on behalf of Zoocheck Canada (Malatest, 2003); the Angus Reid Institute questioned 1,509 individuals across Canada (Angus Reid Institute, 2018).

23. 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 (immediately pre- and post-*Blackfish*). 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 between those two years.

24. 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).

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

26. This study showed that 54.4 percent of respondents opposed public display and 45.6 percent supported public display; this difference was statistically significant (Naylor and Parsons, 2019). 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 strongly supported keeping 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.

27. Six times as many respondents, or 86 percent, preferred to view cetaceans in the wild via whale watching versus in captivity (Naylor and Parsons, 2019). 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).

28. 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).

29. Fox News (2019).

30. 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 10 and 16) 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 http://www.chinacetaceanalliance.org).

31. For example, the website for Indiana's 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).

32. Davis (1997).

33. 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 twice 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, even if they were veterinarians.) Dorsal fins tend to be highly vascularized (containing many blood vessels), making them efficient conductors of body heat for these marine mammals, allowing them to efficiently thermoregulate (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, 2017). 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, although they could also simply be proportional to the larger body size of males, with their need to thermoregulate.

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; Alves *et al.*, 2018; Stack *et al.*, 2019). 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 in the wild appears to occur as the result of injury, exposure to toxins, or disease, although there may be other causes (Alves *et al.*, 2017; see also Pingel and Harrison, 2020, who, in the most recent paper on the topic, hypothesize that bent dorsal fins are the result of immobilization contracture, although they are not cetacean biologists and this cause seems unlikely, as there are no bones, muscles, or ligaments in the dorsal fin to contract, and the fin grows in this shape in captivity, over time). The key fact of the phenomenon in the wild is that the fin is normal before some stochastic (random) insult that causes its internal structure to become unstable. 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 (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 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 stochastic 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, disease, 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 650), the company's online explanation for dorsal fin collapse became more consistent with available data. It now states:

> Scientists don't know yet what causes some killer whales to have bent or collapsed dorsal fins. Like the flukes, the dorsal fin is made of dense, fibrous connective tissue, without bones or cartilage. Dorsal fin size and shapes vary between ecotypes. The dorsal fin of a male killer whale is proportionately larger than that of a female. In adult males, the dorsal fin is tall and triangular. Reaching a height of up to 1.8 m (6 ft.) in a large adult male, it is the tallest dorsal fin of all cetaceans. In most females, the dorsal fin is slightly falcate (backward-curving) and smaller — about 0.9 to 1.2 m (3–4 ft.) tall.
>
> Dorsal fin irregularities in killer whales observed in ocean [sic] are rarely seen; however, some have irregular-shaped dorsal fins: they may be curved, wavy, twisted, scarred, or bent. This may occur in male or female dorsal fins. About 4.7% of wild adult male killer whales around British Columbia were observed with dorsal fin abnormalities. For the observed wild Norwegian population, the rate was 0.57%. But of the adult male killer whales that have been photo-identified in the waters around New Zealand, 23% (7 out of 30) had collapsing or bent dorsal finds [sic].
>
> 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; 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. The degree to which dorsal fin collapse is associated with, or a symptom of, other health concerns in captivity is also unknown, due to the lack of research.

34. SeaWorld maintained for many years in its educational materials that free-ranging orcas live no more than 35 years. For example, even today, SeaWorld states that "killer whales in the North Atlantic may live to 35 years" (https://seaworld.org/animals/all-about/killer-whale/longevity/). 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, 2017). SeaWorld also states that "the most recent science suggests that the life spans of killer whales at SeaWorld are comparable to those in the wild." However, they do not mention that two of the three populations to which they compare their whales are either critically endangered (primarily due to prey declines; Ayres *et al.*, 2012) or threatened due to habitat degradation. See endnotes 493 and 496 for more on this issue.

35. However, as was discussed in endnote 12, one study found no significant difference in knowledge gain between visitors who viewed a live dolphin show at a marine theme park, and those who did not (Miller *et al.*, 2013).

36. In a study on children encountering animal exhibits, it was noted that comprehension of how a species 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). A more recent study also found that visitors absorbed considerable ecological information and conservation messaging from dioramas at museums (Scheersoi and Weiser, 2019).

37. 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. There are even robotic dolphins so realistic it is becoming increasingly difficult to distinguish them from living animals (Romano, 2020). 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.

38. Scollen (2018).

39. 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.

40. 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 their 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 13, "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).

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

42. Buckley *et al.* (2020).

43. Of 13 marine theme 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).

44. 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 facility and those who had not), researchers found that only 27 percent thought the marine theme park provided information about marine mammal conservation, and it 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).

Schroepfer *et al.* (2011) found that those who viewed chimpanzees (*Pan troglodytes*) in entertainment settings had a decreased understanding of the conservation status of this species. People influenced by chimps used in entertainment were less likely to donate to conservation organizations as well. "Such a frivolous use of chimpanzees … leads those watching chimpanzee commercials to overestimate their population size in the wild" (p. 6 in Schroepfer *et al.*, 2011). This is relevant when considering that a large proportion of pinnipeds and most dolphins are displayed in zoos and aquaria in entertainment/performance formats.

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).

Buckley *et al.* (2018) found no significant change in the intention of individuals to change their behavior, even though knowledge increased and attitudes toward species changed in a positive manner. "To be more effective at changing visitor's conservation behaviours, zoos and aquaria must implement exhibit interpretations that are founded in conceptual models of behaviour change" (p. 19 in Buckley *et al.*, 2018)—in other words, zoos and aquaria must design their displays in ways that are *known* to effectively change viewer behaviors, rather than merely believed or hoped to do so.

45. Donaldson (1987).

46. 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 animal enclosures as "habitats" (see, e.g., https://seaworld.com/san-antonio/animal-habitats/, which is only one example from this company). See also "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).

47. Dombrowski (2002) 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). More recently, an opinion-editorial by a conservationist, in the British newspaper *Independent*, noted that "For decades [zoos] have argued that seeing live animals helps educate and mobilise the next generation of conservationists. However, it appears that unguided zoo visits result in improved biodiversity knowledge in only one-third of visitors, that professional zoo-educators can have better results in increasing biodiversity knowledge when working in schools rather than within a zoo, and that improved biodiversity knowledge from zoo visits has only a weak link with increased knowledge of pro-conservation behaviour" (Aspinall, 2019).

48. 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" (emphasis added; p. 246 in Jiang *et al.*, 2008).

CHAPTER 2 • THE CONSERVATION FALLACY

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

50. 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 captive settings, including in natural, but boundaried reserves) 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). Also, "Generally, *in situ* protection is more cost effective than captive breeding" (p. 293 in Miranda *et al.*, 2023; italics added).

51. 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 extirpated (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 involving 17 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.

52. A baiji named Qi-Qi was kept in a captive facility in Wuhan, China, from 1980 until his death in 2002. Five other animals were captured from the wild in the hopes of setting up a captive breeding program, but four died within a few weeks or months of capture. One female survived for 2.5 years but she did not breed. 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).

A second captive breeding project involved placing wild-caught baiji in oxbow lakes (a body of water along a river that either was naturally carved out over time, becoming a separate body of water with or without continued access to the river, or was artificially created as such). The Tian-e-Zhou lake chosen as the first "reserve"—21 km (13 miles) long and 2 km (1.3 miles) wide—had originally been part of the Yangtze River and was therefore considered suitable dolphin habitat (Wei *et al.*, 2002).

To test the suitability of the oxbow lake for breeding cetaceans, Yangtze finless porpoises (*Neophocaena asiaeorientalis asiaeorientalis*), a cetacean subspecies that shared the river with the baiji, were captured from the wild and placed in the reserve. At the time, the finless porpoises were not considered to be threatened, although now they are listed as "critically endangered" by the International Union for Conservation of Nature (IUCN; https://www.iucnredlist.org/species/43205774/45893487). Initially, the finless porpoise translocations went poorly. Beginning with five porpoises in 1990, a total of 34 were captured for the reserve; 85 percent of those died during or shortly after capture. These included two who became entangled in fishing gear still used in the reserve and seven who died during a radio tagging effort (Liu *et al.*, 1997; Wang, 2009). Fourteen porpoises also escaped one year when the reserve flooded.

However, despite this high mortality rate, the finless porpoise efforts were deemed effective; therefore, a female baiji was captured and placed in the reserve in 1995. It was initially assumed by many that the male baiji in Wuhan would be transferred to the reserve to make a potential breeding pair (Carwardine, 2007). However, this did not happen, primarily because the aquarium in Wuhan was benefitting from the publicity and revenue that the

river dolphin was generating (Stephen Leatherwood, personal communication, 1995). However, the female did not survive. In 1996, after spending just seven months in the lake, she was found entangled in the net of a fish farm in the lake (Dudgeon, 2005). Despite the obvious risks of having fishing and aquaculture nets in the reserve, this was allowed in order to raise funds, as staff salaries could not be covered otherwise (Reeves and Gales, 2006).

In 2006, after a comprehensive survey by both Chinese and international scientists failed to observe any baiji in the river, the species was declared "functionally extinct" (Turvey *et al.*, 2007). There may be a small number of individuals still alive even in 2023, but they are not reproducing or expanding in number.

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).

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

54. The two AMMPA members are the Chicago Zoological Society (Brookfield Zoo) in Illinois, in the United States, and the Ocean Park Conservation Foundation, based in Hong Kong. The Chicago Zoological Society has been supporting and participating in projects to protect the Ganges river dolphin (*Platanista gangetica*) since 2014. The Ocean Park Conservation Foundation has been providing funds for research, conservation, and education projects on critically endangered species in Asia, such as the Ganges and Indus (*P. minor*) river dolphins and the critically endangered Yangtze finless porpoise, for decades.

The Chinese Academy of Sciences (not an AMMPA member) has been working to preserve the Yangtze finless porpoise, a species that shared the Yangtze River with the baiji but still has a potentially viable population. The dolphinarium in Wuhan that held Qi-Qi (Dudgeon, 2005; see endnote 52) also holds finless porpoises. In contrast to its efforts with baiji, the Wuhan facility has seen the successful birth of finless porpoise calves (Wang *et al.*, 2005; see endnote 75). The dolphinarium reported these births 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).

55. http://www.iucn-csg.org/index.php/vaquita/.

56. 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 2011 and 2015, AZA institutions provided a total of US$115,000 for vaquita conservation (Vaquita SAFE, 2018), which again is a tiny amount when one considers the overall revenue of these facilities (for example, approximately 0.0006 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.

Then, in 2017, a number of zoos, aquaria, and dolphinaria (including SeaWorld) did contribute to the Vaquita Conservation, Protection, and Recovery (CPR) program (see endnotes 57 and 58). If public display facilities had put more substantive funds into vaquita conservation and education years earlier, 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.

57. Vaquita SAFE (2018).

58. The vaquita is the smallest cetacean, with a maximum length of 1.5 m (5 ft). It is now at a critically low number, no more than 10 individuals in 2022. The species also has a low reproductive rate, having only one calf every two years, and is endemic (found only) in the northern part of the Gulf of California. The species' primary threat is bycatch in gillnets (Rojas-Bracho and Reeves, 2013). In 1997, the estimated population was 576, but by 2008, it had more than halved, to 245—a mortality rate of 7 to 8 percent a year (Thomas *et al.*, 2017). However, from 2011 on, catch rates increased due to the expansion of an illegal fishery for a large fish called totoaba (*Totoaba macdonaldi*). The swim bladders of this endangered fish are in high demand on the black market in China, fetching US$20,000 per kilogram (2.2 pounds). As a result of this extremely lucrative but illegal fishery, bycatch rates of vaquitas increased dramatically, with more than a third of the population being caught per year. Vaquita population estimates plunged to 60 by 2015, then just 30 in 2016 (Thomas *et al.*, 2017).

For decades, scientists have urged banning gillnet use in the porpoise's habitat. In 2005, a "refuge" area was finally established, which encompassed approximately half of the vaquita's range (Rojas-Bracho *et al.*, 2019), with partial enforcement of the area starting in 2008. With the catastrophic decline of the vaquita after the illegal totoaba fishery expanded, gillnets were banned in the northern Gulf of California from 2015, with the Mexican Navy responsible for enforcing the ban. However, the number of porpoises continued to decline.

At the Ninth Meeting of the Comité Internacional para la Recuperación de la Vaquita (CIRVA) in 2017, it was decided that "the only hope for the survival of the species in the short term is to capture vaquitas and bring them into human care" (p. 4 in CIRVA, 2017; https://www.vaquitacpr.org/). CIRVA scientists recognized that "the risks of capture and captive management are high." At the time, there had only been one attempt to capture and handle a vaquita, a live-stranded calf who died shortly after capture (Curry *et al.*, 2013).

The proponents of the Vaquita CPR program raised US$5 million (about a quarter of which came from AZA facilities (Vaquita SAFE, 2018; see endnotes 56 and 57), and in October and November 2017 a team of marine mammal conservation biologists, accompanied by representatives of the public display industry and field researchers experienced in capturing harbor porpoises and bottlenose dolphins, attempted to capture animals and place them in a tuna aquaculture pen. They placed monofilament gillnets in front of vaquita groups they encountered and herded the animals into the nets with rigid inflatable boats. They then placed the animals on a stretcher and transferred them to the sea pen. Altogether, 15 people—veterinarians, veterinary technicians, and cetacean capture experts—were involved in the captures, using techniques that were known to be successful only on species relatively robust to stress (Rojas-Bracho *et al.*, 2019).

On 18 October, a juvenile female (102 cm (3.3 ft) long, weighing approximately 20 kg (44 lb)), was captured from a group of four animals and taken to the pen. However, the animal became agitated and her movements erratic—clear signs of distress. Therefore, the team decided to return her as near as possible to where she was captured. During transport, the veterinarians took blood samples and later analysis found signs of myopathy (muscle damage from handling), immune cell abnormalities, and very high levels of the stress hormone cortisol. These cortisol levels were 10 times higher than reported in any other study where humans handled live cetaceans (Atkinson and Dierauf, 2018). This animal was quickly lost to sight; as she had not been tagged, her fate was unknown. However, she has never been resighted in surveys of the area. Moreover, due to her small size and the vaquita birthing season (March through May), she could still have been dependent upon her mother, who may have been one of the three other animals accompanying her (vaquitas are dependent upon their mothers until at least 8 months of age) (Rojas-Bracho *et al.*, 2019). It is therefore possible—even likely—that this young animal, separated from her family group, subsequently died.

A second female, an adult, was captured on 4 November. Again, the animal was captured and transferred to the sea pen, but started showing acute signs of distress, erratically avoiding the net pen walls (Rojas-Bracho *et al.*, 2019). The team again made the decision to release the animal, but she died of capture myopathy before this could occur. Blood samples taken during attempts to resuscitate her indicated cortisol levels 100-fold higher than levels reported in a variety of handled cetaceans. Levels of epinephrine and norepinephrine ("fight-or-flight" response hormones) were the highest ever reported for cetaceans (Atkinson and Dierauf, 2018; Rojas-Bracho *et al.*, 2019).

After these two failures, the project was abandoned. The two animals represented nearly a tenth of the remaining vaquita population at the time (20–30), but, as both were females, the impact on the potential recovery of the species was much more significant.

59. It should be noted that several zoos and aquaria do support substantial and meaningful *in situ* conservation (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 61; 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). Of 148 AZA-funded mammal field projects in 2022, only three (all led by Brookfield Zoo) were on cetaceans (2 percent). Of 77 AZA-funded non-field research projects on mammals in 2022, only two were cetacean-related (2.6 percent, again led by Brookfield Zoo) and four were polar bear–related (5.2 percent, all led by Henry Vilas Zoo). Non-accredited facilities pursue almost no conservation efforts, comparatively speaking.

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

61. 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 http://bit.ly/3ZIx5DI; 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 a tenth of 1 percent of the revenue generated by SeaWorld annually (on average about US$1.3 billion over the past 10 years, as reported by SeaWorld). 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 revenue. For example, the company spent just over US$70,000 in total on cetacean conservation over a 10-year period (Hodgins, 2014). This was approximately 0.0005 percent of the company's annual revenue, or, to use the analogy above, 1/2000th 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 only 0.5 percent and 0.8 percent of the company's annual revenue, respectively. So SeaWorld increased its tip to 50 cents for a $100 meal in 2014 and 80 cents in 2016 through 2021.

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 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).

62. 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 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 71). 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, which to date has never been done to release the captive-bred progeny (offspring) back into the wild, is never appropriate from a conservation perspective.

63. Jule *et al.* (2008). O'Brien and Robeck (2010) is a prime example of this misrepresentation (see also endnote 145); it is highly unlikely that artificial insemination (AI) will ever be an effective tool in cetacean conservation *in situ*, given the difficulty in handling free-ranging cetaceans and the stress response most species show when restrained in the wild (see, e.g., endnote 58).

64. 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 between 2012 and 2015 (see Chapter 4, "Live Captures") was persistently portrayed as a conservation effort, despite the beluga species overall not being endangered. Indeed, 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 82 and 279).

65. This is especially a problem in lower-income nations, such as certain Caribbean and South Pacific island states. In the 2007 survey commissioned by WSPA (now WAP; see endnote 21), 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 have been 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; https://www.ammpa.org/about/ammpa-international-code-best-practices).

66. See Reeves *et al.* (2003), for a good discussion of this issue. Georgia Aquarium conducted the research necessary to determine if the captures of belugas from the Sakhalin Bay-Amur River population were sustainable, but then chose to interpret the results to favor the captures the facility had already undertaken, rather than objectively. Objective review of the data actually supported finding the population depleted and unable to withstand continued removals (https://www.fisheries.noaa.gov/action/designation-sakhalin-bay-nikolaya-bay-amur-river-stock-beluga-whales-depleted-under-mmpa).

67. 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 federal 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).

68. One dramatic example of a hunt for small cetaceans occurs in the Faroe Islands (a semi-autonomous 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 repeatedly recommended that islanders stop eating pilot whale meat altogether, as it is now too toxic for safe consumption by humans (MacKenzie, 2008; Weihe, 2022). Faroese whalers also kill other species. Following the

slaughter of 1,423 Atlantic white-sided dolphins (*Lagenorhynchus acutus*) in September 2021, the government revised its hunting regulations in July 2022, setting a quota of 500 dolphins per year despite the lack of a reliable population estimate for the species (https://www.ascobans.org/sites/default/files/document/ascobans_ac26_doc4.2_lagenorhynchus-acutus-mass-killing.pdf). More than 9,000 pilot whales and dolphins have been killed in the Faroe Islands in the last 10 years (https://hagstova.fo/en/environment/natural-resources/whale-hunt).

69. 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 (see endnote 2).

Species Enhancement Programs

70. 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 39) claims, "Breeding Programs [sic] 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 (https://www.aza.org/reintroduction-programs; Miranda *et al.*, 2023), none are actually marine.

71. The EU Zoos Directive states, "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."

Gerald Durrell, a British naturalist, conservationist, and zookeeper, was well ahead of his time when he outlined the role that a 20th century zoo should play. He considered the primary purpose of a zoo to be a reserve of critically endangered species that need captive breeding in order to survive. A zoo should serve the secondary purposes of educating people about wildlife and natural history, and of educating biologists about animal habits. Zoos should not be run for the purposes of entertainment only and non-threatened zoo species should be reintroduced to their natural habitats. A species should be present in a zoo only as a last resort, when all efforts to save it in the wild have failed (Durrell, 1976).

The Durrell Wildlife Park on the island of Jersey was the first zoo to house *only* endangered species for breeding, and was one of the pioneers in the field of captive breeding with an international training center and a conference on captive breeding and reintroduction. Durrell also set up the IUCN Captive Breeding Specialist Group. Durrell's ideals should be the goal of a modern zoo or aquarium; however, current dolphinaria and marine theme parks are arguably the antithesis of his ideals, focused on public entertainment and profit rather than conservation.

72. 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).

73. See Kleinman (1989), which contains guidelines for successful captive breeding and reintroduction to the wild, all of which are still considered valid.

74. See endnote 52 for additional information about initial attempts to hold Yangtze finless porpoises in an oxbow lake reserve.

The finless porpoise was initially considered to be one species, but scientists eventually recognized that there were multiple species and, for purposes of conservation, working out the taxonomy of this porpoise became a priority (Parsons and Wang, 1998; Jefferson and Hung, 2004). At present, two species of finless porpoise are currently recognized: the Indo-Pacific finless porpoise, (*Neophocaena phocaenoides*) and the narrow-ridged finless porpoise (*N. asiaeorientalis*) (Jefferson and Wang, 2011). The former is found from the Arabian Gulf in the west, to the east coast of China in the east, and southwards to western Indonesia. The species is considered to be "vulnerable" by the IUCN. The latter is found from southeast China to Japan and is considered to be "endangered" by the IUCN. This species currently comprises two subspecies (Jefferson and Wang, 2011): the East Asian finless porpoise (*N. a. sunameri*) and the riverine Yangtze finless porpoise (*N. a. asiaeorientalis*). The latter subspecies is considered to be "critically endangered." All finless porpoises are listed under CITES Appendix 1, which limits their trade to only small numbers of animals, for scientific or conservation purposes.

In 1990, there were only five finless porpoises in the Tian-e-Zhou reserve (Nabi *et al.*, 2018). However, by 2010 the population had grown to 25 animals. Wang (2009) noted that more than 30 calves had been born in the reserve between 1990 and 2007, with one to three calves born per year, although nearly a third of the animals in the reserve (whether wild-caught or captive-born) had died by 2010. Eight wild-caught porpoises were added to the reserve in 2014 and 2015 (Wang, 2015), and by 2015 there were 18 mature females and 17 juveniles (of which 11 were newborns) (Wang, 2015).

Also in 2015, eight more finless porpoises were captured from Poyang Lake. Four were transferred to the Tian-e-Zhou reserve to add genetic diversity to the population and another four released in a second, larger oxbow lake (World Wildlife Fund, 2015).

Five natural reserves for finless porpoises are now established along the Yangtze River, in which intensive efforts to decrease human-caused mortality are ongoing. Tian-e-Zhou now holds approximately 60 animals—a managed population that produces about two calves a year.

75. The only captive-born porpoise (the only captive-born cetacean of any species, to our knowledge) to be successfully released into the wild had been born in a net pen within an oxbow reserve in 2016, not in a tank. The animal was four when released into the reserve in 2020 (China Daily, 2020). To our knowledge, this animal is still alive.

Yangtze finless porpoises have been captive-bred in a facility in Wuhan, China (which has a 25 m × 7.5 m (82 ft x 25 ft) kidney-shaped pool and a connected 10 m (33 ft)-diameter circular pool). The first calf there was born in 2005 (Wang *et al.*, 2005; see endnote 54). Three calves had been born by 2008 (Xinhua, 2007; Wang, 2009). However, Zhang *et al.*'s (2012) summary of cetaceans held in Chinese facilities only reports one captive-bred finless porpoise in Chinese dolphinaria, so it seems likely other captive-born animals died. However, the Zhang *et al.* (2012) paper also confusingly states that there are 5, 9, and 15 live finless porpoises held in Chinese dolphinaria, with a table noting a total of 15 animals. Many of these finless porpoises are potentially *N. asiaeorientalis* (that is, not the Yangtze River subspecies) originally from Chinese coastal waters.

In addition, in 2018, Chimelong Ocean Kingdom in Zhuhai and Haichang Ocean Park in Shanghai began programs to breed finless porpoises in their facilities (http://chinacetaceanalliance.org/en/2018/08/15/ccas-concerns-over-the-ex-situ-plan-of-transporting-yr-finless-porpoises-to-aquariums/). Eight porpoises captured in a reserve were moved to Chimelong and six to Haichang Ocean Park sometime in 2020 (HKU SVIS, 2021). Chinese and international animal protection groups opposed this action because there

was no conservation need for it, and China's poor record-keeping meant it would be difficult to track the survival of these animals (You, 2018; CCA, 2019). In addition, plans for the porpoises' return to the Yangtze River were unclear (UN Environment, 2019). The reserves are working; the finless porpoises are breeding in their natural river habitat and are the true hope for saving this subspecies. Removing some for captive breeding attempts in concrete tanks is no more than good publicity for the dolphinaria involved and may lead to unnecessary deaths and almost certainly no successful releases.

76. In 2006, a project to determine whether Hawaiian monk seal (*Neomonachus schauinslandi*) pups raised for some months in captivity could survive once released back to the wild was conducted on Midway Atoll, where six wild-born, weaned pups were captured and placed in pens at Midway. SeaWorld was involved in this project. After being fed over the winter of 2006–2007, they were released back into the wild in good health and monitored. However, none of these "Head Start" pups survived to their third year (Lowry *et al.* 2011).

77. After many years of debating whether the Indian, or South Asian, river dolphin was one or two species or subspecies, it was recently and definitively split into two species (Braulik *et al.*, 2021). The Ganges river dolphin is found in Nepal, India, and Bangladesh, while the Indus river dolphin is found in the Indus River in Pakistan and the Beas River in India. Both species are classified as "endangered" by the IUCN and are listed on CITES Appendix 1, which limits their international trade to small numbers and only for scientific or conservation purposes.

The first capture of an Indian river dolphin was in 1878 when John Anderson captured a young Ganges river dolphin near Dhaka, Bangladesh. He kept the dolphin in a bathtub for 10 days but it is unknown whether the dolphin died or was released back into the wild. In November 1968, three Indus river dolphins were taken from near Sukkur, Pakistan, and transported by a team led by the Steinhart Aquarium in San Francisco (Herald *et al.*, 1969). Local fishermen caught the dolphins, who were placed in a swimming pool in Karachi before being shipped to Tokyo and then finally to the Steinhart. The transport took five days; the animals spent one day each in pools in Karachi and Tokyo. During transport all of the dolphins refused food and were eventually force-fed. All three dolphins died shortly after arriving in San Francisco; the first died 24 days after arrival, the second after 33 days, and the last after 44 days (Herald *et al.*, 1969). Two were diagnosed as suffering from pneumonia and one had sustained lower jaw injuries during capture, which may have contributed to the animal's death.

In December 1969, Giorgio Pilleri, the director of the Brain Anatomy Institute in Berne, Switzerland, led the first of three expeditions to capture Indus river dolphins in Pakistan for scientific research purposes (Pilleri, 1970a; 1970b). During the first expedition, seven dolphins were captured, in the Kakagana River, Pakistan. However, at least six of these dolphins quickly died—including three pregnant females (Johnson, 1990). Another 12 animals were captured for examination, of which three were exported to Switzerland for scientific research (Pilleri, 1970b). The aim of this research was to investigate the physiology and echolocation of this little-studied species.

Pilleri noted that "some animals were killed for purposes of post-mortem studies." These animals were killed by placing a plastic bag with ether-soaked cotton wool over their heads. He noted that it took the dolphins from "45 seconds to 1 minute in weak animals, 4–7 minutes in stronger specimens" to die. The transport of the three exported dolphins took over 70 hours, by boat, truck, train, and finally by Land Rover, until they were placed in a children's swimming pool at a hotel near Karachi Airport. For some reason, one of the dolphins remained in Karachi—the fate of this dolphin is unknown—and two were flown to Switzerland (Pilleri, 1970b).

In February 1972, there was a second expedition. Bad weather prevented Pilleri from personally capturing any animals, but a dolphin caught in fishing gear was collected off of Trappu Island, Pakistan (Pilleri, 1972). The dolphin was exported to Switzerland but died shortly after.

A third expedition in the winter of 1972–1973 lead to the capture of four animals between the Sukkur and Gaddu barrages in the Indus River—two juveniles and two young adults—who in turn were exported to Switzerland (Pilleri, 1976). One of the animals died within a day, and the second died after a year in captivity. The third dolphin died in February 1976 and the last in March 1978. In short, although the dolphins could be captured and transported, there was a high rate of mortality.

Pilleri was so negatively affected by his experiences with these river dolphins that he became quite a vocal opponent of keeping cetaceans in captivity. In Johnson (1990), Pilleri is quoted as saying:

> One of the most typical—not to say reprehensible—examples of man's continued ignorance as regards the keeping of animals in captivity is the latest trend towards keeping cetacea [sic] in oceanaria or dolphinaria to train them, an activity which became fashionable in the 1940's. In essence this is no different from the old attempts to satisfy man's curiosity by means of performing animals in miserable travelling circuses or showmen with their pitiful dancing bear acts (p. 165).

He continued:

> It is true that I kept dolphins here at the Institute … I feel ashamed at having done so. I feel ashamed for my lost dolphins … They were nothing more than an alibi for scientific research since keeping dolphins in artificial conditions can do little else than produce artificial scientific results. Four of my dolphins died—three from skin disease caused by chlorine in the water and from consuming fish polluted with mercury and parasites, and one which died after breaking its beak (p. 168).

He also said:

> On one occasion [his first expedition in December 1969], all six [Indus river dolphins] died in the net, including three pregnant females. But for the industry this is by no means exceptional. After capture comes the ordeal of transportation, with the stress involved causing all manner of illnesses to break out because stress has the effect of suppressing the immune system. Noise—especially high frequency—is very distressing to the animals. Many are likely to become sick or die during transport, particularly if the distances are great (p. 169).

Pilleri (1983) wrote that "whatever efforts are deployed[,] the keeping of cetaceans in captivity will always pose problems because of the inherent contradiction on which it is based: the keeping in cramped conditions of creatures which are accustomed to vast open spaces" (p. 247).

78. The genus *Sotalia* was recently split into two species: the Guiana dolphin or costero (*Sotalia guianensis*), a marine or estuarine dolphin found along the Brazilian coast, and the tucuxi (*S. fluviatilis*), a freshwater, riverine dolphin found in the Amazon and Orinoco rivers. During the era of live captures in this region, however, there was no distinction made between the two species (Cunha *et al.*, 2005; Caballero *et al.*, 2007). The tucuxi is considered to be endangered by the IUCN and is listed on CITES Appendix I, which limits trade in this species. The costero is listed as "near threatened" by the IUCN, but it is also listed on CITES Appendix I; as a "look-alike" species, its trade could threaten the tucuxi. Throughout this endnote, when it is unclear if individuals were tucuxis or costeros, we refer to the animals as *Sotalia*.

In October 1965, the Aquarium of Niagara Falls captured two "*S. fluviatilis*" (as well as four Amazon river dolphins, *Inia geoffrensis*) from the Negro River, Brazil. As these dolphins were captured in a riverine environment, they were likely to have indeed been tucuxi. One of the dolphins died before reaching the aquarium (the animals were kept for 10 days in Florida before being shipped to Niagara Falls). The second died two years later from respiratory issues and pancreatitis (https://www.dolphinproject.com/blog/a-history-of-captive-rarities-and-oddities-part-2/.

In November 1968, a mother and calf were caught in Iquitos, Peru, and sent to Marineland of Florida. They were put in a tank with Amazon river dolphins four days after arrival; the latter attacked the calf, who died. The mother died a month later (https://www.dolphinproject.com/blog/a-history-of-captive-rarities-and-oddities-part-2/).

In January 1977, a Dutch animal dealer, Peter Bössenecker, organized a large tucuxi capture in San Antero, Cordoba, Colombia. Eighty dolphins were

captured, with an additional six animals killed during the capture process. Of the surviving animals, 24 were deemed suitable for public display and shipped to European zoos, and the remainder were released (Bössenecker, 1978). Zoos receiving the animals included the Antwerp Zoo, Belgium; Allwetterzoo Münster, Duisburg Zoo, and Nuremberg Zoo, Germany; and Ouwehands Zoo, Rhenen, the Netherlands. Two animals died during or just after transport, three died after 2–3 weeks, and one died roughly two months after transport (Bössenecker, 1978; Greenwood and Taylor, 1978; van Foreest, 1980). In 1978, eight of these imported tucuxis died, including three who were killed in an accident when they were fatally burned by chemicals used to treat their pool water (Greenwood and Taylor, 1979). In January 1979, two more animals died at Duisburg Zoo.

In April 1979, a further three *Sotalia* were captured in Colombia and sent to the Ouwehands Zoo (Dral *et al.*, 1980). In 1983, less than half of the imported animals were still alive, so all of the remaining *Sotalia* were sent to Nuremberg Zoo with the aim of breeding them there. Only one stillborn calf was delivered in 1987, and the mother died 12 days later from pregnancy complications. In 1991, three males were sent to Allwetterzoo Münster because of their aggressiveness, a chronic problem with *Sotalia* in captivity (Terry, 1984; 1986). One of these was the last known captive *Sotalia* to die, in January 2010 (IVZ, 2010).

In Colombia, two facilities have also held a small number of *Sotalia*: Acuario Rodadero, Santa Marta, and Oceanario Islas de Rosario, Cartagena (see endnote 115). The latter were almost certainly costeros. A captive-born costero x common bottlenose dolphin hybrid was born at the latter facility, although this hybrid individual lived only six years (Caballero and Baker, 2009).

79. The Amazon river dolphin, or boto, is currently split into three subspecies (Hrbek *et al.*, 2014; Society for Marine Mammalogy, 2014). *Inia geoffrensis geoffrensis* (the Amazon river dolphin), *I. g. boliviensis* (the Bolivian river dolphin, found in the Madeira River), and *I. g. humboldtiana* (the Orinoco river dolphin). Some scientists believe the Bolivian dolphin should be a separate species, but Gravena *et al.* (2014) argued that it was not genetically distinct enough. Hrbek *et al.* (2014) maintained that the river dolphin population in the Araguaian River, Brazil, is a separate species. However, the Society for Marine Mammalogy (2014) does not consider this to be valid, as only two dolphins were sampled. With more scientific data, the Amazon river dolphin could eventually be split into more species or subspecies. The IUCN lists this river dolphin as endangered; however, CITES lists the species on Appendix II with most other cetacean species, which means trade is allowed with the issuance of permits.

The first live-captured Amazon river dolphins were imported into the United States in 1956—two died within a day of arrival and the remainder within a year. Altogether, 140 Amazon river dolphins were imported into the United States. The last surviving captive boto, a male named Chuckles held at the Pittsburgh Zoo, died in 2002 (Bonar *et al.*, 2007). Caldwell *et al.* (1986) calculated the average longevity of US-held river dolphins (at which time the only river dolphin still alive in the country was Chuckles) as just 32.6 months.

Ostenrath (1976) describes five botos being captured for the Duisburg Zoo in Germany. The animals were captured at Rio Apure, near San Fernando de Apure, Venezuela—two females (one an albino) and three males (one a calf and one a juvenile) (Pilleri *et al.*, 1979). Of these five, only two males survived for any length of time (Collet, 1984); one died in 2006 and the other in 2020. At least two animals were exported to Japan. Other facilities holding these dolphins were in Venezuela (notably Acuario de Valencia) and Peru. At present, there is only one boto remaining in captivity, at Zoologico de Guistochoca in Peru.

Only nine botos have lived more than 10 years in captivity, including the two males at Duisburg Zoo. Bonar *et al.* (2007) noted that there was a very high mortality rate in the first two months after capture and transport, with 26 percent of the 123 botos for whom they had records dying within this short post-capture window. Studies on free-ranging botos have found pronounced stress-related physiological changes when they were captured and handled, especially in their immune systems, and these changes increased with handling time (de Mello and da Silva, 2019). These river dolphins therefore seem to be vulnerable to acute stress impacts. De Mello and da Silva (2019) also noted that captive river dolphins had reduced white blood cell counts compared to free-ranging individuals, possibly making them more vulnerable to disease in a captive setting.

Inter-animal aggression and injury have been frequent in captive botos (Caldwell *et al.*, 1986), one reason why most longer-term survivors have been lone males. Curry *et al.* (2013) note that "this species is more difficult to capture and maintain successfully than bottlenose dolphins due to some biological differences between the species" (p. 229). Therefore, establishing a robust captive breeding population of Amazon river dolphins seems an unlikely prospect.

80. The Irrawaddy dolphin has recently been split into two genetically distinct species—the Irrawaddy dolphin (*Orcaella brevirostris*) and the Australian snubfin dolphin (*O. heinsohni*)—but they are nearly identical morphologically (i.e., in their external physical characteristics) (Beasley *et al.*, 2015). *O. brevirostris* is found in Southeast Asia and *O. heinsohni* is distributed from eastern Indonesia and Papua New Guinea to northern Australia. The IUCN classifies the Irrawaddy dolphin as "endangered" and the snubfin dolphin as "vulnerable."

These two species resemble a large porpoise more than a dolphin—they have a small dorsal fin and do not have a prominent rostrum (beak or snout). They inhabit coastal, brackish, and freshwater areas (including rivers). Like other dolphins living in river systems, they are threatened by dams, pollution, decreasing water flow, and bycatch in fishing gear (Stacy and Leatherwood, 2007). Concerns over aquaria and marine theme parks removing them for display led to Irrawaddy dolphins being listed on CITES Appendix I, which limits their international trade.

In October 1974, Jaya Ancol Oceanarium, Jakarta, Indonesia, captured six Irrawaddy dolphins from Semayang Lake, Kalimantan (Borneo), Indonesia. In August 1978, it captured a further 10 from this location (Tas'an and Leatherwood, 1984), and an additional four were allegedly taken in October 1979 (https://www.dolphinproject.com/blog/a-history-of-captive-rarities-and-oddities-part-2/).

One of the dolphins from the 1974 capture died within a day of capture, one within 10 days, a third within 20 days, and a fourth was dead by July 1978. One of the animals captured in 1978 died after 30 days, and a second after 115 days. One of the animals captured in 1979 died after 20 days in captivity. In 1984, the oceanarium captured a further six from the Mahakam River, Kalimantan (https://www.dolphinproject.com/blog/a-history-of-captive-rarities-and-oddities-part-2/).

By 1985, there were only six Irrawaddy dolphins still alive at the oceanarium, reflecting a high rate of mortality after only 6 to 11 years. By 1995, there were only two left (Tas'an *et al.*, 1980; Tas'an and Leatherwood, 1984; Stacey and Leatherwood, 1997; Krebs *et al.*, 2007). Krebs *et al.* (2007) reported a total of 28 animals taken from Indonesian waters between 1974 and 1988—i.e., potentially two additional animals to those noted above.

The oceanarium planned to breed these dolphins, and two calves were born in 1979. However, one of these died shortly after birth. A third calf was reportedly born in 1981 (https://www.dolphinproject.com/blog/a-history-of-captive-rarities-and-oddities-part-2/). As noted above, there were only six animals left alive in 1985 and just two in 1995, despite a minimum of 26–28 live captures and three births in captivity, a woefully poor record. Tas'an *et al.* (1980) noted that Irrawaddy dolphins were subject to capture-related stress and would often refuse to eat when first placed in a captive enclosure.

In 1990, the Irrawaddy dolphin received full legal protection in Indonesia, limiting the ability to capture them. However, there were two illegal captures reported in 1997 (three dolphins) and 1998 (four dolphins) (Krebs *et al.*, 2007). Moreover, in 2002, there was a request for captures of 8–12 dolphins for a new aquarium along the Mahakam River and for 4–5 dolphins, again for the Jaya Ancol Oceanarium. However, due to local NGO advocacy, the Ministry of Forestry denied these requests (Krebs *et al.*, 2007).

In Thailand, Oasis Sea World has kept Irrawaddy dolphins. This facility claims that these individuals, as well as Indo-Pacific humpback dolphins (*Sousa chinensis*) it holds, were accidentally captured in fishing operations and are only in the facility until they can be rehabilitated and released. However, there is no evidence of any releases ever having occurred. Moreover, the animals have been trained to perform in a show and tourists swim with them. Scientists have noted problems with food and water quality at dolphinaria in Thailand, resulting in high mortality rates (Perrin *et al.*, 1996).

It should be noted that this facility was investigated for illegally exporting wild-caught Indo-Pacific humpback dolphins to Singapore and falsifying permitting documents. The documents erroneously said that the dolphins were captive-bred (Associated Press, 2004). They had also intended to export four wild-caught Irrawaddy dolphins to Singapore in 1999, but one animal died during preparation for transport and the export was canceled (Beasley *et al.*, 2002).

Seven Irrawaddy dolphins in 2008 and 20 in 2011 were captured in the Gulf of Thailand near Hon Chong, Kien Giang, by the Vietnam-Russia Tropical Center for "scientific research and circus performances" (Nguyen *et al.*, 2010; 2012a). Three were transported to Dai Nam Wonderland, Binh Duong, and four to Vinpearl Land, Nha Trang, Khánh Hòa Province, Vietnam (Nguyen *et al.*, 2010; 2012b; Curry *et al.*, 2013).

81. 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; see also endnote 91).

82. See the 5-year status review for the Southern Resident orcas (National Marine Fisheries Service, 2016), the final rule in the *Federal Register* on the Sakhalin Bay-Amur River stock of belugas (*81 Fed. Reg. 74711*, 2016), and the stock assessment for the Gulf of Mexico bottlenose dolphins (Hayes *et al.*, 2018).

Before the passage of the MMPA, "anyone with a boat and a net could go out and lasso a dolphin. In the early '60s, people would buy bottlenose dolphins from Miami Seaquarium for $350, load them into the back of station wagons, take them home and stick them in back-yard swimming pools. When a dolphin died at the Seaquarium, trainers simply dumped the body and went out to catch another" (Weddle, 1991).

Even after the MMPA was in effect, over 500 bottlenose dolphins were taken from US coastal waters for the public display industry (primarily from the Indian River Lagoon system and Gulf of Mexico (Marine Mammal Commission, 1992; Hayes *et al.*, 2017; see also endnote 67). Eventually, however, the US Marine Mammal Commission (MMC) and NMFS recommended the cessation of such captures in the late 1980s (see endnote 67).

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

84. 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 capture at least 18 (and possibly as many as 40) animals from Jamaican waters over a 3-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 into the wild (Dolphin Cove, 2004). This proposal did not progress.

Another proposal to start a captive breeding program while relying on an initial removal from the wild was from the outset 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 protection 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 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 (Kraul, 2007). Such a beginning would have clearly been contradictory to any conservation purpose.

85. 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).

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

87. The recovery of only 17 endangered species can definitively be said to have been aided by captive-breeding efforts (Miranda *et al.*, 2023). 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). Fischer 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).

Resende *et al.* (2020) did a 30-year analysis of literature on species enhancement projects involving translocations (releases into the wild of various types, including moving individuals of a species from one location to another where they have disappeared and releasing wild-born and/or captive-born individuals to augment populations). The literature indicated that 275 species have been reintroduced to the wild in some way, of which only 20.4 percent were considered endangered or critically endangered by the IUCN and only 23 percent involved captive-bred animals. The vast majority of "successful" translocations (the authors noted that unsuccessful translocations might be underreported in the literature) involved wild-born individuals. Those that involved captive-born individuals (mostly terrestrial mammals) were more often successful when intensive management, including training to forage and avoid predators, occurred before release ("soft" release). This last suggests successfully releasing captive-born individuals of culturally complex species such as cetaceans would be difficult.

88. Curry *et al.* (2013). See also 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 endnotes 52 and 58, which describe the failure of the most recent attempts to save critically endangered cetaceans by bringing them into captivity.

89. 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 to 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).

90. 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 seventh 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 return to the wild of dolphins bred in captivity is currently lacking (see also endnote 91). However, we emphasize that there *is* evidence that a successful return to the wild of wild-caught dolphins held for no more than 6–10 years in concrete enclosures is possible (see, e.g., endnote 123).

91. This project is known as the Integrated Conservation Planning for Cetaceans (ICPC); see https://iucn-csg.org/integrated-conservation-planning-for-cetaceans-icpc/ for a description of these efforts.

92. See endnotes 74, 77–80, and Dolphinaria-Free Europe (2021).

93. Curry *et al.* (2013).

94. 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). While the conservation biologists involved in the ICPC intend to adhere to Snyder *et al.*'s guidance, AWI and WAP see the public display industry's participation in this endeavor to be more about maintaining continued relevance in a society that is evolving its views on keeping marine mammals captive than about seriously working toward returning captive-bred cetaceans to the wild.

Mixed Breeding and Hybrids

95. As noted in Morisaka *et al.* (2010), at least 29 hybridizations between bottlenose dolphins and other species were recorded in captivity between 1974 and 2009. As examples, four bottlenose and long-beaked common dolphin (*Delphinus capensis*) hybrids were bred at SeaWorld San Diego, although two of these animals died 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 (Rose, personal observation).

Captive Cetaceans and Culture

96. P. 336 in Rendell and Whitehead (2001).

97. Kleiman's (1989) guidelines for wildlife reintroduction specifically mention the need to account for such foraging specializations.

98. 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).

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

100. Ralls and Ballou (2013) state, "When reintroduced to the wild, captive-bred individuals are likely to suffer high mortality rates due to inappropriate behavior. For example, they may have difficulty finding enough food or fail to avoid predators" (p. 667). They emphasize the importance of a mother or other animals with appropriate skills training juveniles in survival skills that are often otherwise lost in captivity (see also endnote 336).

101. Orcas remain dependent on their mothers nutritionally for one to two years and behaviorally and socially for at least 10 years. In various populations of orcas, both males and females associate with their mothers for their entire lifetimes (Ford, 2017). 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 and grandmothers have higher survival rates and higher reproductive success (Foster *et al.*, 2012; Nattrass *et al.*, 2019). They apparently avoid inbreeding via other, quite likely cultural, mechanisms (e.g., they do not mate with their mothers or sisters (Barrett-Lennard, 2000)). See endnote 103 for examples of how this bond has been disrupted by captivity.

102. The birth of a female orca named Nalani at SeaWorld Orlando dramatically illustrates 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 580)—please note that SeaWorld never made this information public in any form prior to this forced revelation. 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 (and sexually mature)—apparently, staff simply assumed they would not mate. (A SeaWorld representative was overheard 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 as of June 2023; presumably SeaWorld had no plans to breed Nalani even before the company's orca breeding ban (see endnote 650).

103. Other examples include Keto, who was moved from SeaWorld Orlando to SeaWorld San Diego when less than four years old (and eventually was transferred to SeaWorld San Antonio and then to Loro Parque in the Canary Islands). 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 of age. Skyla (who died in 2021) was sent to Loro Parque when she was just 2 years of age. See https://inherentlywild.co.uk/captive-orcas/ for additional details.

104. See endnote 125.

105. Keiko had been removed from his family group in Iceland at the age of one or two 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 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).

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

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

108. For an example of the problems that contact with and habituation to humans can cause in wildlife rehabilitation efforts, see Bremmer-Harrison *et al.* (2004).

109. 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, 2017). 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 who died in 2022, 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 of age, 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 or even to model 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 https://inherentlywild.co.uk/captive-orcas/ for data on these whales).

110. 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 of her calves born in captivity. As a result, a training program was launched to try to train the female not to reject her newborns 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, "Stillbirth 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

111. For example, Joel Manby, then-Chief Executive Officer (CEO) of SeaWorld, 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 was removed, 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 facility, 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 10, "Mortality and Birth Rates," and endnote 473; Venn-Watson *et al.*, 2015) to support the 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, living for years post-transfer, while others were sent to sea pen facilities in the Florida Keys—transferred to "sea cages" after having been born and raised in tanks (https://www.cetabase.org/inventory/us-navy/).

Mark Simmons, a long-time cetacean trainer who started his career at SeaWorld, was so opposed to releasing captive cetaceans that he wrote in his book *Killing Keiko* (Simmons, 2014) that 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 125).

These statements also disregard the fact that, for some time now, animal protection groups have not advocated 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 most animal protection groups follow the science and recognize when they must modify their advocacy to account for a developing body of evidence (see Chapter 13, "The *Blackfish* Legacy—Seaside Sanctuaries: The Future for Captive Cetaceans?").

We note that much of the industry's language opposing the release of long-term captive and captive-born cetaceans is no longer found when conducting internet searches. (For example, when the AMMPA updated its website sometime after the 4th edition of this report was published in 2009, it removed a Frequently Asked Question (FAQ) page, where a response to a question—whether it was safe to release captive cetaceans to the wild—discouraged such releases; see the Wayback Machine at https://web.archive.org/web/20080229214249/www.ammpa.org/faqs.html.) We believe that the removal of these statements is related to the industry's recent decision to participate in the ICPC, where such an attitude is antithetical to the program's

goals (see endnote 91). When we prepared the 5th edition of this report in 2019, the only remaining such statement we could identify online was on Georgia Aquarium's website under its news items (at https://news.georgiaaquarium.org/stories/georgia-aquarium-s-response-to-empty-the-tanks-day) but by 2023 this statement too was taken down. (However, it is still accessible via the Wayback Machine, at http://web.archive.org/web/20191020161857/http://news.georgiaaquarium.org:80/stories/georgia-aquarium-s-response-to-empty-the-tanks-day.) This news item was responding to an anti-captivity protest day and claimed returning captive cetaceans to the wild would be harmful to them.

112. Beck *et al.* (1994); Ruiz-Miranda *et al.* (2019).

113. 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 animals were.

114. 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).

115. 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 a few releases occurring 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 a half months in a temporary rehabilitation enclosure attached to a "spoil" island in the lagoon, adjacent 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 who was 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 the owner of Oceanario Islas de Rosario near Cartagena, Colombia (see endnote 78), to release Dano (a young male) and Kika (an older female), two costeros (although at that time, they were still known by the common name tucuxi, which now applies only to *S. fluviatilis*, found in rivers—see endnote 78). 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 gillnet, 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, additional releases have occurred (see endnotes 116–125).

116. As the result of a project funded by 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 years after his release and was seen in the company of other dolphins (Rollo, 1993).

117. 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 transfer of two more dolphins to the Turks and Caicos, 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.

118. See endnote 113 and Gales and Waples (1993).

119. 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 WSPA rescue specialists arrived, the dolphins were malnourished and stressed. Once stabilized, the animals were moved to a rehabilitation pen off the Guatemalan coast, not far from what was believed to be their home range, and were released a few weeks later (Rossiter, 2001). Local fishermen reported sighting both dolphins in area waters for some time after their release.

120. 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 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.

121. 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.

122. In September 2022, three bottlenose dolphins, Johnny, Rocky, and Rambo, were released from the Umah Lumba Rehabilitation, Release, and Retirement Center in Banyuwedang Bay, West Bali, Indonesia, after each spent a number of years performing—first in a traveling show and then at a hotel facility. Johnny died two months later; the other two continue to be monitored (http://bit.ly/3TcrfHS).

123. 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; Kim *et al.*, 2018). In 2013, the Supreme Court of Korea ruled that their captures were illegal—South 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 last illegally captured dolphin was released off Jeju Island in October 2022, after 17 years in captivity (Lee, 2022).

The first five dolphins have all been observed multiple times through 2022. (One of these stranded dead in June 2022, after seven years in the wild.) They reintegrated with free-ranging dolphins 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). One of these calves was confirmed still alive as of October 2022 (Hyung Ju Lee, personal communication, 2022). The fact that these animals successfully re-adapted to the wild after four to six years in concrete enclosures illustrates that returning some captive cetaceans to the wild is feasible. However, it should be noted that these five animals were adults (not juveniles) when originally taken from the wild. Unfortunately, the final three dolphins have not been re-sighted and presumably died—they were in captivity for much longer and may have been younger when captured, making them less-than-ideal candidates for release.

124. 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 sighted numerous 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 serves as a model for subsequent release efforts (Wells *et al.*, 1998b).

125. After the release of *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 a few 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 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).

126. 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 (see endnote 456). 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, the oldest captive male orca ever; he is believed to have been born in 1977, making him 46 years of age in 2023—see endnote 489 and Table 1). Keiko was donated by his owners to a release program (see endnote 125). 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 (http://rosmarus.com/Releases/Rel_2.htm#Navy).

The releases in Korea (see endnote 123) 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. Given industry participation in the ICPC, it would be illogical and inconsistent for dolphinaria to continue to oppose well-planned, monitored rehabilitation and release projects.

127. 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 or national wildlife protection laws.

128. 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 111.

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 endnote 615) and then immediately after SeaWorld's announcement that it was ending its orca breeding program (see endnote 650 and Chapter 13, "The *Blackfish* Legacy—The End of Captive Orcas?"). This argument claims reproduction is a natural behavior and a "right" for animals in zoos and aquaria and thus ending captive breeding is ethically wrong and even cruel (see, e.g., SeaWorld, 2015a). Yet this appears to be the only natural behavior or 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

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

130. The ICPC clearly believes it is ethical to consider capture and confinement for species enhancement purposes for rapidly declining species (see endnote 91). The Vaquita CPR program (see endnote 58) is an example of a program where many 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—opponents were, of course, justified in their concerns. Many feel similarly about the ICPC's *ex situ* elements (e.g., Dolphinaria-Free Europe, 2021).

131. A recent example of this was the capture operation for belugas from the Sea of Okhotsk. Various public display facilities sourced belugas from the Sakhalin Bay-Amur River population for decades without doing research on the population impact of these removals. When Georgia Aquarium chose to follow suit, it *did* conduct research to determine a "safe" removal level, but then ignored its own research results and applied to import 18 animals. This attempt was prevented because the import would not have met the requirements under the MMPA (see endnote 282).

Stranding Programs

132. http://www.sealsanctuary.co.uk.

133. Nancy Yates, personal communication (2014).

134. 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), which was sponsored by non-profit organizations and private entities. 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).

135. Only 7–8 percent of stranded cetaceans actually survive to release (Zagzebski *et al.*, 2006), and the fates of these released animals are often unknown.

136. Masunaga (2016). See also endnote 111, 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 captivity 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.

137. 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 for Native hunters to kill walrus mothers and thus create orphans, as money was historically 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).

138. 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 (or Surfer Girl) in California in 1979, Pascuala in Mexico in 2007, and Morgan in the Netherlands in 2010 (https://inherentlywild.co.uk/deceased-orcas/). Some in the industry call Kshamenk in Argentina a "rescued" animal, but he was likely forced to strand (see endnote 140) 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 by sending expertise to Mexico, instead pursued a plan whose first priority was to add a new female orca to the captive gene pool in the United States.

Morgan's story is ongoing. She is a female orca who was found as a juvenile, 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, 2014a). Dolfinarium Harderwijk had not made any attempt 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 an orca worth millions of 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 650), 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 would never be releasable to the wild, as she was a genetic hybrid. Ula died in August 2021, less than two months short of her third birthday (https://inherentlywild.co.uk/deceased-orcas/).

139. 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 was Martinha, a short-beaked common dolphin (*Delphinus delphis*), who stranded and was rescued in Portugal in 2007. She too may have been releasable yet remained in captivity for years (http://www.martinha.org). Her case was unique, however; she was being held in a facility that is not open to the public, nor did she

appear to be in use as a research subject. She died in December 2020 (https://marineconnection.org/martinha-the-lone-dolphin-dies/).

140. 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 (the industry term for a captive population) at 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 sunburned, 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).

CHAPTER 3: INDUSTRY RESEARCH

141. Kellert (1999); Naylor and Parsons (2019).

142. 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 similar conservation issue, the answer would be incorrect and could compound the conservation problem.

143. 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 8 ("Stress") and Chapter 10 ("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.

144. Rees (2005).

145. SeaWorld has claimed that its AI techniques for orcas (and other cetaceans) will one day be invaluable to the conservation of endangered species (Robeck *et al.*, 2004; O'Brien and Robeck, 2010), a highly dubious claim to say the least (see endnote 63). 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 4, "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 58).

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 75.

146. 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 stated that 26 orcas had been born in captivity, lauding this as a success. However, this was 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, approximately 60 percent of captive orca pregnancies had been unsuccessful to that time, due to the death of the calf before or just after birth.

147. 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 (12.5 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 ships 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 do free-ranging animals 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).

148. Researchers studying the behavior of captive river dolphins noted, among other issues, "Within 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).

149. 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).

150. 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://seaworldentertainment.com/commitment/science-and-research/350-publications/), but this update is actually a comprehensive list of publications by SeaWorld authors (on mammals, birds, reptiles, and fish), and only 43 of them are specifically on orcas (including free-ranging orcas). Considering that SeaWorld has kept orcas for more than 55 years and took in almost US$257 million in net income in 2020, 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 low.

151. https://www.guidestar.org/profile/59-2072869. In 2003, the Dolphin Research Center's net income was US$3.4 million, most of which came from human-dolphin interactions (Kestin, 2004c). In 2020, the facility had a net income of US$4.3 million, which represented a net loss of US$1.6 million from the previous year, probably due to the COVID-19 pandemic.

152. The Dolphin Research Center (see endnote 49) was established in 1984. For the first two decades of its operation, based on information found on the facility's website (https://dolphins.org/references_abstracts), the staff appear to have produced only three original 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. In addition, the first paper listed on the website (from when it was still Flipper's Sea School) 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 (after four years of no publications), there was a sudden increase in the number of original studies produced by the Center's researchers (perhaps not coincidentally, the same year Congress held a hearing on cetaceans kept in captivity—see endnote 14). Twenty papers are listed for the period 2010–2021 (although five of these are rebuttals to other researchers' work, rather than original research), which is still somewhat low (fewer than two papers per year) for a "research center."

153. http://www.marinemammalscience.org.

154. In the 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 (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 species "that had been cared for by humans for some length of time" (p. 417); that is, species that were ever held in captivity. This, of course, would lead to a greater percentage of captive studies being represented in their sample. In short, they compared apples to oranges.

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, "Research 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*" (emphases added; p. 434). This conclusion echoes a point made in this and previous editions of this report: "The 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 Rose and Parsons, 2019; this report).

Interestingly, Hill and co-authors did a similar literature review six 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 endnote 157 and Chapter 13, "The *Blackfish* Legacy"), given the baseline established in 2010 (Hill and Lackups, 2010).

155. See endnote 154 and Hill and Lackups (2010).

156. The 24th Biennial Conference on the Biology of Marine Mammals was held in West Palm Beach, Florida, in the United States, with 1,124 abstracts accepted for presentation as posters or talks (Society for Marine Mammalogy, 2022). Out of 773 cetacean abstracts, 40 focused on captive animals (5.2 percent),

and most of these were on bottlenose dolphins. Fifty-seven presentations featured captive marine mammal species (5.1 percent). Of these, only the seven featuring sirenians, some of the pinniped studies, and one of the cetacean studies (of a stranded pygmy sperm whale, *Kogia breviceps*) addressed species whose status was of conservation concern. In short, of the hundreds of captive marine mammal facilities around the world, only a small proportion are producing science, and even fewer are producing any research of conservation relevance. Yet many marine mammal facilities still claim they are contributing significantly to cutting-edge marine mammal science and conservation.

157. See, e.g., Eskelinen *et al.* (2015); Clegg *et al.* (2015); Clegg and Butterworth (2017); Clegg *et al.* (2017a, 2017b); Monreal-Pawlowsky *et al.* (2017); Rose *et al.* (2017); Serres and Delfour (2017); Brando *et al.* (2018); Clegg and Delfour (2018); Dierauf and Gaydos (2018); Perez *et al.* (2018—this paper, on a pantropical spotted dolphin, *Stenella attenuata*, was one of the few captive cetacean welfare papers identified from this time period that focused on a species other than bottlenose dolphins, orcas, or beluga whales); Van Bressem *et al.* (2018); Brando *et al.* (2019); Clegg *et al.* (2019); Serres *et al.* (2019).

158. The project (see endnote 342) involved 216 common and Indo-Pacific bottlenose dolphins (these are different species—the papers from the project incorrectly refer to them as subspecies), 13 beluga whales, and eight Pacific white-sided dolphins, held at 43 facilities in seven countries. This study design leads to a number of confounding variables. In addition to different species of differing ages and sexes being used in the study, each facility would have different numbers and combinations of animals; different enclosure sizes, with varying depths and numbers and arrangements of primary and holding enclosures; enclosures made of different materials (concrete or sea pen netting); different training regimes and schedules (and trainers and observers); different types and numbers of shows and performances; and even different climates. Because of the differences across facilities, many of the factors studied were relative, such as whether animals used the top or bottom third of a tank, rather than actual depth. In addition, this variability meant that there was a lot of statistical "noise" in the study, minimizing the number and level of significant results that could be obtained.

Moreover, enrichment activities were not categorized; however, from descriptions in the papers, they seemed to range from food treats served in a variety of ways to puzzles to solve. Lauderdale *et al.* (2021e) provided an inventory of a wide variety of enrichment activities. Unfortunately, because these enrichment data were lumped together, useful questions such as "what types of enrichment activities lead to better welfare?" (using behavioral or hormonal indicators) could not be answered.

159. Page 1 in Miller *et al.* (2021a).

This research could have, and arguably should have, been approached as an effort to accept or reject the null hypothesis that captivity has no impact on cetacean welfare. The researchers should have been in no way affiliated with the public display industry, as such a relationship would be an obvious conflict. No language indicating bias for or against the public display of cetaceans should have been included in the text of any of these papers, as, again, this would clearly indicate bias, leading to a lack of credibility in the results. Nevertheless, the special issue is filled with rhetorical statements such as "[dolphinaria] are *critical partners* with the scientific community to understanding the biology, behavior, physiology, health, and welfare requirements of this taxonomic group" (emphasis added; p. 1 in Lauderdale *et al.*, 2021a) and "There is a strong commitment among zoos and aquariums to continuously advance an understanding of welfare across facilities using scientific methods to positively impact the quality of life for the animals" (p. 2 in Lauderdale *et al.*, 2021a). Yet, as this chapter has laid out, dolphinaria are far from "critical" to marine mammal research—at best they are occasional partners in science. In addition, dolphinaria have only become committed (strongly or otherwise) to advancing marine mammal welfare using scientific methods within the past decade, since the release of *Blackfish*.

160. The project received a grant totaling US$739,480 from the US government (grant MG-30-17-0006-17 to Brookfield Zoo, https://imls.gov/grants/awarded/mg-30-17-0006-17).

161. The special issue of the journal *PLoS ONE* contains nine papers. Seven of these papers are minor variations of each other, examining dolphin behavior, enclosure use, and enrichment activities. Essentially the same analysis is repeated in each paper with slightly different behavioral variables (Lauderdale *et al.*, 2021a, 2021b, 2021c; 2021e; Miller *et al.*, 2021b, 2021c, 2021d). Lauderdale *et al.* (2021d) reported data on blood parameters and Miller *et al.* (2021a; 2021d) reported on stress hormone data, providing the only variety in the special issue. The practice of using data from one sample (all the cetaceans at the 43 facilities), essentially using a single methodology (biologgers, a type of tag—see endnote 342), to produce multiple, similar papers analyzing small sections of these data is called "data slicing" (Kirkman and Chen, 2011) or "salami publication" (p. 263 in Altay and Koçak, 2021). Slicing data to produce multiple papers out of one dataset is becoming increasingly common in an academic world where there is pressure to produce as many papers as possible. However, "Salami slicing is considered an ethical violation in scientific publishing and may result in significant sanctions" (p. 263 in Altay and Koçak, 2021). The *PLoS ONE* special issue is, in our opinion, a package of data-sliced papers, and it is surprising that the journal accepted them, as it in fact published a paper only a few years earlier condemning salami publication, albeit in disciplines other than biology (Karabag and Berggren, 2016).

162. Richard (2022).

163. Richard (2022).

164. See endnote 317 for a definition of "stereotypy" or "stereotypical behavior." Miller *et al.* (2021a) found that behavioral diversity, or the lack of stereotypical behavior, was related to lower levels of stress hormones in bottlenose dolphins; i.e., stereotypical behavior was a sign of poor welfare, something that has been known in the field of animal welfare science for decades.

165. The study revealed that many facilities provide new enrichment activities only rarely, with some providing no new enrichment activities for periods longer than a year.

166. Lauderdale *et al.* (2021b)

167. Lauderdale *et al.* (2021c).

168. Miller *et al.* (2021c).

169. Miller *et al.* (2021b). These findings were also not novel; they have been known for decades with other mammal species in zoos. One could argue that the study's initial analyses were designed to confirm biases, rather than test hypotheses (which might provide results unflattering to the public display industry) such as: Are captive dolphins as active overall as free-ranging dolphins? Do they spend more time being inactive—for example, by swimming very slowly or logging (floating motionless at the surface)—than their free-ranging counterparts?

170. Miller *et al.*, (2021b).

171. Lauderdale *et al.* (2021a).

172. Lauderdale *et al.* (2021d) summarized blood sample data from over 200 cetaceans, with two blood samples taken from each animal six months apart. This was presented as "a baseline from which to compare hematological, serum, and plasma biochemical values in cetaceans in zoos and aquariums" (p. 1). However, blood tests are routinely conducted on captive cetaceans as part of normal veterinary care and husbandry. This analysis could have been done (and arguably has been done; see, e.g., Pogue and Maiden, 2014) by looking at the veterinary records of these individuals—indeed, of thousands of individuals from decades of captive holding—over any time period desired. A separate, dedicated study taking such samples was not necessary.

The fact that this redundant paper was published as novel is yet more evidence that this study was a reaction to *Blackfish*, rather than

a spontaneous gesture on the part of the public display industry to meaningfully contribute to marine mammal science. Lauderdale *et al.* (2021d) noted, "This is the first report of a [sic] hematological, serum, and plasma values and reference values for Indo-Pacific bottlenose dolphins" (p. 26). However, even in the 1990s, Ocean Park in Hong Kong had its own hematology laboratory, which stored years of blood data from Indo-Pacific bottlenose dolphins held there (E.C.M. Parsons, personal observation). The industry's failure to publish such basic information on this commonly held cetacean species until now certainly does not comport with its facilities' self-description as centers of essential research.

Miller *et al.* (2021d) reported on using fecal samples to investigate stress hormones in captive cetaceans, although this method has been used for some time on free-ranging cetaceans (e.g., Hunt *et al.*, 2006) and even on captive dolphins (Houser *et al.*, 2016). Again, the logical question arises: Why has this non-invasive method for monitoring stress hormones in captive cetaceans not been published before now? Several of the publications from this study appear to be results in search of a relevant or novel research question, while other relevant and/or novel research questions on welfare have yet to be addressed (see endnote 169).

173. For example, Miller *et al.* (2021b) concludes, "Given the importance of social behavior, this in turn can help ensure that dolphins are experiencing positive welfare and can continue to inspire people to become engaged in conservation activities" (the latter claim being overtly biased and unnecessary for the point being made; see also Chapter 2, "The Conservation Fallacy," for a discussion of how this claim is not science-based). Yet they do not actually provide recommendations or guidelines for improving (or, more accurately, maintaining the current level of) dolphin welfare other than continuing to provide already-available enrichment activities. It is difficult not to see this reluctance to provide such recommendations as wishing to avoid any suggestion that conditions are not already nearly ideal at accredited facilities participating in this study. Yet the study was intended to investigate whether dolphin welfare was in fact good (let alone ideal) at such facilities; clearly, the researchers began with biased expectations and unsurprisingly found what they were looking for.

174. Richard (2022).

175. We note that none of the papers in the *PLoS ONE* special issue cited Clegg *et al.* (2015), the C-Well welfare index developed precisely to monitor various welfare indicators in captive cetaceans (see endnote 342). Only two of the nine papers in the special issue cited anything at all by Isabella Clegg. This is notable because this researcher has figured prominently in the literature in recent years, publishing a number of papers on cetacean welfare (see endnote 157). It is possible her work is under-cited by researchers working in close cooperation with the public display industry (rather than researchers who have remained independent) because it often implies or openly asserts that captive cetacean welfare can be significantly improved, rather than starting with the premise that it is already nearly ideal.

176. See, e.g., Serres *et al.* (2020a, 2020b, 2020c); Delfour *et al.* (2021); Guérineau *et al.* (2021); Huettner *et al.* (2021); Probert *et al.* (2021); Stevens *et al.* (2021); Jacobs *et al.* (2022); Mátrai *et al.* (2022); Serres *et al.* (2022a, 2022b).

177. Serres *et al.* (2020c).

178. The majority of the work by Agathe Serres, which occasionally addresses factors typically found in captive facilities that can result in an increased level of negative welfare indicators, is performed in China.

179. See, e.g., Guérineau *et al.* (2021). See endnote 158, which notes that the Cetacean Welfare Study did not distinguish among enrichment types, making it difficult to formulate practical recommendations from its results.

180. See endnote 388.

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

CHAPTER 4 • LIVE CAPTURES

182. 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. See endnote 58 for an example with vaquita. Chases and capture can also have negative psychological or social impacts, including triggering aggressive behavior in a targeted group (Fair and Becker, 2000). The risk of exposing captured animals to unfamiliar pathogens carried by humans, such as the SARS-CoV-2 virus (Damas *et al.*, 2020; Gryseels *et al.*, 2020), is also always present.

183. US government scientists measured strong stress reactions in pantropical spotted dolphins, 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).

184. Page 17 in Reeves *et al.* (2003) and endnote 602. For example, during the 2013 capture season in the Sea of Okhotsk for beluga whales (see Chapter 4, "Live Captures—Belugas" and endnote 64), 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.

185. Small and DeMaster (1995a).

186. Hunting dolphin species with drives, for subsistence and cultural purposes, continues to occur elsewhere, including Solomon Islands and the Faroe Islands (see endnote 68), 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 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 also been highlighted as 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).

187. The documentary film *The Cove* (http://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.

188. 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. These data came from Ceta-Base, which until recently kept a page monitoring the hunt in Taiji (this page is currently not available). In the 2017–2018 season, Ceta-Base reported that 613 small cetaceans were killed and 107 were live-captured in Taiji. According to Ric O'Barry's Dolphin Project (https://www.dolphinproject.com/blog/taijis-dolphin-drive-hunts-end-for-season), 498 small cetaceans were killed in the 2021–2022 season, with 65 taken alive for display. 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.

189. 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 (Reuters, 2007). This concern was well founded, as researchers found mercury levels in dolphin meat nearly six times higher than health limit guidelines (Endo and Haraguchi, 2010). The average mercury level found in the hair of locals who ate dolphin meat at least once a month was 12 times the national average. Three dolphin meat consumers were found with levels that held the risk of potential toxic effects.

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 potentially high levels of pesticides and pathogens in dolphin meat that could pose a human health risk (Parsons *et al.*, 2006).

190. 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., endnotes 233 and 235), reported that export papers accompanying a shipment of seven dolphins to the Philippines recorded a single dolphin selling for US$60,000 (Palmer, 2008).

191. Vail and Risch (2006).

192. China Cetacean Alliance (2015; 2019).

193. 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, six dolphins were sold to Saudi Arabia, six to South Korea, five to Vietnam, 11 to Russia, 20 to Ukraine, and 36 to China (Kirby, 2014a).

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

195. 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.

196. A group of dolphins were captured in a drive in Taiji in October 2006. 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).

197. 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 capture 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).

198. 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 335—the 1998 applications were granted; the 2001 applications were denied (*67 Fed. Reg. 58630*, 2002).

199. *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.

200. 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 (https://web.archive.org/web/20220123220000/https://eaam.org/wp-content/uploads/2018/04/Statement_Policy_Drive_Fisheries_2013.pdf).

201. http://bit.ly/3TfByes; see 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.

202. China Cetacean Alliance (2015; 2019). In 2019 and 2020, Japan exported a total of 149 live bottlenose dolphins to China (CITES, 2022a). By June 2023, the database did not yet have the 2022 data available, but in 2021, Japan exported 82 live bottlenose dolphins to China and 15 to Thailand.

203. Four live bottlenose dolphins (three female and one male), originally sourced from Taiji, were shipped from Japan to the United Arab Emirates in 2008 (CITES, 2022b). Japan reported sending 20 live bottlenose dolphins to Saudi Arabia between 2010 and 2016 (CITES, 2022c).

204. Lusseau and Newman (2004); Williams and Lusseau (2006).

205. The Southern and Northern Resident orcas in Washington and British Columbia were persistently targeted by capture operators in the 1960s and 1970s, leading to the removal of at least 53 juveniles over 15 years (Asper and Cornell, 1977), most from the Southern Resident population. Researchers estimate there were approximately 24 breeding males in the Southern Resident population prior to captures; however, the current population has only 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 (Ford *et al.*, 2018), who remain critically endangered because of food shortages and other threats, but also because an entire generation is missing and never contributed its genes or offspring to the population.

206. Naylor and Parsons (2019).

207. See endnote 21.

208. On 29 March 2004, Miranda Stevenson, PhD, 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).

209. See http://www.chinacetaceanalliance.org for details in its investigation reports for individual facilities.

210. Master (2018); China Cetacean Alliance (2015; 2019). See also http://www.chinacetaceanalliance.org and CITES, 2022a; 2022f).

211. See http://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).

212. 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 236). 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).

213. The *2002–2010 Action Plan* (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 (p. 17).

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

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

215. 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

216. Cuban authorities were issuing capture permits for, on average, 15 live 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 live 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 live wild-caught bottlenose dolphins from 2005 through 2013. After 2013, at least 48 more dolphins were exported for commercial purposes from Cuba to a number of countries, including a total of 20 to Jamaica between 2015 and 2017 and four to Saudi Arabia in 2020 (CITES, 2022d).

217. There are at least 10 dolphinaria in Cuba (Schmidt-Burbach and Hartley-Backhouse, 2019).

218. These two exports to Venezuela were of five and four dolphins respectively.

219. See endnote 216.

220. 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 more recent documents on this topic, but could not identify any.

221. For example, in November 1996, Manatí Park, in the Dominican Republic, applied to import four dolphins captured in Cuban waters (Pasini, 2015). See also endnote 216, which shows 20 Cuban dolphins going to Jamaica (which has at least four dolphinaria; Schmidt-Burbach and Hartley-Backhouse, 2019) in the past decade.

222. 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.

223. 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(i)(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).

224. International Whaling Commission (2007a).

225. 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.

226. 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).

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

228. 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 5, "The Physical and Social Environment—Sea Pens," and endnote 300.

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

230. 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, so this capture of dolphins would have violated Articles 3, 5(d), 5(j), 10.3(a), 10.3(b), 11.1.b(i), 11.1.b.(ii) and 11.1.c(i)(c) (Parsons *et al.*, 2010a).

231. Alaniz (2010).

232. 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 11, "Human-Dolphin Interactions").

233. 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 (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 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) (p. 7).

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

235. 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, 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 from local people. Despite the Solomon Islands Fisheries Act No. 6 of 1998 (https://www.fao.org/faolex/results/details/en/c/LEX-FAOC016127/) requiring at that time that a precautionary approach be taken to marine resource management, such an approach was not being used. Indeed, it was the opposite of the precautionary approach, in that potentially damaging actions were taken in the absence of 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 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). (The Solomon Islands Fisheries Act of 1998 was repealed in 2015.)

236. 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 212). In December 2008 and January 2009, 18 more dolphins were exported to the Philippines, where they were to be trained before being exported onwards 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 (CITES, 2022e).

237. Kirby (2016).

238. CITES (2022e).

239. Fisher and Reeves (2005).

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

241. 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 (https://tmsnrt.rs/3yAvLX6).

242. 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).

243. 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 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/).

244. 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 67). 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 (Gordon, 1993; *53 Fed. Reg. 26631*, 1988). 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 have continued 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.

245. 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.

246. 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 dolphins "caught in the wild" from Cuba known to the government and the media (Bonaire Reporter, 2008).

247. 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

248. Weiler *et al.* (2018).

249. Mapes (2018a). Some whales from the Northern Resident orcas in British Columbia, related but genetically and behaviorally separate from the Southern Residents, were also captured, far fewer than in the south. One of these northern whales still survives—Corky, captured in 1969, and currently part of the SeaWorld San Diego orca group (https://inherentlywild.co.uk/captive-orcas/).

250. This Southern Resident survivor's story offers insight into the impacts, for both free-ranging and captive cetaceans, of this US capture operation. In July 1970, at Whidbey Island, Washington, in the United States, whales from the Southern Resident J, K, and L pods were driven into Penn Cove. Six young orcas, aged between 2 and 5 years based on size, were taken for public display. The whales were transferred to Seattle Marine Aquarium and, together with another whale caught off Bainbridge Island and one caught in January, were sold to facilities around the country for US$20,000 each, with one remaining in Seattle (Pollard, 2014).

Although captures of orcas were banned in Canadian waters by then, in the United States, only a net license was required from the state of Washington's Department of Fisheries. (This would change with the passage of the federal MMPA.) In response to local protests over the whales' capture, Ted Griffin and Don Goldsberry, the original capture operators in Puget Sound, claimed that "not only were the whales happy in captivity but they made a valuable contribution to entertainment and research" (p. 88 in Pollard, 2014).

During the capture, at least one animal, a young female, died. However, in the months following the capture, four additional orca calves were found dead near the capture site, some of whose carcasses had been opened up and filled with rocks to sink them, and one was weighted down with an anchor (Pollard, 2014). Many of the captured orcas were dead within a year. However, one whale, eventually named Lolita (also known as Tokitae or Toki; she will be referred to throughout this report as Tokitae), survived and became famous as a focus for the campaign against holding orcas in captivity.

Tokitae was sold to Miami Seaquarium after her capture. Established in 1955, Miami Seaquarium was locally owned until it was sold in 2014, to Palace Entertainment, an American subsidiary of Parques Reunidos, based in Spain (https://www.palaceentertainment.com/about-us). In 2021, the Seaquarium was sold again, to MS Leisure, the American subsidiary of The Dolphin Company, a dolphinarium company based in Mexico (InPark Magazine News, 2022). Upon her arrival, Tokitae joined a juvenile male orca named Hugo. Hugo had been captured at an estimated 3 years of age from the Southern Resident orcas in February 1968. Hugo had frequently and repeatedly rammed his head against the walls and windows of the tank in which these two whales were held (known as the "Whale Stadium")—a sign of poor welfare and distress (Pollard, 2014). In March 1980, this behavior led to a burst brain aneurysm and Hugo died (see https://www.cetabase.org/inventory/miami-seaquarium/). After Hugo's death, Tokitae was never held with another orca, although she did share the Whale Stadium with Pacific white-sided dolphins, a Risso's dolphin (*Grampus griseus*), and at least one California sea lion over the years (Pollard, 2014).

The enclosure in which Tokitae is kept was built in the 1960s. It does not meet the minimum space requirements for orcas under the US Animal Welfare Act (AWA) (7 USC §§ 2131–2159 (1966)). These AWA requirements, found in 9 CFR Part 3 Subpart E §§ 3.100–3.118 (1984; 2001), establish a minimum horizontal dimension (MHD) of 14.63 m (48 ft) for an orca (9 CFR § 3.104, Table 1, Group 1 cetaceans). Tokitae's primary enclosure is 24.38 m (80 ft) long, 6.1 m (20 ft) deep (but with a sloped bottom, so it is shallower at the edges), and only 10.67 m (35 ft) wide. There is a back area, accessible by gates at either end of a work island that unequally bisects the entire enclosure. This back area is not part of her primary enclosure, although the gates are often left open, and serves as a holding tank when Tokitae is separated from her dolphin companions and as a medical tank. Therefore, the MHD of Tokitae's tank is roughly three-quarters of the requirement.

The AWA regulations are administered and enforced by the US Department of Agriculture (USDA) Animal and Plant Health Inspection Service (APHIS). Despite numerous complaints about non-compliance from a number of animal organizations and activists, as well as visitors, over the years, Tokitae remains in a tank that violates the regulatory standards. Efforts to sue the USDA and APHIS over this situation have been unsuccessful, for various technical reasons unrelated to the merits of the case (Rose, personal observation).

In June 2017, the USDA's Office of Inspector General (OIG) issued a report of an audit it conducted on APHIS' implementation of the AWA regulations for cetaceans. The report noted, among other things, that Tokitae's tank "falls short of the minimum requirements for an orca" (p. 7 in OIG, USDA, 2017). APHIS' response was to point to *44 Fed. Reg. 36868* (1979), claiming that the supplementary information of this notice established minimum space requirements for AWA-covered marine mammals and indicated how those requirements apply to pools with "unique configurations." Tokitae's tank, for example, has the work island that bisects it, which is a solid barrier—this is a unique feature and results in a tank with a unique configuration. However, the notice only states, "As stated in the supplemental information of the proposed rulemaking, a circular pool with the required MHD is the smallest pool which would meet the standards. The pool can be of any size and shape, but in that pool, there must be a place that will meet or exceed the MHD, depth, surface area, and volume requirements" (p. 36,870). The smallest circular area that can fit within Tokitae's tank is 10.67 m (35 ft) in diameter, given the work island is a solid barrier (that is, the same as an enclosure wall, albeit with two gates at either end).

The next section of the 1979 *Federal Register* notice states:

> Another comment requested clarification of the term "primary enclosure" as it relates to holding pools which are connected to a larger performance pool. In response to this request, it should be restated that enclosures smaller than required by the standards may be used for holding animals for short periods of time at the discretion of the attending veterinarian. However, if the animals are confined in the holding pools for extended periods of time and do not have access to the larger performing pool, except during their performance, then the holding pool would be considered the primary enclosure and must meet or exceed all of the minimum requirements. When the animals have free access to the larger performing pool, other than during their performance, then the entire pool complex may be considered as the primary enclosure (p. 36,870).

None of this text offers a rationale for why a tank of other than a circular configuration could have an MHD that is less than the requirement, nor how Tokitae's tank at Miami Seaquarium could possibly meet the size standards established in 1979, even with its "unique configuration." A review of the Whale Stadium tank in 1995 by an APHIS inspector pointed out that it did not meet the size standards, but referred to a waiver granted in 1988. In 2017, APHIS told the OIG that no such waiver existed (OIG, USDA, 2017) and that there is no legal basis for granting one that would allow for a tank of this size. Tokitae's enclosure has indeed been in violation of the AWA since 1979, and APHIS has done nothing to address this.

In 2015, NMFS extended the Southern Resident ESA protection (see endnote 496) specifically to Tokitae (*80 Fed. Reg. 7380*, 2015). Many hoped that this would lead to her being repatriated to the Pacific Northwest and her original habitat. However, the ESA allows endangered and threatened species to be kept in captivity, unless a zoo or aquarium acts in a way that actually kills or injures the listed individuals, or the facility's intentional or negligent conduct results in their harassment and disturbance with the potential for injury or could significantly disrupt normal behavioral patterns (see *Rowley v. City of New Bedford*, 413 F. Supp. 3d 53 (D. Mass. 2019), for more on this precedent). While Tokitae's tank violates AWA regulations, the courts considering her case did not believe that the harm Tokitae suffered in her tank at Miami Seaquarium satisfied the standard they applied (*People for the Ethical Treatment of Animals, Inc., v. Miami Seaquarium*, 879 F.3d 1142 (11th Cir. 2018); see also Winders *et al.*, 2021).

In 2019, concerned about the plight of Tokitae, whom they call Sk'aliCh'elh-tenaut, the Lummi Nation (Lhaq'temish) of Washington, in the United States, launched a campaign for her repatriation to the Salish Sea and her family, L pod. The Lummi name for Tokitae means that she is a daughter of the Sk'aliCh'elh, the resident orcas of the Salish Sea. The Lummi have organized several protests outside Miami Seaquarium (Mapes, 2018; Priest, 2020) and have also sought attorneys to assist with developing legal strategies to repatriate Tokitae. Miami Seaquarium management was, in the past, very dismissive of the concerns and requests from the Lummi Nation, referring to their activities as a publicity stunt (Rose, 2018).

Tokitae's long ordeal has recently shifted course. In 2021, MS Leisure began the process of purchasing Miami Seaquarium from Palace Entertainment. While the facility was still under Palace Entertainment management, a routine APHIS inspection in June 2021 led to one of the most shocking reports ever prepared for a dolphinarium. Miami Seaquarium was cited for multiple AWA "non-compliances" throughout the park and regarding Tokitae's care (Gonzalez, 2021). These violations included contaminated pool water; having Tokitae, who is considered geriatric, perform tricks that resulted in injury; having her perform while injured; reducing her food and water intake in a manner that affected her health; disregarding veterinarians who did not approve of a planned move of two additional Pacific white-sided dolphins into Tokitae's tank due to her medical and behavioral challenges; housing incompatible individuals together, which in turn led to aggression, injury, and death of at least five individual marine mammals; trainers not keeping the public far enough away from Tokitae's enclosure; paint peeling off Tokitae's tank walls and falling into the water; a lack of shelter from the hot Florida sun; ignoring veterinary advice; and worst of all, feeding her and other animals rotten fish, which in turn led to intestinal issues. After the release of the June 2021 report, three more marine mammals died at Miami Seaquarium, including one of the Pacific white-sided dolphins with whom Tokitae shared her tank (Kendall, 2022). Soon after, Miami Seaquarium closed the Whale Stadium to the public, ending Tokitae's performances.

As part of the sale to MS Leisure, the Miami-Dade County authorities required the facility to pass a new APHIS licensing inspection before transferring the property lease to the new owner (Vasquez, 2021; InPark Magazine, 2022). In March 2022, APHIS issued an exhibitor's license to MS Leisure. However, the agency wrote a cover letter to accompany the new license that explained the license did not cover Miami Seaquarium's Whale Stadium or the animals held there (Tokitae and her remaining Pacific white-sided dolphin companion, a male named Lii). While APHIS claimed the new license did not cover the Whale Stadium because, among other reasons, MS Leisure had decided to take Tokitae and Lii off exhibit (that is, due to a decision by the licensee; E. Goldentyer, letter to MS Leisure Company, Inc., 2 March 2022), it is also true that the Whale Stadium enclosure does not meet AWA standards, and scrutiny was intense. It may be that "carving out" the Whale Stadium was the only work-around APHIS had to its dilemma. The agency would otherwise have had to deny the company an exhibitor's license and Miami Seaquarium would have had to close, which would have presented the agency with potentially hundreds of animals in need of relocation, including Tokitae. APHIS would have also faced considerable political fallout had it made this decision.

Regardless of the reason, APHIS' decision was not consistent with its previous practice of continuing to cover individual animals held by licensed exhibitors even when those individuals were not on display (e.g., held in a back area due to illness or because they were breeding). Indeed, the logic of allowing a licensee to avoid AWA requirements simply by removing an animal from exhibit could clearly result in absurd situations; for example, an otherwise compliant facility could have animals held off exhibit in squalid conditions. Indeed, this incentivizes exhibitors to simply take an animal off public display if they are unable to keep them in the bare minimum conditions necessary for their well-being, thereby avoiding APHIS oversight. This unprecedented APHIS exhibitor's license issuance raises a number of troubling legal questions, which were still unresolved as of June 2023.

251. https://www.whaleresearch.com/orca-population.

252. 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 by that time was simply missing (see endnotes 205 and 250).

253. 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 (Rossiter, 1997a; 1997b). A third member of the "Taiji Five" died in September 2004 and the remaining two died in September 2007 and 2008 respectively. These orca deaths are recorded at https://inherentlywild.co.uk/deceased-orcas/.

254. 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).

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

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

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

258. 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). Two at least have since died (Narnia, the first to be captured, and Nord, the sole male; see https://www.cetabase.org/inventory/moskvarium/), but also note that no orcas are currently featured on the website, which leaves the fate of the third whale in doubt.

259. Filatova and Shpak (2017).

260. There were 15 orcas imported into China as of June 2023 (Chinese Ministry of Forestry and Agriculture, letter to China Cetacean Alliance, 7 December 2015; Al-Jazeera, 2018; China Cetacean Alliance, 2019; CITES, 2022f), with two of these having been imported as early as 2013 (the rest were imported in 2014, 2015, 2016, and 2017; see Chinese Ministry of Forestry and Agriculture, letter to China Cetacean Alliance, 20 October 2016; and CITES, 2022f). Yet the first four went on display, in Shanghai, only in November 2018 (Best China News, 2018). These four are still the only individuals on display; the status of the other 11 is uncertain.

261. Whale and Dolphin Conservation (2017).

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

263. See, e.g., Chow (2018) and https://www.youtube.com/watch?v=YSRrzS6a-jA.

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

265. 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).

266. By January 2019, only 87 belugas remained; three either escaped (as the capture operators claimed) or died (Dalton, 2019).

267. A provision in Russian Federal Law No. 166-FZ, "On Fisheries and the Preservation of Aquatic Biological Resources" (https://www.fao.org/faolex/results/details/en/c/lex-faoc051893/), which allowed aquatic biological resources to be captured for "educational and cultural purposes" and utilized in Russia *and abroad*, was canceled in April 2018 (emphasis added; Oxana Fedorova, personal communication, 2019).

268. Brown (2019).

269. Brown (2019).

270. See https://www.youtube.com/watch?v=4sklWzlKhYI for video taken by the BBC crew of the surviving whale.

271. The BBC crew stated, "It is not known if this orca has rejoined her family, or has been adopted into a new one. But she was sharing in the meal [of a captured seal] and even helping to hunt seals. Clear proof that captivity is not the end of the line for these animals. And there is in fact hope, that animals that have a captive experience, can once again live wild lives." Russian scientist Grigory Tsidulko, who was working with the BBC crew, added, "That means that despite all of the arguments from the captive industry, orcas actually can be released and safely returned into their natural environment and live a happy life."

272. Mongabay.com (2019). The release site of these final animals was not far from the "whale jail" in Nakhodka. Nakhodka is a harbor city of about 150,000 people close to Russia's borders with both North Korea and China, on the shores of the Sea of Japan. It is about 1,900 km (1,180 miles) from the belugas' capture location and is outside the species' natural distribution, nor is it suitable habitat for these animals, as it is a heavily industrialized area. Many scientists and conservationists complained about this unceremonious "dumping" of the animals in the waters near the whale jail, done, presumably, to avoid the financial and time investment of returning these remaining 50 individuals to the Sea of Okhotsk.

273. Agence France-Presse (2021).

274. Pravda (2018).

275. 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; 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 have been 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 (Shpak *et al.*, 2016; 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 few 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 endnotes 254–274.

Belugas

276. Some of the Marineland beluga whales may have come from the White Sea in Russia rather than the Sea of Okhotsk (see, e.g., https://www.cetabase.org/inventory/marineland-canada/, 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.

277. 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 three were still alive in 2022. Eleven belugas imported between 1999–2005 (39 percent) died before 2018. Only five (50 percent) of the Black Sea bottlenose dolphins were still alive in 2022 (https://www.cetabase.org/inventory/marineland-canada/).

278. Kilchling (2008). As of December 2022, two of these females had died (25 percent) and Marineland had 45 belugas, many of them the captive-born descendants of these imported whales (https://www.cetabase.org/inventory/marineland-canada/). Little monitoring has been possible in the four years since the 5th edition of this report was published, partially due to the COVID-19 pandemic—therefore these numbers are uncertain.

279. 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 wild-caught cetaceans (Malatest, 2003). See endnote 22.

280. Georgia Aquarium (2012).

281. 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.

282. Under the MMPA, a population is considered depleted (defined at 16 USC § 1362 (3)(1)) as 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. 74,713 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; *https://www.fisheries.noaa.gov/national/marine-mammal-protection/georgia-aquarium-application-import-18-beluga-whales-denied-file-no-17324*.)

283. AWI, with other animal protection 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://media.fisheries.noaa.gov/dam-migration/ga_court__decision_092815_508.pdf. 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" (*Ga. Aquarium, Inc. v. Pritzker*, 135 F. Supp. 3d 1280 (N.D. Ga. 2015)).

284. 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).

285. Various newspapers and organizations have reported on these transfers in the past two decades (see also CITES, 2022g and http://www.chinacetaceanalliance.org for more information on belugas in China).

286. 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 283; *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.

Unfortunately, there is a loophole in the prohibition on importing marine mammals or their progeny from a depleted population. Such marine mammals may be imported into the United States for scientific research or conservation enhancement. Mystic Aquarium in Connecticut attracted controversy in 2019 when it announced a plan to import five captive-born belugas from Marineland in Canada (https://www.fisheries.noaa.gov/action/permit-application-import-5-beluga-whales-scientific-research-file-no-22629-mystic-aquarium). These belugas were the offspring of wild-caught Sakhalin Bay-Amur River whales, which were designated as depleted (see endnote 282). In its MMPA scientific research permit application, the aquarium proposed eight research projects, including studies on pregnant females and their offspring. This raised concerns among animal protection groups that the imports were more to augment a failed breeding program (see Chapter 10, "Mortality and Birth Rates") than to conduct legitimate conservation-based research. It seemed clear that the fate of any offspring of these whales was eventually to be absorbed into the US population of captive belugas.

In addition, the whales would perforce be on public display, as Mystic Aquarium has no dedicated research facility. Public display is not a legitimate export purpose in Canada, after the passage of Bill S-203 (see endnote 656), nor a legitimate import purpose in the United States for depleted marine mammals or their progeny under the MMPA. After comments were submitted by animal protection groups detailing these concerns (see, e.g., https://awionline.org/sites/default/files/uploads/documents/NGO_comment_ltr_on_84FR52072_FINAL_02Dec19.pdf), the US and Canadian governments ultimately approved the transfer (the US permit was issued in August 2020; see *85 Fed. Reg. 56219*, 2020), on the condition that the animals be used for scientific research only; public display could only be "incidental." In addition and more to the point, the reproductive studies were disallowed, and breeding of the animals was prohibited.

CHAPTER 5 • THE PHYSICAL AND SOCIAL ENVIRONMENT

287. 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 that their opinion (as we do with ours) is informed and substantiated.

Concrete Enclosures

288. Globally, approximately two-thirds of captive bottlenose dolphins (as well as other cetacean species) are held in concrete enclosures (Schmidt-Burbach and Hartley-Backhouse, 2019). Most pinnipeds are held in concrete enclosures, as well.

289. 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 (such as pinnipeds and polar bears) are not always in the water, 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.

290. 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).

291. Couquiaud (2005). These hygiene methods, however, can themselves cause problems—see endnotes 312 and 362.

292. 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. Monreal-Pawlowsky *et al.* (2017) reported salivary cortisol levels sharply spiking in captive dolphins exposed to nearby construction noise. Huettner *et al.* (2021) systematically examined the impact that various factors, including construction noise, had on the behavior of captive dolphins at Nuremburg Zoo. The researchers found that construction noise caused significant changes in dolphin behavior, including a decrease in social play and an increase in fast swimming. The latter has long been considered a stress response to disturbance in free-ranging and captive cetaceans.

293. "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 650) 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.

294. See endnote 303 for more on temporary use of human swimming pools as a hurricane contingency.

295. 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://petersburgcity.com/family/animality/dulphinarium/) 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 (Rose, personal observation). 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.

Indonesia still had traveling dolphin shows until 2020 (other countries, including the United States, had such shows in decades past, but over time all the others have ended). There were still four such shows in the country in 2017 (Promchertchoo, 2017). The animals were transported in crates from venue to venue, usually on the back of a truck. Upon arrival, staff would 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 moved on. The negative welfare implications of this situation should be obvious. In February 2020, the Indonesian government finally ended this practice (https://www.dolphinproject.com/campaigns/indonesia-campaign/indonesian-traveling-circus/).

296. 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 conspecific-inflicted wounds are rarely observed in the wild. Such wounds, when they are seen in free-ranging animals, are usually the result of a collision with a vessel hull or propeller or of entanglement in fishing gear.

Aggressive interactions such as this do not occur only among captive orcas (see, e.g., Serres *et al.*, 2019). 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. Between 2019 and 2021, a number of dolphins were injured and killed due to aggression at Miami Seaquarium. One dolphin (Sam) was blinded in one eye in an altercation with a tank-mate. Gemini sustained a head injury from another dolphin. Abaco was found dead at the bottom of the dolphin enclosure with bleeding injuries inflicted by another dolphin, although his death was caused by his beak becoming entangled in a fence, whereupon he drowned. Indigo was found dead at the bottom of the enclosure after aggressively interacting with two dolphins, "from acute trauma and pulmonary shock." Echo was observed to increase his activity level with another dolphin; four days later, he stopped eating and died soon after. A necropsy found "hemorrhage in the neck and surrounding tissues, and his left rib was torn from its attachment. His death was due to trauma" caused by this aggressive interaction (p. 14 in Gonzalez, 2021).

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 (Waples and Gales, 2002; Brando *et al.*, 2017; see endnote 380). 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.

297. Miranda *et al.*, 2023. See also, e.g., Chapter 2, "The Conservation Fallacy—Stranding Programs" and endnote 136.

Sea Pens

298. See endnote 228. 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). The first dolphins (the four survivors of Dolphinaris Arizona—see endnote 357) arrived in February 2019. 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/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 functions 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—surely suffer. In addition, *Sargassum* blooms are an increasing problem throughout the Caribbean (e.g., Yong, 2019) and have been particularly intense around St. Thomas, and in Water Bay specifically, for the past 2–3 years.

299. 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).

300. As noted in endnote 228, 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 late October, a fourth animal had died from a storm-induced condition (Diebel, 2003; Alaniz and Rojas, 2007).

301. 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 (St. Thomas Source, 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 exposed the local wildlife to non-native pathogens.

302. In 1996, Anthony's Key Resort, in Roatán, Honduras, was hit by a hurricane. 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 (Associated Press, 1996)—given their complete lack of familiarity with the area, it is unlikely they survived.

303. 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 at least a week before being moved to a dolphinarium in Florida.

Eight other dolphins were left behind in the largest tank in the complex, one with walls 9.15 m (30 ft) high, 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 12.2 m (40 ft) 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 Ceta-Base (https://www.cetabase.org/inventory/atlantis-bahamas/), 12 of these dolphins are still alive at the Atlantis. According to a local Mississippi news station (WLOX Staff, 2022), the eight dolphins who were carried out to the Gulf by the storm surge are among those still alive and have given birth to a total of 12 calves, but details are lacking.

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 32 km (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).

304. 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).

305. Robinson (2017).

306. 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).

307. Goreau (2003).

308. 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 298, Coral World, an existing aquarium on St. Thomas, has constructed a sea pen enclosure, used 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).

309. 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

310. 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).

311. The AWA marine mammal regulations (see endnote 250) set the minimum requirements for such things as chlorination and the use of freshwater or saltwater. Other jurisdictions worldwide have similar minimal marine-mammal-specific regulations (such as in the EU—see endnotes 30, 62, and 71) and sometimes no regulations for captive wildlife at all.

APHIS announced its intention to revise the AWA 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). Thirteen sections were revised and published in 2001, and the agency announced the next year that it was beginning the process to update the remaining five provisions. Nevertheless, these provisions remained unchanged for the next 14 years, when APHIS finally published a proposed rule to amend them (*81 Fed. Reg. 74711*, 2016). APHIS' 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 associations 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 532 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, this proposed rule was shelved after the 2016 federal election and withdrawn completely in 2017 (Barbara Kohn, personal communication, 2017). Animal protection groups, including AWI, are pushing for a new proposed rule to be published, this time based on sound science, as soon as possible.

312. For a discussion of chlorine and its effects on marine mammals, see Geraci (1986); Arkush (2001); and Gage and Francis-Floyd (2018). In countries such as China, where dolphinaria have been 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; 2019; http://chinacetaceanalliance.org/en/category/cca-investigations/).

313. Olfactory cues for pinnipeds are known to be important in nature, yet have rarely been considered in captive settings (Brochon *et al.*, 2021). Odorized enrichment could increase the interest pinnipeds show novel objects placed in their enclosures (see endnote 397)—it is concerning that olfaction has rarely, if ever, been considered key to pinniped welfare prior to this study.

314. See endnote 310.

Polar Bears

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

316. Clubb and Mason (2003; 2007).

317. Stereotypies are repetitive, generally negative behaviors that often manifest in captive animals whose movements or natural behavioral expressions are restricted. They include pacing, swaying, and self-mutilation and are seen in a good number of taxa in captivity, including primates, elephants, polar bears, cetaceans, and big cats (see, e.g., Swaisgood and Shepherdson, 2006).

318. 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, the predatory marine mammals are not alone in developing 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).

319. A quintessential quote reflecting this error in logic was made by Brad Andrews, a SeaWorld representative at the time. 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.

320. 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).

321. In an article discussing a controversy about inappropriate captivity practices for elephants, the conservation and science director of the AZA, in mentioning the then-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).

322. 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.

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

324. 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 (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.

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 (3,337 square ft) for two bears. In contrast, Sweden's 1982 space requirement for two adult polar bears was approximately 1,200 square m (12,917 square ft), and the standard for two adult polar bears in Newfoundland is 4,500 square m (48,438 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 322).

As of June 2023, the regulatory and guideline situation in Canada had improved only slightly. The Canadian Department of the Environment's webpage on polar bears states, "The Polar Bear Protection Act and Regulations allow orphaned cubs[,] or older bears that cannot be released back to the wild, to be transferred under a perpetual loan agreement from Manitoba to zoos that meet or exceed the facility and husbandry standards established in The Act and Regulations" (https://www.polarbearscanada.ca/en/manitoba).

In 2022, Bill S-241 (also known as the Jane Goodall Act; https://www.parl.ca/DocumentViewer/en/44-1/bill/S-241/first-reading) was introduced in the Canadian Parliament. If passed, it may more comprehensively regulate wildlife, including polar bears and other marine mammals, in captivity in Canada, end their holding and use in some circumstances, including entertainment, and facilitate improvements to their captive husbandry and welfare.

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" for 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 (Rob Laidlaw, personal communication, 2023). Zoocheck Canada funded a study to look at options for orphaned polar bear cubs, including, among other ideas, revisiting the surrogacy program with improved GPS tracking technology. The study's release was delayed by the COVID-19 pandemic, but should be published sometime in 2023.

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 321).

325. Laidlaw (1998).

326. https://web2.gov.mb.ca/laws/statutes/ccsm/_pdf.php?cap=p94.

327. 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 (5,382 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).

Sirenians and Sea Otters.

328. 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 (Rose, personal observation). See also Walsh and Blyde (2017).

329. Walsh and Blyde (2017).

330. 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).

331. "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; see also the description of natural sea otter behavior in Rose *et al.*, 2017).

332. 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 Nicolas 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).

333. 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 sea otters, facilities add those that are considered non-releasable to their captive collections, thus replenishing their numbers. 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 336 for another rescue program that genuinely seeks to return orphaned otter pups to the wild and endnote 465 for other captive otter mortality statistics.

334. There may be only three sea otters left in Japan (Miki, 2023). 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 (https://www.iucnredlist.org/species/7750/219377647). 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, "There 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).

335. 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 198). 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).

336. Found in California waters, the southern sea otter population (*Enhydra lutris nereis*) is listed as threatened under the ESA. At the Monterey Bay Aquarium, live-stranded, orphaned otter pups from this population were once raised by human caretakers, often to die soon after. For more than two decades, these pups have been placed into a surrogate-rearing program, where the non-releasable adult females from the aquarium's sea otter exhibit adopt the orphans and care for them, specifically to teach them better survival and social skills and minimize acclimation to humans. This has resulted in high survival rates following release into the wild (Nicholson *et al.*, 2007; Mayer *et al.*, 2021).

Cetaceans

337. 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).

338. 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 example, 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 (http://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/or too cold for the other.

339. 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 home 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, such as right-angled tank corners, can promote reverberation, which would be problematic), 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. While the industry has studied the characteristics of echolocation clicks in captive dolphins (where the subjects echolocate on cue), it has not examined the relatively infrequent spontaneous use of echolocation in captive enclosures in any detail.

340. 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; Lauderdale *et al.*, 2021a; see also endnote 346) 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.

341. 9 CFR § 3.104(b)(1)(i). See also Rose *et al.* (2017).

342. 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).

Despite the obvious need for systematic studies examining whether captive cetacean behavior (such as activity budgets) is the same as, or significantly different from, that of free-ranging animals and the potential welfare implications of the results, a recent study—conducted post-*Blackfish*—noted that its recording of activity budgets using biologgers was "the first of [its] kind for dolphins in a managed environment" (p. 798 of Shorter *et al.*, 2017). The ability to examine captive dolphin activity budgets using technology, whether with tags or video, or direct observation (including at night), has been possible for decades, yet it took the scrutiny resulting from *Blackfish* before the industry allowed studies like this to be undertaken or published. The results of Shorter *et al.* (2017) were preliminary—only five dolphins were included and they wore the tags primarily during the day and only for a few hours at a time. One telling aspect of the methodology was the researchers did not measure speed when the animals were "swimming" (Shorter *et al.*, 2017). In their discussion, the researchers implied the time captive dolphins spent "swimming" was similar to the time free-ranging dolphins spent "traveling" (swimming in a straight line at 1.8 m per second on average; see, e.g., Ridoux *et al.*, 1997); however, without knowing the speed at which the captive animals were swimming within their enclosure, some of this "swimming" may have in fact been rest (swimming at less than 1 m per second; see below). This suggests that captive dolphins spend less time "traveling" than free-ranging dolphins, a result that has obvious implications for captive dolphin health and welfare.

Another study also published in 2017 (Walker *et al.*, 2017) used direct observation to develop activity budgets for nine bottlenose dolphins in a public display facility (interestingly, this facility was Marine Life Oceanarium, which was destroyed in Hurricane Katrina in 2005—see endnote 303—but the observations were made in 2001). This study did observe the animals over 24 hours, a significant improvement on other studies purporting to assess captive cetacean activity budgets. However, the researchers did not distinguish between "low intensity swim" and "rest"; in fact, they defined "rest" as being motionless, which is not a natural definition. Regardless, they recorded that the dolphins spent most of their time in "low intensity swim" (again implying that this was the same as "travel" in free-ranging dolphins), with one older male spending about 70 percent of his time either motionless (approximately 25 percent, a truly excessive amount of time for this species) or in low intensity swim (approximately 45 percent). All the dolphins spent the majority of nighttime hours (90 percent) in rest or low intensity swimming; the researchers noted this indicated the animals had adopted a diurnal activity pattern, which "is not surprising, as those times correlate with facility hours and when animals would be engaged with animal care staff" (p. 9 of Walker *et al.*, 2017). So despite the spin on the interpretation of results, this study's results themselves support the argument that captive dolphins are far less active—with all the associated health and welfare impacts—than free-ranging dolphins.

Thirty years after Goldblatt's observation (1993), not much has changed in terms of understanding the specifics of how captive conditions, such as the limited space provided by most tanks, might 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 applied, based on how and where it has been cited since it was published (see also endnote 175). However, a study began in early 2018 (see Chapter 3, "Industry Research" and endnotes 158–175), involving 43 (originally 44) facilities in seven countries, sampling hundreds of dolphins, belugas, and other species with the intent of collecting over 7,000 hours of data (Ruppenthal, 2018a).

It is concerning that this multi-facility study did not include orcas, the species that may suffer the most significant welfare impacts of all the captive cetacean species (all the larger commonly held species—beluga, pilot, and false killer whales—have similar problems). 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 above). Also of concern, this multi-facility study did not do a similar activity budget assessment for the species it did include.

Clegg *et al.* (2017) noted that there are still "very few studies on cetacean welfare and methods of assessment" (p. 165), a conclusion with which the industry apparently agreed, as it has produced a fair number of such studies in the years since (see Chapter 3, "Industry Research"). 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 serve as indicators of welfare). These factors included monitoring health, although the authors noted that cetaceans frequently hide pain and disease, and 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 10, "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., Kirby, 2015). Rita Stacey, curator of marine mammals at the Brookfield Zoo, said, "When our animals are doing the same sorts of behaviors that dolphins do in the wild, when they're healthy, they're disease-free and *they reproduce*, we have a lot of indicators that say our animals are thriving in our care" (emphasis added; Lourgos, 2019).

343. 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 ft) long, not counting the tail) in a circular pen 2.5 m (8 ft) across, and just over a meter (3.7 ft) high for their entire lives.

344. Durban and Pitman (2012); Matthews *et al.* (2011); Eisert *et al.* (2015).

345. Baird *et al.* (2005); Reisinger *et al.* (2015).

346. 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).

347. 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 311).

348. See endnote 46. 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 suggesting 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 340). 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.

349. For an introduction to the natural history of the northeast Pacific populations of orcas, see Ford *et al.* (1994) and Ford (2018).

350. 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 5, "The Physical and Social Environment—Polar Bears"; Clubb and Mason, 2007). 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.

351. "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). Despite the recent spate of welfare studies published by industry-affiliated or approved researchers, few have focused on stereotypic swimming patterns in cetaceans and there is still a lack of effort to determine physiological correlates to connect such patterns to cetacean welfare state (see, e.g., Serres *et al.*, 2020).

352. For detailed technical descriptions of the social structure of the northeast Pacific populations of orcas, see Bigg *et al.* (1990) and Ford (2018).

353. Animal welfare scientists recognize, with social species such as most marine mammals, that "keeping animals in appropriate social groupings, and with the required space and complexity to allow individuals to choose to spend time together or apart, is likely to be the most important welfare consideration" (p. 85 in Brando *et al.*, 2017). However, "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).

354. 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).

355. 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.

356. Margaux Dodds, personal communication, 2018.

357. Dolphinaris Arizona, a dolphinarium near Scottsdale, Arizona, in the United States, was another controversial facility built in a desert. The $20 million facility (Leavitt, 2016) was attracting protests even before it opened in October 2016, as the first stand-alone dolphinarium built in the United States in years. A number of animal protection groups expressed their concerns about constructing a dolphinarium in the desert, especially one known to harbor Valley fever (Galgiani, 2022). In addition, the dolphins would be exposed to the hot desert sun with little if any shade and a very shallow tank (only 3 m (10 ft) deep), meaning being underwater would give only a small amount of protection from ultraviolet light (see, e.g., Dunne and Brown, 1996; Wilson *et al.*, 2012). Ultimately, the protesters proved prescient; four dolphins died within the first two and a quarter years of operation, leading to the facility's closure in 2019.

The facility's parent company, Ventura Entertainment, operates a number of SWD facilities in Mexico. Dolphinaris Arizona started with eight bottlenose dolphins, four from facilities in Mexico, one from Six Flags, California, and three on loan from the US-based company Dolphin Quest (Longhi, 2019).

The first death occurred 11 months after the grand opening, in September 2017. The male dolphin was 7 years of age, and Dolphinaris claimed the cause of death was mucormycosis, a fungal disease of the muscles that typically only attacks humans with weakened immune systems (Spellberg *et al.*, 2005; Petrikkos *et al.*, 2012; Center for Disease Control, 2021). A second dolphin died (aged 10) from a bacterial infection in May 2018 and a third (aged 11) from a parasitic infection in December that year (Clifton, 2019a).

The facility's general manager, Christian Schaeffer, told the media that this last dolphin was already suffering from the parasitic infection before being sent to Arizona. If this was the case, it calls into question the veterinary practices of the company, as a dolphin with an active infection should not have been transported (it was the third transfer for that particular dolphin in less than four years; Clifton, 2019a). Indeed, a dolphin with an active parasitic infection should not have been participating in an SWD program, especially as this water-borne parasite could be transferred to humans (e.g., Fayer, 2004).

In January 2019, one of the dolphins originating from Dolphin Quest was euthanized. Within days, Dolphin Quest announced that it was terminating the loan of its two remaining dolphins to Dolphinaris. On 5 February 2019, Dolphinaris announced that it was temporarily closing down to assess its situation (Frank and Longhi, 2019), a closure that became permanent barely two weeks later (Gallen, 2019). The four surviving dolphins, including the two from Dolphin Quest, were shipped to Coral World Ocean Park in St. Thomas in the US Virgin Islands soon after (Clifton, 2019b; see endnote 298). It should be noted that in addition to the four animals who died at Dolphinaris Arizona, during the same period three dolphins died at Dolphinaris' facility in Riviera Maya, Mexico, and a further two at its Cozumel facility (Clifton, 2019b).

As a final example of dolphins not belonging in the desert, a controversial facility, Siegfried & Roy's Secret Garden and Dolphin Habitat at The Mirage in Las Vegas, Nevada, in the United States, closed permanently in November 2022 after three dolphin deaths within six months and a sale to Hard Rock International (Katsilometes, 2022). The first of the three dolphins, aged between 11 and 19 years, died in April 2022; the other two dolphins died in September 2022. A fourth dolphin, aged 48, died in January 2023 (Gutierrez, 2023). Public outcry about the deaths was persistent, and the new owner chose to close the exhibit as part of its makeover of the resort complex. This facility had been criticized since it opened in 1990 because, among other things, there was no shade for the animals in Las Vegas' desert sun and heat. Three of the remaining six dolphins were relocated to SeaWorld in February 2023 (Emerson and Andre, 2023). In May 2023, the final three dolphins were transferred to Coral World in St. Thomas, to join the original four from Dolphinaris (see endnote 298), two from Bermuda (transferred in 2022), and one calf born in October 2022 (see https://www.cetabase.org/inventory/coral-world/).

CHAPTER 6: ANIMAL HEALTH ISSUES AND VETERINARY CARE

358. 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); pp. 21–22 in Brando *et al.* (2018); and pp. 719–721 in Rosen and Worthy (2018). Rosen and Worthy (2018) note, "Both 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 result in loss of water content (and water-soluble vitamins). Water supplementation is usually provided via gelatin blocks—a large proportion of their mass is freshwater—as several marine mammal species will not drink at all.

359. 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).

360. 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 (see, e.g., Associated Press, 1995). As another example, in a now iconic aerial shot, Tilikum, the male orca responsible for the deaths of three people (see Chapter 13, "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 109) 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 138).

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 (Surdin, 2006)—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.

361. For information on the practice of administering routine medications, see Gulland *et al.* (2018). Also see the Society for Marine Mammalogy (2014), which has guidelines produced by its Ethics Committee.

362. Lott and Williamson (2017); Haulena and Schmitt (2018).

As an example of a transport and import with tremendous fallout, in December 2020, Mystic Aquarium informed NMFS that three of the five beluga whales to be imported were too ill for the move and requested three substitutes (see NMFS webpage in endnote 286). Supposedly healthy individuals of the same sex and similar in age were chosen to replace the original three, who remained behind at Marineland. APHIS requires that a veterinarian examine live animals being imported into the country 10 days prior to transport, at which time the whales—two originals and three substitutes—were given clean bills of health. In May 2021, they were transferred to Connecticut. One of these whales (a substitute named Havok, a 5-year-old male), despite passing his pre-transport exam, actually had ulcers in his throat, stomach, and throughout his gastrointestinal system and chronic inflammatory bowel disease at the time of the transfer (https://bit.ly/3TcAack). Transportation of marine mammals, particularly cetaceans, is stressful (see endnote 409), which undoubtedly exacerbated these conditions.

On 6 August 2021, only three months after his arrival at Mystic Aquarium, Havok died (Drummond, 2021). His death led APHIS to conduct an inspection of the aquarium in September 2021; the inspector reported three "critical" non-compliances of the AWA during the inspection (Gladue, 2021). Critical non-compliance is the most serious infraction of AWA regulations. Havok had been on a 24-hour watch because of health concerns; eight hours before he died, he started showing signs of extreme discomfort and distress. His respiration became "gaspy" (p. 1 in Gladue, 2021) and he started bleeding from an already-existing wound. However, Mystic staff monitoring Havok did not notify the attending veterinarian of these developments. The report stated that the "facility failed to provide adequate veterinary care by not using appropriate methods to prevent, control, diagnose and treat diseases during Havok's last eight hours" (p. 2 in Gladue, 2021).

The report also noted that Havok had poor vision and multiple injuries, including one caused by a collision with a gate separating two of the facility's three whale enclosures. After a period of acclimation in the back holding tanks when the five Marineland belugas first arrived, the caretakers opened this gate in June, to allow the newcomers into the main enclosure to mingle with the three resident whales. This introduction did not go smoothly. "A visitor dropped a foreign object in the main pool… in response to the foreign object, [the caretakers] closed the gate to the holding pool" (p. 2 in Gladue, 2021). When an attempt was made to retrieve the object, Havok was startled and swam in a panic toward the holding tank where he been held for the previous few weeks, a behavior that should have been anticipated, as Havok was known to have a "disposition for being 'spooked'" (p. 3 in Gladue, 2021). He was unable to see the gate was closed and collided with it, causing wounds to his upper jaw.

The third critical non-compliance was the poor condition of the enclosures holding the whales, resulting in Havok sustaining injuries when he collided with the walls. The inspection report highlighted that "[i]ndoor and outdoor housing facilities for marine mammals must be structurally sound and must be maintained in good repair to protect the animals from injury" (p. 3 in Gladue, 2021), and clearly this was not the case.

The report also criticized the fact that there was a lack of shade for animals and that ozone levels in the pool water were high, which could cause eye and skin irritation (see endnote 386) and respiratory problems.

A second (original) imported beluga, a 6-year-old female named Havana, died on 11 February 2022. The aquarium stated that the whale had "numerous significant lesions indicating storage disease in the whale's brain and spinal cord" and died from "acute cardiac failure" (Hardaway, 2022). For several months, Havana had been "demonstrating episodic abnormal behavior including abnormal swimming, contacting walls, and appearing as though she could not see" (Mystic Aquarium's Senior Vice President of Mission Programs, Katie Cubina, quoted in Hardaway, 2022). In addition, two days before her death, Havana "exhibited abnormal respirations and lethargic behavior" (Cubina, quoted in Hardaway, 2022). An APHIS inspection held at the aquarium just before Havana's death had noted coliform bacterial levels greatly exceeding marine mammal standards (Hardaway, 2022).

Mystic Aquarium acknowledged that Havok had a "preexisting condition" before import, in its Instagram post the day of his death. This belies its stated commitment (https://bit.ly/427wXyQ) to import only healthy animals when it asked to substitute other individuals for the sick whales it had originally chosen for import. Mystic Aquarium is fully responsible for the tragic loss of 40 percent of the young whales it imported.

363. 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).

364. See, e.g., Padgett and Glaser (2003); Segerstrom and Miller (2004); https://medlineplus.gov/ency/article/000093.htm; https://www.healthline.com/health/pneumonia-weakened-immune-system. Regarding captive marine mammals, Field (2022) notes, "Pneumonia often can be the result of errors in management, although pneumonia-associated death is common even in carefully managed captive animals. Marine mammals require good air quality, including high rates of air exchange at the water surface in indoor facilities.

365. In 2017, three orcas died at SeaWorld, each of whom was subject to a public display permit under the MMPA that required the holder of the animal at the time of his or her death to submit necropsy and clinical history information to NMFS. Following each death, AWI and other animal protection groups tried 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. (Three other orcas have died at SeaWorld since 2017—Kayla (died January 2019, 30 years of age), Amaya (died August 2021, 6 years of age), and Nakai (died August 2022, 20 years of age).)

In practice, the US public historically could not see full necropsy reports unless requested under the Freedom of Information Act (FOIA) (5 USC § 552), and has not seen any for public display animals since 1994, when the MMPA

was amended (see endnote 311). When the necropsy reports for the three 2017 deaths were requested under FOIA, NMFS took the position that the 1994 amendments to the MMPA negated the agency's authority to enforce these permit provisions, but the agency refused to explain the legal basis for that position. As a last resort, the animal protection groups turned to litigation. See *Animal Welfare Inst. v. Nat'l Oceanic and Atmospheric Admin.*, 370 F.Supp.3d 116 (D.D.C. 2019), in which the plaintiffs sought to compel NMFS to respond to a request under FOIA to disclose its legal rationale. Although the court refused to order the agency to release that rationale, the case resulted in the release of over 500 documents, from which plaintiffs learned, for example, that there are over 220 relevant MMPA permits. In a second suit, plaintiffs sought a declaration that NMFS' belief that it lacks the legal authority to enforce the necropsy and related provisions of the pre-1994 permits was unlawful. The district court never addressed the merits of the case, however, as it found plaintiffs lacked standing, and the appellate court agreed. See *Marino v. Nat'l Oceanic and Atmospheric Admin.*, 451 F.Supp.3d 55 (2020), *aff'd* 33 F.4th 593 (D.C. Cir. 2022). For more on the provisions of these pre-1994 permits, see Rally *et al.* (2018) and Stone (2018).

366. Tryland *et al.* (2018); see endnote 387.

367. Higgins and Hendrickson (2013).

368. The "dolphin's smile" is merely an anatomical quirk—a fixed expression regardless of the animal's mood. A dolphin smiles even when dead.

369. 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 (United Press International, 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.

370. 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). In February 2012, Taijah, a 1.5-year-old bottlenose dolphin calf at the Minnesota Zoo, stopped nursing on a Monday morning and stopped eating fish that afternoon. By later that night, she was dead (Fleming, 2012).

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."

371. Higgins and Hendrickson (2013); Haulena and Schmitt (2018).

372. 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.

373. 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) (Venn-Watson *et al.*, 2015).

Another possible explanation for this pattern is that 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). Earlier tag technology recorded offshore bottlenose dolphins diving as deep as 450 m (1,476 ft) (Klatsky *et al.*, 2007) and holding their breath for at least eight minutes (Corkeron and Martin, 2004). More recent tags have recorded offshore dolphins diving as deep as 1000 m (3,280 ft) for almost 14 minutes (Fahlman *et al.*, 2023).

In contrast, captive dolphins spend much of their time at or near the surface. In fact, they spend at least 25 percent of their time with their heads fully above the water, waiting for food or direction from their trainers (Galhardo *et al.*, 1996; this percentage was confirmed in a more recent study, where dolphins spent roughly 28 percent of their time more or less stationary at the surface of their enclosure; Shorter *et al.*, 2017), and never dive deeper than a tank allows; most dolphin tanks are shallower than 10 m (33 ft). 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 we hypothesize may result in 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 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) (Venn-Watson *et al.*, 2015; Rose *et al.*, 2017; Raju and Venkataramappa, 2018).

374. 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 a few 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.

375. 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, slightly raised gray patches on the surface of a dolphin's skin, is widespread (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*.

376. 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).

377. 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.*, 2009a).

378. Buck *et al.* (1987); Zappulli *et al.* (2005).

379. Ventre and Jett (2015).

380. Waples and Gales (2002) describe 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 (see, e.g., Sachser *et al.*, 1998). In captivity, animals have been frequently transferred between facilities and enclosures, which results in new combinations of animals, destabilizing old and creating new hierarchies, which leads to repeated aggressive interactions as animals try to assert their dominance over newly introduced individuals.

381. 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 369, 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).

382. Dima and Gache (2004) reported that the most common causes of death for the dolphins in the 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).

383. Buck *et al.* (1993); St. Leger *et al.* (2011); Jett and Ventre (2012).

384. 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. In the wild, this behavior makes up a miniscule proportion of their daily activity profile; in captivity, more than half of their day can be spent logging. Mosquito-borne illness, therefore, seems to be a risk unique to captive orcas.

385. Couquiaud (2005). APHIS does not currently require providing shade to protect marine mammal eyes (Rose *et al.*, 2017), despite the obvious need for it. However, APHIS recommends providing "shelter" that shades marine mammals (such as umbrellas or building walls), so when they look up at a trainer, they are not gazing directly at the sun (see endnote 386). APHIS considers eye protection under 9 CFR Part 2 Subpart I § 2.131(b)(1) (2004), which states, "Handling of all animals shall be done as expeditiously and carefully as possible in a manner that does not cause trauma, overheating, excessive cooling, behavioral stress, physical harm, or unnecessary discomfort." Therefore, providing shade is merely an option for eye protection under § 2.131(b)(1), not a requirement.

386. Eye pathologies have been examined in pinnipeds (Colitz *et al.*, 2010; Gage, 2011), and more recently in cetaceans (Colitz *et al.*, 2016; Nollens *et al.*, 2018). "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). This was an issue noted in the June 2021 APHIS inspection report for Miami Seaquarium (see endnote 250; the report noted that "several marine mammal pools lacked sufficient shelter to protect the animals from direct sunlight. … Many dolphins were looking directly into the sunlight during training and interactions. A number of bottlenose dolphins have eye lesions" (p. 7–8 in Gonzalez, 2021)). Another element of captive conditions that may exacerbate eye problems for marine mammals is oxidants in the water, byproducts of interactions with ozone (Nollens *et al.*, 2018; Gomes *et al.*, 2020). Colitz *et al.* (2016) noted that "cetaceans under human care may develop ophthalmologic problems. The most common lesions are [various] keratopath[ies] … suggested to be due to environmental factors. Other lesions include traumatic corneal and eyelid lesions. Cataracts were diagnosed, and most also had concurrent corneal lesions. … Clinical signs of pain … should be identified, diagnosed, and treated aggressively. In addition, shade structures and other methods to reduce UV index may be beneficial in diminishing keratopathy" (p. 18) in captive dolphins. "Good water quality, with low residual oxidants, is paramount for both prevention and treatment of corneal injuries" in dolphins (p. 900 in Nollens *et al.*, 2018).

Lack of shelter was also noted in a September 2021 APHIS inspection report for Coral World (Chapman, 2021; 2022; see endnote 298). The inspection documents included a site visit report by one of the inspectors, who noted a concern about lack of shade at this sea pen facility (Gage, 2021). The failure to provide shade (even after the inspectors addressed the lack of shade to trainers on-site—one trainer continued to handle a dolphin without shade even as the inspectors looked on) was initially cited as a non-compliance (Chapman, 2021), but when Coral World appealed this citation, the non-compliance was downgraded to a "teachable moment" (Chapman, 2022).

387. Gili *et al.* (2017). Methicillin-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.

388. Graham and Dow (1990); Ventre and Jett (2015); Visser and Lisker (2016); Jett *et al.* (2017); see also endnote 389. Other marine mammals have been known to break their teeth in captivity, notably walruses. These pinnipeds have been known to break their tusks when 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.

389. 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 658), 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).

390. 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 over 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 from free-ranging populations that show extreme tooth wear: (1) 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 (2) 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 372), 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.

391. Ford *et al.* (2011).

392. See, e.g., http://www.seaworldfactcheck.com/teeth.htm, which quotes "Ask SeaWorld's" Twitter feed to this effect.

393. 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 captive orcas and other cetaceans might lead to health problems have not been published in the scientific literature, although it is an obvious topic to pursue.

CHAPTER 7: BEHAVIOR

394. The impact of losing foraging/hunting opportunities in captivity 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, "The 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). More recently, Brando *et al.* (2018) noted that "for large apex predators such as polar bears and orcas, the thwarting of hunting behavior may be a cause of poor welfare, linked to the development of abnormal behavior. … There are reports of cetaceans opportunistically capturing and eating wild birds … and of dolphins in sea pens capturing fishes, crabs and lobsters. … This suggests the urge to hunt can still be present in captivity, even when free food is provided" (p. 27).

395. 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 also endnote 382). 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.

396. 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). In one study, only 50 percent of provided objects elicited a manipulative response in captive dolphins (Delfour and Beyer, 2012). In another, sea lions quickly lost interest in the devices and objects provided as enrichment (Brochon *et al.*, 2021). A study that looked at a specific type of submerged interactive enrichment device—unsurprisingly more engaging than inanimate toys—found that its provision increased dolphin social and underwater activity (Lauderdale and Miller, 2020). Another study found that introducing novel items for enrichment purposes to captive dolphins reduced unwanted (repetitive swimming) behaviors, but also elicited unintended responses, including agonistic interactions (Lyn *et al.*, 2020). This result emphasizes that how marine mammals perceive "enrichment" items may not match how caretakers view the items.

397. 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).

398. Brando *et al.*, 2018. They note that training has been used to increase dolphin interest in objects and to encourage object play. However, they state, "The criticism here is that rather than being intrinsically motivated to explore the objects, the dolphins' behaviour was 'engineered'" (p. 27).

399. In the July 2022 inspection report for Miami Seaquarium, which was a "focused" inspection resulting from a complaint filed about the emaciated body condition seen in some dolphins there, the inspector discovered that dolphins had had their fish rations cut in March 2022 to 60 percent of their January 2022 levels—one dolphin lost 100 lb within three months of this ration cut, a weight loss neither normal nor safe in this time frame (Gonzalez, 2022). This ration cut was reportedly done without the approval of the attending veterinarian (a violation of APHIS regulations), but it is difficult to comprehend how the veterinarian could have missed such a severe weight loss, which would have noticeably occurred over the course of weeks. The staff stated that the ration cut was "for the purpose of ensuring the animals performed for the guest interactions" (p. 5 of Gonzalez, 2022), so clearly, while food deprivation as a training method is no longer common in the industry, it still occurs.

400. Free-ranging marine mammals do not necessarily exhibit the human diurnal (daytime) activity cycle; that is, they are not necessarily active during the day and resting/sleeping at night. Cetaceans in particular are active whenever they need to be, as light/vision is not essential to their activity cycles due to their echolocation abilities (see endnote 339). In captivity, the human workday governs captive wildlife activity cycles (see, e.g., Brando *et al.*, 2017) and animals are left to their own devices in their enclosures all night long, often relatively inactive for most of the night (for example, bottlenose dolphins in one study spent 90 percent of nighttime hours resting or in low intensity swimming; Walker *et al.*, 2017), a pattern that is not natural at all.

401. "Life in a controlled environment may impede certain aspects of normal social dynamics" (p. 296 in Couquiaud, 2005).

402. The extreme example of this was the fatal 1989 interaction between Kandu V and Corky II at SeaWorld San Diego (see endnote 296 and Chapter 12, "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 380.

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).

403. A recent review of the literature and available evidence supports the hypothesis that the cetacean brain is negatively affected when exposed long-term to the confined and impoverished environment of captive enclosures, most particularly when born and raised in such an environment (Jacobs *et al.*, 2022).

CHAPTER 8: STRESS

404. 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.

405. 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).

406. 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); Marino *et al.* (2020); Unal and Romano (2021); 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 the industry has only started laying the groundwork for this research (see, e.g., Unal and Romano, 2021).

407. For extended discussions of these stress effects, see Keller *et al.* (1991); Sapolsky (1994); Apanius (1998); Mass (2000); Moberg (2000); Reeder and Kramer (2005); Deak (2007); Romero and Butler (2007); and Busch and Hayward (2009).

408. 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).

409. Nielsen (1999). For a specific example in cetaceans, see the immune system response to transport stress in Spoon and Romano (2012). Note also endnote 58, regarding the response of vaquita individuals to capture.

410. See, e.g., Clubb and Mason (2007); Marino *et al.* (2020).

411. 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).

412. A good review of stress in dolphins caused by chase and handling, by the NMFS 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. Research since then has substantiated Curry's conclusions.

413. Small and DeMaster (1995a).

414. 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 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.

415. Small and DeMaster (1995b).

416. Ugaz *et al.* (2009; 2013).

417. Papers with examples of this include McBride and Hebb (1948); Caldwell and Caldwell (1977); Samuels and Gifford (1997); and Spoon and Romano (2012).

418. Waples and Gales (2002); see endnote 380.

419. "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).

420. Stirling (2011).

CHAPTER 9: CETACEAN INTELLIGENCE

421. Manger (2006).

422. Marino *et al.* (2008).

423. Gregg (2013).

424. Shiffman (2013).

425. Page 217 in Gregg (2013).

426. Page 216 in Gregg (2013).

427. Humans were using stone tools until the end of the Neolithic Age (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—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 428). 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.

428. 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, 2013). 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, "Dr Gregg is the co-editor of *Aquatic Mammals*, a journal funded by the International Marine Animal Trainer's 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).

429. 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).

430. 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).

431. Caldwell *et al.* (1989).

432. 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).

433. Janik (2000).

434. Terrace (1985); Wilkins and Wakefield (1995).

435. Miller *et al.* (2004).

436. McCowan *et al.* (1999).

437. Reiss and McCowan (1993).

438. Richards *et al.* (1984).

439. 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 four 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).

440. Herman (1986).

441. Úbeda *et al.* (2018).

442. 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."

443. Herman *et al.* (1994).

444. Abramson *et al.* (2013).

445. Yaman *et al.* (2004).

446. Jaakkola *et al.* (2005).

447. 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).

448. 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.

449. Marten and Psarakos (1995); Reiss and Marino (2001).

450. Delfour and Marten (2001).

451. Gallup (1970; 1982); Suarez and Gallup (1981); Anderson (1984).

452. Amsterdam (1972).

453. 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.

454. 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 days (see, e.g., Fertl and Schiro, 1994; Reggente *et al.*, 2016). The Southern Resident orca J35 was recorded carrying her calf for 17 days (Mapes, 2018b). This is interpreted by some 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.

455. 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.

456. 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 10: MORTALITY AND BIRTH RATES

457. See endnote 365.

458. 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.

459. Clegg *et al.* (2017).

460. Clubb and Mason (2003; 2007).

461. In a study of captive birth rates of 44 species, Farquharson *et al.* (2018) concluded that "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. 7).

Pinnipeds, Sirenians, Polar Bears, and Sea Otters

462. Average annual mortality rates for additional pinnipeds in captivity (older than one 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).

463. 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 three 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. 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.

464. South American sea lions and northern fur seals (*Callorhinus ursinus*) in captivity have a pup mortality rate of 66.2 percent and 66.8 percent, respectively (Roberts and DeMaster, 2001).

465. 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 333 notes that the mortality rate for animals held from 1955 to 1996 was higher), whereas annual 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).

466. See http://www.chinacetaceanalliance.org for details of specific facilities and the possible or admitted sources for their exhibited pinnipeds.

467. Twenty-five years ago, California sea lion pup annual mortality rate in captivity was 14.2 percent on average (Small and DeMaster, 1995b), while mortality rates in the wild are much higher—the result of a high level of hookworm parasites in pups (https://www.fisheries.noaa.gov/inport/item/25769) and predation rates.

468. "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, females put on contraceptives, and/or males castrated (Robeck *et al.*, 2018). See endnote 469.

469. Chemical contraceptives help prevent pregnancy by disrupting the normal hormone cycle of intact animals to prevent the development and release of gametes (sperm or eggs) and/or alter the environment of the reproductive tract. Some can be used in both males and females, while others are effective for use in females only. The benefit of chemical contraceptives is that animals do not need to be separated to prevent pregnancy. Separation may cause stress in stable social groups, such as those with mothers and older male offspring. However, there may be side effects (behavioral or physiological, or pathology changes), and challenges with administration may lead to inconsistent dosing and variable efficacy.

The two primary categories of chemical contraceptives are synthetic progestins and gonadotropin-releasing hormone agonists (chemicals that

block the release of hormones needed to make gametes). Administration varies by product and includes oral, injectable, and time-release implants. The progestin-based product Regumate has been routinely used on pinnipeds and bottlenose dolphins (Asa and Porton, 2005; Calle, 2005). Reactions at the injection site have been noted in pinnipeds, and conception has occurred at least once while using Regumate, with a subsequent loss of the calf, in bottlenose dolphins (Robeck *et al.*, 2012).

The effectiveness of chemical contraceptives varies by individual and species. Appropriate doses, side effects, and the long-term impact of chemical contraceptives on marine mammals are still under investigation; however, these drugs are commonly administered to cetaceans in captivity. Out of 344 documented cases of contraceptive use in captive bottlenose dolphins at AZA facilities, only three failures have been reported, and two of these are presumed to be related to inappropriate dosing. Thus, substantial data exist to suggest that appropriately administered chemical contraceptives are relatively safe and effective in captive cetaceans (Heather Rally, DVM, personal communication, 2022).

Immunocontraceptives have also been used on pinnipeds. These work by stimulating the animal's immune system to attack reproductive cells or block hormones involved in making gametes. However, their duration of efficacy, safety, and long-term effects are not well known in cetaceans.

470. Age at death was obtained for 598 individual polar bears born in captivity. Only one-third lived to adulthood (past 4 years of age) (Curry *et al.*, 2015).

471. Laidlaw (2010).

Bottlenose Dolphins

472. These studies include DeMaster and Drevenak (1988), Duffield and Wells (1991), and Jaakkola and Willis (2019)—see endnote 476—as well as several unpublished studies presented at industry conferences.

473. 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, while held in San Diego Harbor (very noisy and busy with vessel traffic), are also 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 (33 ft, 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.

474. Long (2018).

475. 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 4 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.

476. Page 1418 in Jaakkola and Willis (2019). This study noted an annual survivorship rate (ASR) of 0.978 (97.8 percent of the population survived from year to year) in dolphins older than one year of age from various facilities, from 2003 to 2012. The survivorship rates in earlier years were significantly lower. From 1974 to 1982, 91.8 percent of all dolphins in these facilities survived to the next year, 94.9 percent survived each year from 1983 to 1991, and 95.7 percent survived annually from 1993 to 2001. Calf survival to the age of 1 was 61 percent from 1974 to 1982, 54 percent from 1983 to 1991, 81 percent from 1993 to 2002, and 83 percent from 2003 to 2012 (suggesting calf survivorship is more variable in captivity than adult survivorship).

Jaakkola and Willis primarily compared the captive ASRs they calculated to that of the dolphin population in Sarasota Bay, where Wells and Scott (1990) calculated an ASR of 96.1 percent. This ASR was based on sightings of identifiable individuals in the population and was thus likely an underestimate of survivorship, as some animals likely dispersed (emigrated) outside of the study area rather than died (although they were treated as if dead). Wells and Scott reported approximately 81 percent of Sarasota calves survived to age 1.

Lacy *et al.* (2021) conducted a more recent survivorship analysis for the Sarasota dolphin population. For dolphins aged 1–5 years, the disappearance rate (i.e., when identified dolphins are no longer observed) was 8.1 percent. However, as noted above, many of these young animals are likely dispersing and emigrating to new locations. The annual rate of *known* deaths in this well-studied population for this age group was only 1.83 percent. For prime-of-life adults (5–25 years), the disappearance rate was 2.58 percent, which is similar to the captive mortality rate calculated by Jaakkola and Willis (2019), but again, some of these animals likely emigrated rather than died, and the known mortality rate was lower—1.02 percent.

Above the age of 25, mortality rate increased in Sarasota (Lacy *et al.*, 2021). Disappearance rate in females only (there were not enough data on males) was 5.84 percent, with known deaths 3.56 percent. Very few captive dolphins live past the age of 25, so there are no comparable data on mortality in captive dolphins. Jaakkola and Willis calculated a mean life expectancy of 28.2 years and a median life expectancy of 29.2 years in captivity. The oldest Sarasota dolphin included in Lacy *et al.* (2021) was 68 years of age when she died—the oldest known captive dolphin, Nellie, was 61 when she died (Messenger, 2014).

This highlights that the present-day survivorship rates of captive dolphins are only comparable to the Sarasota population if all missing Sarasota dolphins are assumed dead, when some have undoubtedly simply dispersed to other nearby populations (unlike many orca populations, free-ranging bottlenose dolphins do emigrate out of their natal populations) (see, e.g., Manlik *et al.*, 2016).

477. See endnote 476. The dolphin population primarily used for comparison in studies looking at captive dolphin survivorship is in Sarasota Bay and faces a wide diversity of natural and human-caused impacts; see, e.g., Lahvis *et al.*, 1995; Duignan *et al.*, 1996; Wells and Scott, 1994, 1997, 1999; Wells *et al.*, 1998a, 2003, 2005, 2008; Wilson *et al.*, 1999; Nowacek *et al.*, 2001; Buckstaff, 2004; Cunningham-Smith *et al.*, 2006; Fire *et al.*, 2006; Houde *et al.*, 2005, 2006a, 2006b, 2006c; Woshner *et al.*, 2008; Esch *et al.*, 2009; Wilkinson *et al.*, 2017; Kucklick *et al.*, 2022; https://sarasotadolphin.org/.

478. The other free-ranging dolphin populations to which Jaakkola and Willis (2019) compared their captive data are in the Mississippi Sound region of the Gulf of Mexico (Mattson *et al.*, 2006) and the Indian River Lagoon system in Florida (Stolen and Barlow, 2003). These studies extracted teeth from stranded dolphin carcasses to get age distributions.

The age distribution of the Mississippi Sound dolphins may be skewed due to the capture of more than 200 dolphins from this population over a 20-year period for the purpose of public display. This population was also subject to "unusual mortality events" caused by a morbillivirus outbreak and possibly toxic algal blooms, leading to "ages [that] are younger than those of other studies" (p. 663 in Mattson *et al.*, 2006). For the Indian River Lagoon population, "few females live past 35 years and few males live past 30 years" (p. 645 in Stolen and Barlow, 2003). These maximum life spans are 10–17 years lower than those observed in Sarasota Bay (Wells and Scott, 1999). Moreover, "in the case of the Indian River population of bottlenose dolphins, human removals from the population (live captures for public display and research) may have caused systematic deviations from stable age structure and have biased the estimates of mortality rates" (p. 638 in Stolen and Barlow, 2003). Sixty-eight young dolphins were captured between 1973 and 1988 for public display at marine theme parks (Scott, 1990). In short, these two populations have age distributions skewed young, which would bias survivorship downward (as younger animals have higher mortality rates than prime-age

adults). The captive population therefore may *not* compare favorably with dolphin populations that have normal, undisturbed age distributions.

Making the comparison even less favorable, the Indian River Lagoon dolphins face additional causes of mortality. Stolen et al. (2007) noted that signs of human interaction were observed in at least 10.2 percent of stranded animals (e.g., wounds from fishing gear and debris entanglement; debris ingestion; deliberate mutilations; wounds from boat collision). The population also has a high prevalence of disease (e.g., Bossart *et al.*, 2003, 2006; Fair and Bossart, 2005; Reif *et al.*, 2006; Bossart *et al.*, 2017), which is potentially exacerbated by high levels of pollutants in the lagoon system (Bossart 1984; Hansen *et al.*, 2004; Reif *et al.*, 2006; Durden *et al.*, 2007).

479. There are bottlenose dolphin populations facing far fewer threats than in Florida or Mississippi, but data on their survivorship are often lacking, as such populations are not typically the focus of intense, long-term research projects, as the embattled US dolphins are. However, one such dolphin population, in Bunbury, Australia, had a calf annual mortality rate of 11.67 percent, a juvenile mortality rate of 3.08 percent, and an adult mortality rate of only 1.57 percent (Manlik *et al.*, 2016). Favorably comparing captive dolphin survivorship to the survivorship of free-ranging populations experiencing heavy impacts from human-caused threats is not the positive the public display industry seems to think it is. It seems clear that captive conditions affect dolphin survivorship in ways similar to the various threats facing many dolphins in the wild.

480. 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 based on incomplete datasets (Woodley *et al.*, 1997).

481. For information on causes of death of newborn calves, see NMFS, *National Inventory of Marine Mammals*. See also endnote 565.

482. Long (2018).

483. For example, the estimated annual infant mortality rate was 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 was 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 was 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).

484. Long (2018).

Orcas

485. Two SeaWorld documents from the 1990s originally made the claim of a 35-year life span for orcas. These were *The Facts about SeaWorld's Killer Whales* (SeaWorld, 1993), and *A Discussion of Killer Whale Longevity* (SeaWorld, 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, "When 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.

486. 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 few have.

487. Ford (2017).

488. It is highly likely that *at least* one of these females was actually older than 15 years of age at the start of this long-term study (given the unlikely circumstance that all three were exactly the same minimum age for adulthood), meaning she is more likely in her 70s or 80s. 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), Towers *et al.* (2015), and Towers *et al.* (2020). See also https://whalemuseum.org/collections/meet-the-whales; the Southern Resident catalog identifies an additional female, L25, who was also an adult when the southern study began (1976) and was still alive in 2022, meaning she too is at least 60 years of age (but likely older).

489. DeMaster and Drevenak (1988); Small and Demaster (1995b); Jett and Ventre (2015); Robeck *et al.* (2015); https://inherentlywild.co.uk/captive-orcas/. For a summary of the following, see Table 1.

Only three male orcas at SeaWorld have reached or exceeded 30 years of age: Orky, Tilikum, and Ulises (Orky of SeaWorld San Diego died in 1988 at approximately 30 years of age; Tilikum was born in approximately 1981 and died in 2017; Ulises was born in approximately 1977 and is still alive, so has achieved approximately 46 years of age). Only two other captive male orcas in other facilities have reached or exceeded 30 years of age (Bingo at Port of Nagoya Aquarium in Japan, who died in 2014 at age 32, and Kshamenk of Mundo Marino, Argentina, who was born in approximately 1988 and is still alive at 34).

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 in SeaWorld San Diego) were born in approximately 1976. Katina, at SeaWorld Orlando, has thus exceeded 45 years of age. Kayla (who died at the beginning of 2019 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 at 34 (she has never reproduced). 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 (Tokitae, still alive at Miami Seaquarium, is estimated to have been born in 1965—see endnote 250; Kiska, who died in March 2023 at Marineland in Canada, was estimated to have been born in 1976; Stella, still living at Port of Nagoya Public 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.

490. 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, miscarriages, or the 12 free-ranging orcas who are known to have died during the capture process.

491. Page 1362 in Jett and Ventre (2015).

492. 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.

493. Robeck *et al.* (2015) used ASRs to calculate this captive-born average life expectancy of 47.7 years (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. Deliberately excluding any free-ranging animals who could potentially be more than 40–45 years of age at the time of the analysis was clearly a major flaw in their methodology. 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 (the Southern Resident L25) is believed to be at least 80 years of age, but she and three other whales alive in 2022 in these northeast Pacific populations were *at least* 62 or 63; they were first identified as adults (by size and behavior) when the study began 50 years ago, meaning 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 all had just reached adulthood when the study began, actually an unlikely circumstance—see endnote 488). 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.

494. As noted in endnote 489, only one male orca (wild-caught) and four females (wild-caught) who are currently alive are older than 35 years of age (see Table 1). One wild-caught female, Kasatka, was 41 when she died and another, Kiska, was 47 when she died.

The oldest captive-born whale is Orkid, who reached 34 years of age in late 2022. The next oldest, Kayla, was two months younger than Orkid, but Kayla died in 2019 at age 30 (the next nearest-in-age living captive-born orca at SeaWorld was born three years after Kayla). There are now 15 living captive-born orcas in SeaWorld's parks, while more than a dozen have died since the first successful birth in 1985. Most were younger than 20. It should be clear even to those with no math skills that an average life expectancy for captive-born orcas of almost 48 years is invalid when none living or dead have yet come within 12 years of this age.

495. See, for example, the statements "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" and "the most recent science suggests that the life spans of killer whales at SeaWorld are comparable to those in the wild" on SeaWorld's website, https://seaworld.org/animals/all-about/killer-whale/longevity/.

496. SC 2002, c. 29. The northeast Pacific resident whales, in the state of Washington, in the United States, and British Columbia, in Canada (Southern and Northern Residents, respectively) are some of the best-studied orca populations in the world (Ford, 2017). 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 (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 orca community is listed as threatened in Canada (https://species-registry.canada.ca/index-en.html#/species/698-8). Olesiuk *et al.* (2005) assessed the ages of individual animals in this community, finding that in a period of population growth (1973 to 1996), female Northern Resident orcas who had survived the first six months of life had a mean life expectancy of 46 years and an estimated maximum life span of 80 years, while males had a mean life expectancy of 31 and estimated maximum life span of 60–70. However, there was a decline in mean life expectancy between 1996 and 2004, with that of females declining to 30 years and males to 19. This was due to "a significant reduction in the availability of the whales' primary prey, Chinook salmon" (p. 5 in Towers *et al.*, 2015); i.e., during this period the orcas were severely stressed nutritionally (were literally starving). Since then, prey have rebounded for Northern Residents, but not for Southern Residents.

When compared just to the southern Alaska residents, a relatively 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 (due to human-caused degradation of their prey's habitat)—which is hardly something to boast about.

Nevertheless, even in the face of these many threats, up to 80 percent of the whales who survive their first year in the northeast Pacific populations reach sexual maturity (about 14–15 years of age) and up to 45 percent reach menopause (about 35–40 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).

497. The most recent orca deaths at SeaWorld were Kayla (age 30) in January 2019, Amaya (age 6) in August 2021, and Nakai (age 20) in August 2022 (see endnote 365).

498. See https://inherentlywild.co.uk/captive-orcas/ for a complete list of all known captive orcas, living and dead, and their pregnancies as of June 2023—this website is regularly updated and is 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.

499. Marino *et al.*, 2020.

500. https://inherentlywild.co.uk/captive-orcas/.

501. 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, 2017). This datum is uncertain, however, and is generally not cited by orca biologists.

502. Clubb and Mason (2003).

503. See endnote 109. Morgan, who gave birth in September 2018 at Loro Parque in the Canary Islands, Spain, also failed to properly nurse Ula, her first calf, requiring staff to step in and bottle feed the newborn (Alberts, 2018)—Ula died before the age of 3 (see endnote 138). Morgan 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 (Ford, 2017; see endnote 493), 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 (rarely) been observed in the wild, it is believed that this occurs when the mother dies, not because of maternal rejection.

Other Cetacean Species

504. Woodley *et al.* (1997).

505. Stewart *et al.* (2006).

506. Willis (2012).

507. Whale and Dolphin Conservation (2016).

508. Ceta-Base (2010).

509. Willis (2012).

510. NMFS, National Inventory of Marine Mammals; Couquiaud (2005); http://www.cetabase.org.

Conclusion

511. The most notable recent examples of such industry-affiliated analyses are Willis (2012), Robeck *et al.* (2015), and Jaakkola and Willis (2019).

512. The pattern of zoo animals often living longer (sometimes significantly 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 free-ranging 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 and rarely live as long as (and certainly do not live longer than) free-ranging counterparts.

513. Reeves and Mead (1999).

514. See, for an example of this, Marino *et al.* (2020). For comparison, "happier" captive orangutans—those provided conditions that reduce their stress levels—have been found to live longer (Weiss *et al.*, 2011b).

CHAPTER 11: HUMAN-DOLPHIN INTERACTIONS

Dolphin-Assisted Therapy

515. See, e.g., the Dolphin Experience (http://www.thedolphinexperience.com/Dolphin-Therapy-Benefits.html).

516. See Marino and Lilienfeld (1998); Humphries (2003); Basil and Mathews (2005); Marino and Lilienfeld (2007); Baverstock and Finlay (2008); Williamson (2008), Fiksdal *et al.* (2012), and Marino and Lilienfeld (2021). Hernández-Espeso *et al.* (2021) found that dolphin-assisted therapy (DAT) had some limited benefits versus therapy without dolphins (having a control group was a major advance in study design), but still recommended some improvements in methodology and additional observations before concluding DAT was preferable over other animal-assisted therapies that were more accessible and more affordable. The authors also noted that the International Association of Human-Animal Interaction Organizations (IAHAIO) (https://iahaio.org/) prohibits the use of wildlife in animal-assisted therapies in its membership guidelines, which specifically reference dolphins (https://iahaio.org/wp/wp-content/uploads/2021/01/iahaio-white-paper-2018-english.pdf).

517. There is no overarching, international, or even national, academic or medical professional management body regulating DAT facilities, so there is no oversight of the qualifications, certifications, or degrees of the staff at these facilities (Brakes and Williamson, 2007). The IAHAIO does not accept members using dolphins (or any wildlife) as therapy animals (see endnote 516).

518. Smith (2003). Even David Nathanson, one of the strongest 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, "Interaction 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

519. The parties to ACCOBAMS expressed concern about an increase in commercial operations involving "swim-with" encounters and DAT programs in captive facilities and enclosed/semi-enclosed sea areas. They were "*[c]onvinced* that the extent of such operations is likely to be an increasing threat to wild cetacean populations due to illegal takes and reintroductions" (emphasis in the original; ACCOBAMS, 2007).

520. 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. The COVID-19 pandemic underscores this concern; cetaceans appear to be susceptible to the SARS-CoV-2 virus (Damas *et al.*, 2020; Gryseels *et al.*, 2020).

521. Enforcement was suspended in April 1999 (*64 Fed. Reg. 15918*). See endnote 531 for a history of the US SWD regulations, ending in the suspension of their enforcement.

522. 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 311), but this co-management ended in 1994 when the MMPA was amended.

523. At the time, SWD encounters were considered experimental, and only four operations existed in the United States. The NMFS report was later published, after peer review and revision, in the scientific journal *Marine Mammal Science* (Samuels and Spradlin, 1995).

524. Another scientific examination of SWD attractions concluded that SWD interactions are dangerous to humans and dolphins and recommended against the expansion of such operations 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).

525. "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.

526. APHIS' 2016 proposed regulations gave a minimum refuge size of 7.3 m x 7.3 m x 1.8 m (24 ft x 24 ft x 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).

527. A behavioral study (Kyngdon *et al.*, 2003) 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 about a third the size of the interactive area, 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 interactive 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.

528. Few peer-reviewed studies have systematically examined whether participation in SWD sessions leads 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 small sample size (three dolphins) and the dolphins only participated in one interactive 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.

A more recent study looked at 13 bottlenose dolphins used in an SWD attraction for three sessions a day (with three performances a day in addition) at a dolphinarium in Curaçao. The researchers found that the dolphins' behavior was the same just before (when anticipating a session), just after (after experiencing a session), and at times not associated with SWD sessions (the control) (Brando *et al.*, 2019). In short, the SWD sessions did not appear to stress or indeed affect the animals at all. Interestingly, the older dolphins in this facility were trained for open-ocean activities (with visitors and without; the latter were for enrichment) and the younger dolphins were in the process of being trained for such outings. It is possible this element of their care contributed to lower stress overall and therefore a greater tolerance of SWD interactions. In addition, this facility's interactions were highly controlled (see endnote 525).

In contrast, Sew and Todd (2013) found negligible evidence of play behavior (0.035 percent of the time) for Indo-Pacific humpback dolphins 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 in 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).

529. 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 24 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 12, "Risks to Human Health."

530. 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 interactive session.

531. 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 dolphin 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 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 June 2023, SWD interactions are still effectively unregulated in the United States.

532. 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 311), the International Marine Animal Trainers Association urged members to send in the following statements (e.g., https://web.archive.org/web/20220123211855/https://www.imata.org/aphis/index.html and https://www.regulations.gov/comment/APHIS-2006-0085-1473):

"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."

533. The Source (2018); see endnote 298.

534. 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 (see, e.g., Schmidt-Burbach and Hartley-Backhouse, 2019). 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 a few 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 COVID-19 pandemic has disrupted the cruise line economic sector (see, e.g., McKeever, 2022), no doubt with a knock-on effect for its port excursion vendors.

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)—these facilities are 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, 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 13, "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 (Paton, 2017). Virgin Holidays went further and stated it would not promote any new dolphinaria starting in 2019 (https://www.virginholidays.co.uk/cetaceans). Booking.com and British Airways Holidays also stopped booking dolphin excursions (Schmidt-Burbach and Hartley-Backhouse, 2019). As of late 2022, Expedia, Airbnb, Flight Centre, and The Travel Corporation are also no longer selling tickets to facilities offering SWD interactions (World Animal Protection, 2022).

535. 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 4, "Live Captures"). As described in endnote 298, 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

536. 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).

537. See Vail (2016) and Powell *et al.* (2018) for discussions of the consequences of feeding for free-ranging cetaceans. In its report for the IWC's Scientific Committee, the Sub-Committee on Whalewatching 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).

538. http://www.dontfeedwilddolphins.com/.

539. https://www.youtube.com/watch?v=nZc7_Y5f91s.

540. 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) and a leopard seal (*Hydrurga leptonyx*) killed a person in the Antarctic in summer 2003 (Proffitt, 2003).

541. 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 encounters.

542. In comparison, the suspended US 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.

543. 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.

544. Whale and Dolphin Conservation Society and The Humane Society of the United States (2003).

545. 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).

546. 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 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 563), 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 12, "Risks to Human Health," bottlenose dolphins are capable of inflicting serious injury and can kill people under certain circumstances (Santos, 1997).

547. Whale and Dolphin Conservation Society and The Humane Society of the United States (2003).

548. 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 12: RISKS TO HUMAN HEALTH

Diseases

549. 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 individuals working with captive marine mammals have developed "seal finger" infections from bites (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, "During 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, "Encounters 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, "Marine 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 "Given 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 between non-human animals and humans. Cetaceans may be susceptible to the SARS-CoV-2 virus, which causes COVID-19 (Damas *et al.*, 2020; Gryseels *et al.*, 2020); given that zoo lions have contracted COVID-19 from their handlers (McAloose *et al.*, 2020), it is more likely that humans would transmit this disease to cetaceans.

550. Eighteen percent of survey respondents reported respiratory illnesses contracted while working with marine mammals, although only 20 percent of these 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).

551. 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).

552. 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 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.*, 2009b; Guzmán-Verri *et al.*, 2012). There have been several incidents of humans being infected by *Brucella* strains common to marine mammals 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 humans infected with *Brucella* strains common to seals and dolphins, 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; other 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; Bossart and Duignan, 2018). In particular, *Staphylococcus aureus* bacteria, 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). The bacterium 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.*, 2009b), 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 found in two of their caretakers (Gili *et al.*, 2017; see endnote 387).

553. 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).

554. 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.

555. 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 552). 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).

556. As noted in endnote 520, there are currently no regulations prohibiting handlers or tourists who have illnesses or infections from interacting with captive marine mammals. Rose *et al.* (2017) recommended 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

557. It should be noted that because enforcement of regulations for SWD facilities is currently suspended in the United States (see endnotes 521 and 531; 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.

558. For example, a report to the MMC never considered aggressive contact behaviors between dolphins and humans, such as strikes or blows, to be accidental (Pryor, 1990).

559. Yomiuri Shimbun (2003). The injured party sued the facility for ¥2.8 million in damages (approximately US$25,000), claiming the facility failed to take precautions to prevent such incidents.

560. 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 (https://www.youtube.com/watch?v=rjUwL1l1YCc). 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 245) asked questions about the incident in the Dutch Parliament, after expressing concern about the welfare of the dolphins and the safety of tourists (see https://www.tripadvisor.com.ph/ShowTopic-g147238-i388-k1645277-Proposed_Dolphin_Pools_at_Sandy_Point-Anguilla.html; scroll to comment 3, which is the only remaining online source for an article originally published in January 2007 in *Amigoe*, a Netherlands Antilles publication).

561. See endnote 525.

562. For example, there were approximately 10 SWD encounters operating in China in 2022. Because China controls its media tightly to avoid international criticism, news about injuries or deaths in these attractions is unlikely to be reported.

563. See endnote 546. 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).

564. 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).

565. 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).

566. "Killer whales" historically got their name from having been observed killing other marine mammals, namely baleen whales. Observations in Monterey Bay, California, in the United States, have noted that orcas in this area attack and kill at least seven species of marine mammals, including pinnipeds and cetaceans. There has been evidence of attacks (such as scarring and injuries) on two species of baleen whale in the bay (Ternullo and Black, 2003); actual attacks on blue and gray whales have also been recorded in recent years (see, e.g., Gibbens, 2017; https://www.youtube.com/watch?v=uVTOUxqjY3Q). See Chapter 13 ("The *Blackfish* Legacy") for more on orca aggression.

567. 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).

568. 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 researchers have observed free-ranging orcas (and bottlenose dolphins) in various 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 296 for more on injuries captive orcas have inflicted on tank-mates.

569. See, e.g., Dudzinski *et al.* (1995); Seideman (1997); Deegan (2005); Williams (2007); Osborn (2022).

570. Shane *et al.* (1993).

571. Santos (1997). There was no retaliation against the dolphin for this action, given the sequence of events.

572. Kirby (2012).

573. Associated Press (1999); Kirby (2012).

574. 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 companions 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.

575. 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).

576. 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 13 ("The *Blackfish* Legacy") for more information.

577. Viegas (2010).

578. 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 without injury (Parsons, 2012).

579. Transcript of Proceedings at p. 369, from *Secretary of Labor v. SeaWorld of Florida LLC*, OSHRC Dkt. No. 10-1705 (Sept. 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).

580. 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; 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).

581. "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).

582. The initial narrative summary on 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 California's Department of Industrial Relations, 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 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 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 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.

583. 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 (https://www.osha.gov/sites/default/files/2018-11/fy10_sh-20832-10_Intro_to_OSHA.ppt; 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.* 2012 WL 3019734, slip op. at *9-10, *33-34 (No. 10–1705, 2012); 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.

584. US Department of Labor (2010). See also Parsons (2012).

585. The maximum fine is US$70,000 for a "willful" violation of the law (https://www.osha.gov/sites/default/files/2018-11/fy10_sh-20832-10_Intro_to_OSHA.ppt). 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). 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 substantial evidence supported determination that "drywork" and "waterwork" with orcas were recognized hazards under OSHA; the ALJ did not abuse his discretion in accepting the Secretary of Labor's expert witness with regard to the aggressive behavior of orcas; substantial evidence supported the ALJ's findings that it was feasible for SeaWorld to abate (reduce) the hazard; and the general duty clause was not unconstitutionally vague as applied to SeaWorld (*SeaWorld of Florida v. Perez*, 748 F.3d 1202 (DC Cir., 2014)). The majority opinion noted, "The 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 safety violations (Consillio, 2018), whereas 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 making over a billion dollars a year at the time, SeaWorld's fine was effectively negligible.

586. *The Cove* primarily covered the drive fishery for small cetaceans in Taiji, Japan (see Chapter 4, "Live Captures"), but highlighted the historic purchasing of these cetaceans by US aquaria, including SeaWorld.

587. See Chapter 1 ("Education") and endnotes 14 and 16–18.

588. A disturbing trend is the expansion of in-water interactions to other species, including larger cetaceans such as beluga whales (https://seaworld.com/san-antonio/experiences/beluga-whale-swim/) and pinnipeds such as California sea lions (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 549); 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 13: THE *BLACKFISH* LEGACY

589. Much of this chapter is derived from Parsons and Rose (2018). See also Boissat *et al.* (2021), which covers much of the same information and draws similar conclusions.

Blackfish

590. Zimmermann (2011); Parsons (2012).

591. See Chapter 12, "Risks to Human Health."

592. Zimmermann (2011); Parsons (2012).

593. Parsons (2012).

594. Hoyt (1984).

595. 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."

596. See Chapter 12, "Risks to Human Health," and endnote 583. 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 there is substantial probability that death or serious physical harm could result and that the employer knew, or should have known, of the hazard" (https://www.osha.gov/sites/default/files/2018-11/fy10_sh-20832-10_Intro_to_OSHA.ppt).

597. Grove (2010); Parsons (2012).

598. See endnote 580.

599. Kirby (2012).

600. Hargrove and Chua-Eoan (2015).

601. See https://www.youtube.com/watch?v=Tey5PWnMy1U for *Anderson Cooper 360* and https://www.cc.com/video/o9wpha/the-daily-show-with-jon-stewart-john-hargrove for *The Daily Show*.

602. 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 also endnote 250). See *Blackfish* and Pollard (2014) for more details.

603. The Numbers (2013).

604. 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).

605. CNN (2014).

606. http://www.imdb.com/title/tt2545118/awards?ref_=tt_awd.

607. Busis (2014).

608. 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.

609. 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 one-year-old marine theme park in San Diego and she became the first Shamu (Neiwert, 2015).

The Blackfish *Effect*

610. Wright *et al.* (2015).

611. Renninger (2013).

612. SeaWorld (2014).

613. http://www.blackfishmovie.com/news/2015/9/18/blackfish-responds-to-seaworlds-latest-critique and https://www.scribd.com/doc/218098897/Blackfish-Response-to-SeaWorld-69-Critique. This rebuttal was produced directly in response to SeaWorld (2014).

614. Titlow (2015); SeaWorld (2015b).

615. For example, in 2014, 35 marine scientists, including prominent cetacean and orca biologists, signed a letter supporting the passage of Assembly Bill 2140, the bill introduced that year in the California Assembly to phase out public display of orcas in the state (see endnote 646).

616. Kirby (2012); Neiwert (2013).

617. 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, Elliott (then 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.

618. Kumar (2014); Joseph (2015); Cronin (2014c).

619. These acts included Willie Nelson, Pat Benatar, Heart, Cheap Trick, REO Speedwagon, Barenaked Ladies, and the Beach Boys (Duke, 2014).

620. 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).

621. Gelinas (2015). In the scene, a massive, predatory, aquatic reptile (a mosasaur), 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 mosasaur leapt out of the water and summarily gulped down a pterosaur holding a screaming tourist, tourist and all.

622. Cronin (2014b).

623. SeaWorld (2015b).

624. Apparently, SeaWorld expected questions about the company's animals, 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.

625. Lobosco (2015).

626. http://www.seaworldfactcheck.com.

627. *The Onion* (2013a, 2013b).

628. *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).

629. https://www.youtube.com/watch?v=Tloss7UKUaw&feature=youtu.be; https://www.youtube.com/watch?v=XEVlyP4_11M&feature=youtu.be&t=6m39s; http://www.cc.com/video-clips/ebp0j3/the-daily-show-with-trevor-noah-it-s-time-to-free-jeb-bush.

630. 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 (https://youtu.be/ZlspTKY2Meg).

631. PRNewswire (2015).

632. 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.

633. PRNewswire (2015).

634. 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.

635. Russon (2017a).

636. Russon (2017a, 2017b).

The Legal and Legislative Impacts of Blackfish

637. 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 Cir. Aug. 28, 2018)). In October 2020, the judge in *Anderson v. SeaWorld* ruled that the two plaintiffs did not have standing to sue SeaWorld and dismissed the case. No ruling was ever made on the substance of the issue; that is, whether SeaWorld was violating the law with its advertising about captive orcas (https://www.law360.com/cases/56421df4a9db3a27c9000003).

In December 2022, Earth Island Institute filed a motion to unseal those portions of the record for *Anderson v. SeaWorld* dealing with the health and welfare of SeaWorld's captive orcas. See *Earth Island Institute's Notice of Motions and Motions for Leave to Intervene and to Unseal Judicial Records and Memorandum of Points and Authorities in Support Thereof*, Dkt. Entry 604 in *Anderson v. Seaworld Parks and Entertainment*, 4:15-cv-02172-JSW (N.D. Cal. Dec. 7. 2022); see also https://savedolphins.eii.org/news/wildlife-advocates-ask-court-to-unseal-seaworlds-orca-health-records. On 30 January 2023, the district court granted the motion to intervene, but denied the motion to unseal the documents. Similar records in Florida (which were made public pursuant to Florida's Rule of Judicial Administration 2.420, Public Access to Judicial Records; see https://www.flcourts.gov/content/download/219096/file/RULE-2-420-Jan2014.pdf and http://bit.ly/3ZKmbga) were a revelation regarding the many problems facing the company's orcas (see endnotes 102 and 583).

638. Business Wire (2015).

639. 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 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 vulnerable to identity theft, and for automatically charging renewal fees for SeaWorld passes without obtaining customers' permission. See, e.g., *Herman v. SeaWorld Parks & Entertainment Inc.*, No. 8:14-cv-03028-MSS-JSS (MD Florida, Dec. 3, 2014).

640. *Baker v. SeaWorld Entertainment, Inc.*, No. 3:14-cv02129-MMA-AGS (S.D. Cal., Sept. 9, 2014). See also Weisberg (2014) and Russon (2017).

641. Weisberg and Russon (2017).

642. Russon (2018).

643. Swenson (2017).

644. Zaveri (2018).

645. *Order Granting Class Representatives' Unopposed Mot. and Approving Distribution Plan* in *Baker v. SeaWorld Ent., Inc.*, No. 14-CV-2129-MMA-AGS, 2022 WL 298662 (S.D. Cal. Jan. 31, 2022) (see https://cases.justia.com/federal/district-courts/california/casdce/3:2014cv02129/452968/533/0.pdf?ts=1643798495; KUSI Newsroom, 2020).

646. 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).

647. See http://leginfo.ca.gov/glossary.html for a definition of this term.

648. Assembly Bill 2305.

649. 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.

650. 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 293). 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 potentially eventually for sale and export 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 the state's administrative permitting process. 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 conditions should the permit be issued. 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 or, eventually, rescued animals needing rehabilitation and perhaps permanent housing. See also Weisberg (2016).

Then, in March 2016, SeaWorld suddenly and 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 Newsroom, 2016).

651. State Senator Greg Ball introduced Senate Bill 6613, which would have prohibited the keeping of orcas in facilities in New York, in the United States.

For the text of the bill, see https://www.nysenate.gov/legislation/bills/2013/s6613/amendment/original.

652. Senators Kevin Ranker and Christine Rolfes and Representative Brian Blake (and others) introduced similar bills in the state of Washington, in the United States: Senate Bill 5666-2015-16 and House Bill 2115-2015-16. As of June 2023, California remains the only US state that has actually passed a post-*Blackfish* bill addressing captive cetacean welfare (see "Conclusion").

653. HR 4019, the Orca Responsibility and Care Advancement (ORCA) act, was co-sponsored by Representatives Adam Schiff (D-California) and Jared Huffman (D-California), along with 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 (https://www.congress.gov/bill/115th-congress/house-bill/1584). For more about the most recent legislative landscape in the United States regarding captive orcas, see Wise (2016) and endnote 654.

654. Unlike the ORCA Act, the Strengthening Welfare in Marine Settings Act has a companion bill in the Senate, which increases its chances of passage to some extent. For the text of HR 8514 (sponsored again by Adam Schiff) and S 4740 (sponsored by Senator Dianne Feinstein (D-California)), see https://www.congress.gov/bill/117th-congress/house-bill/8514?s=1&r=9 and https://www.congress.gov/bill/117th-congress/senate-bill/4740/all-actions?s=1&r=12&overview=closed. Bottlenose and other smaller dolphins and porpoises were deliberately excluded from this bill, as there are many more of them in the United States (over 400 versus fewer than 60 of the larger cetaceans—see NMFS' *National Inventory of Marine Mammals*, http://www.cetabase.org, https://inherentlywild.co.uk/captive-orcas/, and endnote 655), and opposition from the industry presumably would be unremitting if they were included. With these four larger species, for which the science is also more robust, it may be that dolphinaria will see the handwriting on the wall and keep their opposition to a minimum.

It is unclear whether these bills will progress, as the majority party in the House changed in the November 2022 election, while the Senate majority party remained the same. Given the controversy with Connecticut's Mystic Aquarium and its import of five captive-born belugas from Canada (see endnote 286), including belugas at a minimum in this federal legislative effort seems timely.

655. As of June 2023, there are 19 orcas, 37 belugas, three pilot whales, and no false killer whales in US dolphinaria (see, e.g., https://www.cetabase.org/facility-list/?search_region=80&search_categories%5B%5D=226); at one point there were about two dozen false killer whales in the United States, but they have all died.

656. For a review of this legislation, see Sykes (2019).

The End of Captive Orcas?

657. Manby (2016).

658. 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, up to the 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); 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 138, 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 and death (at less than three years of age) of her calf Ula, see http://www.freemorgan.org/pregnancy-timeline/.

The two original SeaWorld females who were transferred to Loro Parque in 2006 died in 2021 (Skyla, who was 17 years of age) and 2022 (Kohana, who was 20 years of age). Kohana's first calf, Adán, is still alive, as are Tekoa and Keto, the two original SeaWorld males. Morgan is now the only female there (https://inherentlywild.co.uk/captive-orcas/) and is unrelated to any of these males. This is a completely unnatural social group for orcas.

659. SeaWorld (2017a).

660. 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).

661. 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.

662. 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.

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 (Pollard, 2014; Mapes, 2018a). 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 10 orcas died during the capture process, and at least 53 animals, mostly from the Southern Residents, were removed for display (the rest were released) (Asper and Cornell, 1977). All the whales—almost all juveniles—who were taken into captivity from the Southern Residents are dead now, except for Tokitae at Miami Seaquarium. Only one Northern Resident in captivity is still alive; Corky II at SeaWorld San Diego. See also endnotes 249 and 250.

663. Fry (2016).

664. SeaWorld reported a US$30 million decline in revenue in 2016 compared 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 $11 per share (down from a high of nearly US$40 per share in May 2013).

665. 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).

666. SeaWorld went public in early 2013, after being privately held for decades. Its IPO price for one share of its stock was US$27 (Reuters, 2013).

667. 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 660 and 661), 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). The company's stock price as of June 2023 was in the US$50–60 range, a complete recovery from its nadir in 2017 (see endnotes 664 and 666—a web search for SEAS stock will provide the current stock price). This is arguably the result of its 2016 change in corporate policy, shifting its marketing away from "Shamu" and its orcas, and its focus on building new rides and other attractions that compete better with other theme park attractions.

Seaside Sanctuaries—The Future for Captive Cetaceans?

668. See Chapter 1, "Education," and Naylor and Parsons (2019).

669. https://www.virginholidays.co.uk/cetaceans; 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 534.

670. 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 it transferred its last cetacean, a Pacific white-sided dolphin named Helen, to SeaWorld San Antonio (Vancouver Courier, 2018). She was transferred to SeaWorld in April 2021 and died there in March 2022 (SBG San Antonio, 2022).

671. 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 (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 was 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 (https://court.gov.ua/eng/supreme/pres-centr/news/618734/).

672. 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.

673. https://whalesanctuaryproject.org/news-release-launch-whale-sanctuary-project/.

674. http://www.onewhale.org.

675. http://dfe.ngo/seaside-sanctuaries-a-concept-review/ for a discussion of the seaside sanctuary concept.

676. Whale and Dolphin Conservation (2018); https://belugasanctuary.sealifetrust.org/en/.

677. Racanelli (2016); https://aqua.org/support/donate/blueprint/dolphin-sanctuary.

678. One of the animal protection groups working on the feasibility study is WAP (Martin and Bali, 2018).

679. 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/.

680. See endnote 9. "The future of cetaceans in captivity is unclear. … It seems unlikely that the future holds a substantial increase in the number of cetaceans kept in captivity. … The future may well include a greater mix of cetaceans kept in facilities in coastal areas [seaside sanctuaries], rather than in tanks" (p. 207 in Corkeron, 2022).

CONCLUSION

681. Kirby (2014b).

682. 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.

683. 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 84).

684. Kirby (2014b).

685. The regulations did not grandfather in existing facilities, so they closed within a short period, as they could not meet the new standards without significant capital outlay.

686. Rose *et al.* (2017).

687. *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 4, "Live Captures—Belugas" and https://www.imdb.com/title/tt6619064/?ref_=fn_al_tt_1). *Long Gone Wild*, released in 2019, essentially picks up where *Blackfish* left off (https://www.longgonewild.com/).

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