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CAPTIVE ELEPHANTS AND CETACEANS

The misery of the menagerie

Lori Marino, Catherine Doyle, Heather Rally, Lester O'Brien and Bob Jacobs

Modern zoos and entertainment parks have vastly improved over the decades. However, they still retain some of the old menagerie-style characteristics, such as restrictive space, lack of stimulation, and artificial social conditions. Highly intelligent species that are wide-ranging with complex social lives are at a greater risk for poor welfare in captive settings than others. Here, we explore the shared characteristics and welfare challenges of captive elephants and cetaceans, focusing on those characteristics such as space, sociality, and cognitive complexity, found to be important factors in coping with captivity across many species. We discuss the implications for whether elephants and cetaceans can thrive in zoos and marine parks and offer an alternative in the form of sanctuaries.

Keywords: **captivity**, **animal welfare**, **elephant**, **cetacean**, **zoo**, **marine park**.

Zoos (or menageries) have a dark history, first emerging in medieval Europe as private collections for the wealthy and, in the 19th century, having exhibits of «exotic populations» (i.e., people of color) to bolster the illusion of a superior Western culture. Although considerable progress has been made in the 21st century in terms of the mission and design of captive facilities, they remain particularly problematic for larger mammals, also known as *charismatic megafauna*.

Captivity is the state of being confined to an artificial environment (usually designed for human benefit), which is typified by zoos, aquariums, and marine parks. Well-being (which includes both mental and physical health) in captivity is closely tied to how well the captive environment allows for species-specific behaviors and opportunities. And while conditions have vastly improved, the fundamental problems of space, lack of stimulation, and artificial social conditions continue to take their toll on well-being. These factors come into play whether by land or sea and explain why cetaceans (dolphins and whales) and elephants, who, at first glance might seem to have little in common, are both among the least suited for confinement in zoos and marine parks.

«Cetaceans and elephants remain immensely popular, and thus monetarily valuable, attractions at captive entertainment facilities»

As the literature on captive animal welfare grows, certain patterns of characteristics emerge as bellwethers of vulnerability to the effects of captivity. One of these is the amount of space a species requires. For instance, carnivores with large home ranges tend to do less well in zoos than those with small home ranges (Clubb & Mason, 2002; 2007). Another is sociality. Primates who naturally live in large social groups that travel daily tend to do less well in zoos than those who are adapted to smaller

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groups that travel less (Pomerantz et al., 2013). A third is cognitive complexity. Mellor et al. (2021) showed that psittacine birds with larger relative brain sizes (as a proxy for cognitive complexity or intelligence) were more prone to poor welfare in captivity than those with smaller relative brain sizes. In the same study, species that engage in more time-consuming feeding and more complex methods of food gathering, selection, and manipulation exhibited poorer welfare. As the authors suggested, the mismatch for these species between natural propensities and captive environments is often difficult to overcome.

In the present paper, we focus on two taxonomic groups, elephants and cetaceans, who are among the species of wild animals who suffer the most in commercial captive facilities (Doyle et al., 2024). Both are wide-ranging, highly intelligent species with complex social lives and ways of navigating and solving problems in their environment. Both require a long juvenile period of learning their cultural traditions in order to thrive. And both are at greater risk for poor welfare in captivity when they are forced to live in confined impoverished environments.

Unfortunately, cetaceans and elephants remain immensely popular, and thus monetarily valuable, attractions at captive entertainment facilities. The scope of the problem is broad. Approximately 17,000 elephants are held in captivity around the world (Jackson et al., 2019). Globally, more than 3,600 cetaceans are confined to concrete tanks or small pens, with the most common species being bottlenose dolphins, orcas, and beluga whales (Cetabase, 2024). Here we focus on the welfare of elephants and cetaceans in zoos and marine parks within the context of three important factors – space, the ability to socialize and form species-typical social relationships, and the level of complexity and stimulation the captive environment affords. We offer a possible antidote to the welfare issues they continue to face by suggesting that zoos and marine parks incorporate more naturalistic features and sanctuary-like practices and that as many of the elephants and cetaceans currently living in entertainment parks be transferred to authentic sanctuaries when these facilities become available.

CAPTIVITY FACTORS

Space

Space is critical for both cetaceans and elephants, as it is key to their physical, behavioral, social, and mental well-being. In their natural habitat, elephants have expansive, dynamic home ranges, extending from tens to 10,000 km² and they typically walk ~8-12 km/day (Miller et al., 2016) (Figure 1). In zoos, elephants are usually confined to one or more outdoor yards and a barn (Figure 2). Cetaceans travel miles in the ocean together and dive deep (Figure 3). Similarly, captive cetaceans are kept in concrete tanks that are much too small and/or shallow to allow natural ranging or diving behaviors (Cascadia Research Collectiva, n.d.). Even in the largest facilities, a cetacean of any commonly kept species is restricted to a tank that is ~10,000 times smaller than their natural home range. These highly restrictive spaces are also impoverished, lacking in much of the complexity and the sensory stimulation that comes with a natural environment (Figure 4).

«Globally, more than 3,600 cetaceans are confined to concrete tanks or small pens»

Sociality

Free-roaming elephants tend to live in matriarchal, multi-generational family groups of two to ten adult females and juveniles (de Silva et al., 2011). These groups share a fission-fusion structure, separating and merging with larger groups of up to several hundred elephants, depending on species. Females remain with their natal herd, forming strong lifelong bonds with related females; males remain with their family group until sexual maturity, when they disperse (Lee et al., 2011) Cetaceans, like elephants, have long juvenile periods and depend heavily on cultural learning within closely bonded complex family and social networks. Bottlenose dolphins, for instance, live in fission-fusion societies with strong mother-calf bonds and learning of foraging strategies and social rules (Sergeant & Mann, 2009). By contrast, captive cetaceans and elephants tend to live in artificial groupings with limited choice for social relationships (Sánchez-Hernández et al., 2019; Williams et al., 2019). Moreover, transfers into and out of facilities disrupt social bonds, making it difficult for individuals to maintain important relationships or develop new ones.

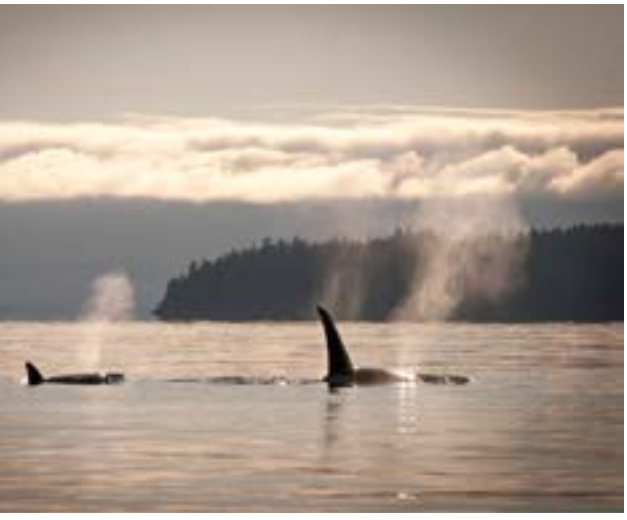
Intelligence, cognitive complexity and stimulation

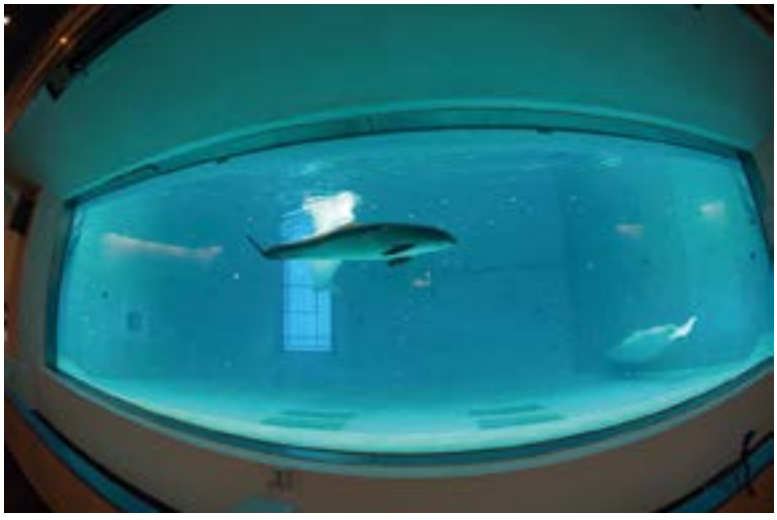
Cognitive complexity refers to the ways in which individuals learn about and solve problems in their natural lives. It includes navigating complex social relationships, complex foraging and hunting strategies, and learning how to cope with dangers, among many other facets of life. Free-roaming elephants are highly diverse feeders, searching for, selecting, and

Courtesy of Lester O'Brien

Courtesy of Katy Laveck Foster

Courtesy of Catherine Doyle





Courtesy of Ingrid Visser, Orca Research Trust

Left to right, up to bottom: Figure 1. A herd of Asian elephants traveling together in Kaudulla National Park, Sri Lanka. Figure 2. African elephants in a common indoor area at an AZA (Association of Zoos and Aquariums) accredited zoo in the USA. During cold weather, the elephants spend the majority of their time in this small space. Lack of movement and standing on hard surfaces are associated with foot and musculoskeletal disorders. Figure 3. Adult and juvenile orcas traveling together in the Salish Sea (Washington, USA). Figure 4. Harbour porpoise and beluga whales housed together in a tiny featureless tank with no enrichment objects in Japan.

consuming more than 100 food species. Elephants naturally spend 60-80 % of their waking hours foraging over long distances (Poole & Granli, 2009). Unfortunately, zoo diets are very limited, easily consumed and given on a predictable schedule requiring none of the foraging and processing enjoyed in the wild.

Cetaceans are predators and eat a range of foods from invertebrates to other mammals, requiring strategic hunting methods that sometimes include tactical collaboration. The simplistic way dead fish are delivered to cetaceans in captivity (i.e., thrown directly into their mouths above water) requires none of the important cognitive or behavioral engagement and stimulation involved in hunting and feeding on live prey in the wild.

Environmental enrichment programs are usually employed to attempt to improve the lives of captive

animals. Indeed, enrichment was first recognized as essential by the zoo and marine park industry precisely because of the animals' observed difficulties in coping with the incongruity between artificial and natural environments (Morgan & Tromborg, 2007). Some have suggested that even the training that comes with daily husbandry routines can be enriching (Fernandez, 2022; Fernandez & Martin, 2021). But the kinds of enrichment objects and methods that increase welfare in captive animals are yet to be identified (Delfour et al., 2017). Recent studies have begun to more rigorously examine whether various environmental enrichment techniques actually result in better welfare (Brereton & Rose, 2022; Lauderdale et al., 2021). The current literature on welfare in captive elephants and cetaceans indicates that much more research is needed to determine if and how specific enrichment efforts can improve welfare with the caveat that certain dimensions of enrichment (e.g., space) are not achievable in commercial facilities.

«Captive elephants and cetaceans experience problems in several areas of welfare»

CURRENT WELFARE ISSUES

Captive elephants and cetaceans experience problems in several areas of welfare. These include abnormal behavior, systemic disease, dental and musculoskeletal problems, and reproductive issues, among many others.

Stereotypies

One of the more prevalent, observable abnormalities found in many captive animals are stereotypies: purposeless, repetitive acts induced by the frustration of natural impulses. Stereotypies in elephants typically take the form of body rocking and swaying, head bobbing and pacing (Mason & Rushen, 2006). In captive cetaceans, stereotypies are commonly expressed as repetitive swimming patterns, grating of the teeth against hard surfaces, head bashing, and regurgitation (Marino et al., 2020). Such stereotypies appear to be a direct reflection of dysregulation of motor-control systems in the brain (Jacobs et al., 2021).

Infectious disease

One of the consequences of chronic stress is immune system dysfunction and the resulting opportunistic infections. Captive elephants are particularly susceptible to *Mycobacterium tuberculosis* (TB) and the endotheliotropic herpesvirus (EEHV), both of which are often fatal. Captive populations, particularly Asian elephants, are disproportionately affected by both of these because of stress-induced immunosuppression (Mikota, 2009). For captive cetaceans, viral and bacterial pneumonia are the most common causes of fatality. The prevalence of infectious diseases in captive cetaceans is compounded by the routine use of antibiotics and antifungals, including frequent prophylactic administration, leading to an imbalance of microflora and increased risk of opportunistic infection (Reidarson et al., 2018). The ubiquity of these and other opportunistic infections in captive cetaceans and elephants despite the protected environment and expert veterinary care provided by zoos and marine parks points to the ongoing struggle to keep these animals healthy in zoos and marine parks.

Dental disease

Tusk injuries are particularly common in captive elephants, who frequently encounter hard, unyielding materials in their enclosures (Steenkamp et al., 2008). The oral cavity is also susceptible to infections (e.g., periodontitis) following foreign body or food impaction, which can cause chronic stomatitis. Functional abnormalities include malocclusion and retention of molars, which is common in captive elephants and associated with inadequate dietary roughage. Many cetaceans, especially orcas, in captivity engage in an oral stereotypy involving

Courtesy of Catherine Doyle

Ontario Captive Animal Watch

Figure 5. Captive orca with severely damaged teeth worn down to the gum from oral stereotypy, biting and gnawing on hard surfaces. Note holes in center of teeth from drilling to prevent infection.

Figure 6. Obese Asian elephant at AZA-accredited zoo in the USA standing with all four feet in tubs containing a disinfectant solution. This is a common treatment for pododermatitis, which may include abscesses, infections within and around the nails, and pockets within and beneath the sole of the foot.

«In zoos, elephants are usually confined to one or more outdoor yards and a barn»

grating the teeth on hard surfaces (Figure 5). This behavior results in severely worn teeth and infections (Jett et al., 2017).

Skin and musculoskeletal health

More than half of captive elephants suffer from foot ailments (e.g., hyperkeratosis, cracked nails, infections with osteoarthritis regularly occurring prematurely) (Fowler, 2006) (Figure 6). These conditions are brought on by inappropriate substrate or unsanitary conditions.

Skin diseases are also common in captive cetaceans. When facilities fail to maintain levels of chlorine and ozone within strict parameters, elevated concentrations of these chemicals can cause eye damage, respiratory problems, and skin sloughing (Gage, 2010).

Reproduction

Due to a variety of reproductive problems (e.g., acyclicity, ovarian cysts, infant mortality) compared to their free-roaming counterparts, captive elephant populations are not sustainable without imports from the wild (Wiese, 2000). Although rare in free or semi-captive populations, captive elephants suffer from a high rate of stillbirth, infant mortality, and infanticide, with a 20 % stillbirth/perinatal death rate in North American zoos (Taylor & Poole, 1998) and 21 % in European zoos (Perrin et al., 2021). In captive cetaceans, abortions and stillbirths are also common reproductive problems. Bottlenose dolphin pregnancies in captive facilities from 1995–2000 had an abortion rate of 8 % and a stillbirth rate of 8.8 % (Robeck et al., 2018). Although there are high rates of first year mortalities in free roaming dolphins, the causes of death are typically predation and lack of food, factors not relevant to captive cetaceans. This suggests there may be other factors endemic to the captive environment contributing to reproductive problems in cetaceans.

CONCLUSION

The current review addresses the longstanding question of whether elephants and cetaceans can thrive in traditional captive environments (i.e., zoos and marine parks). Thriving refers not only to how *physically* healthy someone is or *how long* they live, but *how well* that individual lives – the overall quality of their life, their *well-being*. It includes the ability to exercise autonomy and be stimulated by significant challenges. The current evidence demonstrates that elephants and cetaceans are not thriving in zoos and marine parks. Moreover, it is unlikely zoos and marine parks can provide a sufficient facsimile to a free-roaming life to allow captive elephants, cetaceans, or others to thrive. What, then, is the alternative? Insofar as captive elephants and cetaceans cannot usually be released from a zoo or marine park into a natural environment (as they do not have the necessary survival skills), the best option is to transfer them to authentic sanctuaries. Some sanctuaries have reported improved physical and psychological health in elephants after their arrival (Buckley, 2009; Derby, 2009). Inclusion of natural elements into any captive environment may enhance well-being. For instance, it appears that dolphins in captive environments with more natural elements (though not sanctuaries) may be less stressed and show fewer behavioral abnormalities (Ugaz et al., 2013). These findings suggest that even a change such as being allowed to live in ocean water in a natural bay (with fish and other complex characteristics) promotes better welfare in cetaceans. In conclusion, although the misery of the menagerie remains for most captive elephants and cetaceans (and other wild animals), there are alternatives that can be realized through collaboration among all who want a better life for these species. Perhaps elephants and cetaceans can become the catalyst for better welfare for all wild animals held in zoos, aquariums, and marine parks.

«Inclusion of natural elements into any captive environment may enhance well-being»

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LORI MARINO. President of the Whale Sanctuary Project and Adjunct Professor in Animal Studies at New York University (USA), Lori is a neuroscientist who has studied the evolution of brain and behavior in cetaceans and other mammals for over thirty years. She has 150 publications in the areas of brain anatomy, brain-behavior relationships, intelligence, self-awareness, as well as captive wild animal welfare, and animal law and science. ✉ marinolori@outlook.com

LESTER O'BRIEN. Former zoo elephant manager turned global consultant, with experience working in diverse facilities across four continents, including zoos, temples, and sanctuaries. Expertise spans dietary planning, foot health evaluations, and behavioral training. Field research has focused on herd dynamics, the effects of musth, and ecological requirements of elephants, with time spent in regions ranging from Borneo to Botswana. Current projects include foot health assessments, promoting non-invasive training principles for captive animals, and contributing to an upcoming documentary on the conditions of captive elephants.
✉ obrienology@icloud.com

CATHERINE DOYLE. Director of Science, Research and Public Policy for the Performing Animal Welfare Society, which rescues and cares for elephants, big cats, and other wildlife at its 2,300-acre sanctuary in California (USA). She has more than 20 years of experience in captive elephant welfare, with extensive knowledge of elephant health, well-being, and management. Her publications include chapters and papers on captive elephants, the ethics of elephant confinement, and captive wildlife sanctuaries.
✉ cdoyle@pawsweb.org

HEATHER RALLY. Medical Director at a general practice and specialty veterinary hospital in Los Angeles (USA). She is also the Founder and Director of Thrive Wild, a consultancy organization providing veterinary and welfare expertise to captive wildlife facilities, including numerous cetacean sanctuary initiatives around the world. Dr. Rally previously served as the Senior Veterinarian of Captive Animal Law Enforcement at the PETA Foundation where she led investigative and enforcement actions in cases of cruelty and neglect of captive animals.
✉ eatherrally@gmail.com

BOB JACOBS. Professor Emeritus at Colorado College (USA). His specializations include language acquisition, non-human animal communication, cognitive neuroethology, and comparative neuroanatomy. In the last decade, he conducted quantitative neuromorphological research on several more exotic mammalian species, including African elephant, humpback whale, hippopotamus, giraffe, manatee, cheetah, clouded leopard, lion, zebra, and Siberian tiger. He was the first researcher to document the morphology of neurons in the cerebral cortex of many of these species. More recently, he has published articles on the neural consequences of captivity for captive elephants and cetaceans.
✉ bjacobs@coloradocollege.edu