Call of the Wild: Zoos Should Be Shut Down

Abdulla Al-Qubaisi

Department of Finance

ENG 204: Advanced Academic Writing

Dr. Philip McCarthy

May 23, 2021

Abstract

In this paper, I argue that zoos should be shut down. Over the years, the purpose of zoos has shifted from entertainment and animal conservation to profit-maximization at the expense of animals. I support my position with three arguments. First, zoos violate animal rights since animals are kept in unnatural environments and exposed to cruel treatment. Second, zoos expose tourists and zookeepers to fatal animal attacks. Third, many zoo owners operate zoos as profit-maximization centers. Tickets and fund-raising events allow zoo owners to gather profits. I also consider the alternative arguments that zoos have specialized staff members to replicate animals' natural habitats, zoos protect and conserve endangered species as well as educate the public about nature. However, I show that inadequate resources within zoos and failure of zoos' breeding programs suggest that zoos should be shutdown. I conclude my paper by recommending that government should ensure there is stricter legislation for zoos.

Keywords: zoos, natural habitats, animal rights, profit-maximization, animal attacks

Call of the Wild: Zoos Should Be Shut Down

Zoos, also known as menageries or animal parks, have been in existence for thousands of years. Indeed, the oldest of the rediscovered zoos was unearthed in Egypt and dates its existence back to 3,500 BC (Gaille, 2017). Zoo facilities serve several purposes including giving people the opportunity of learning or saving endangered and rare species. Further, zoos attract tourists for entertainment such as to witness a cub being born or a gorilla taking its first baby steps. However, these purposes are often at the expense of the animals held in captivity in poor conditions. As such, politicians, animal rights activists, researchers, and scientists have expressed varying opinions over whether zoos should remain operational (Loh et al., 2018).

Numerous concerns raised about the functioning of zoos suggest that these animal parks should be shut down. From an ethical standpoint, zoos should be shut down because they hold animals in captivity and deny them the right to roam freely in the wild as they are naturally inclined to do (Learmonth, 2019). Attacks on zoo visitors and keepers as a result of the deteriorating mental health of animals also highlight the need for shutting down zoos. For instance, the 2006 and 2009 giant panda attacks on humans at the Panda House in the Beijing Zoo are only a few examples of gruesome attacks by frustrated animals (Zhang et al., 2014). Zoos have also become a hub for individuals with malicious intentions such as seeking to maximize profits, in turn neglecting the welfare of the animals (Loh et al., 2018). These worrying concerns affirm that zoos are harsh environments for animals and a danger to society.

At the same time, some people claim that zoos should remain operational. These people argue that zoos play a crucial role in protecting rare and endangered species, including those on the verge of extinction (Learmonth, 2019). Similarly, zoos also serve as educational facilities where children and families can learn about many animal species (Gaille, 2017). In addition, they also suggest that specialized trainers take good care of animals while striving

to replicate individual animals' natural habitats. By replicating animals' natural habitats, it can be deemed that zoos indeed, protect animal welfare.

While zoos have some advantages, their operations are a source of concern among the general public. Failure to ban zoos will likely result in negative impacts that outweigh the benefits of keeping these animal parks operational. Indeed, the notion that society can use animals for any means including entertainment (as in the case of zoos) to serve their needs because animals have no intrinsic value is outdated. This paper argues that zoos should be shut down because of the cruel treatment of animals, animal attacks on tourists and zookeepers, as well as the poor motives of some zoo owners to maximize profits.

Animal Welfare and Specialized Zoo Professionals

Zoos are known to conserve animals and they are mandated to protect animals from harm. Growing evidence suggests that zoos have failed to protect animal welfare by subjecting them to harsh environments, despite zoo enthusiasts often citing that these institutions strive to replicate the animals' natural habitats. This section examines zoos from an animal welfare perspective.

Zoos and Animal Welfare

Zoos have failed to promote animal welfare. More specifically, Safina (2018) establishes that, historically, zoos tend to raise serious animal welfare issues, which are mostly concentrated on animal handling techniques, veterinary care, housing conditions, husbandry, stress management, and psychological well-being. Out in the wild, animals have a sufficient amount of space that they can use to satisfy all their needs such as digging, hunting, climbing, nesting, and swimming. Within zoos, variety, complexities, and options are some of the many challenges that enclosed animals are subjected to. Indeed, space for these animals will always remain as being restrictive and unethical and bears minimal resemblance to wild animals' natural habitats. In fact, while domestic animals such as house cats may thrive in enclosed and captive environments, wild animals such as orcas can barely survive in captivity. As Gaille (2017) suggests average orcas can live up to a hundred years in the wild,

but the average age of a captivated orca is merely 30 years. Therefore, zoos do not promote animal welfare and rather can lower the life span of some wild animals.

Animal handling techniques within zoos are often against the best animal welfare practices. In most instances, most wild animals inside zoos are mistreated or tortured for various reasons. Such issues are particularly common in zoos that use animals for entertainment purposes. Gupta (2005) illustrates this better with the example of Indian-based zoos, which torture animals and imprison them in small cages as a way of dominating them and ensuring that they perform confusing and often physically demanding tricks. Predominant forms of torture included physical torture using whips, bullhooks, and electric prods, stress to which they are shifted from one location to another in small cages, and insufficient food. In fact, in light of such practice, the Honorable Supreme Court in India was forced to impose a ban on zoos for using lions, tigers, bears, monkeys, and leopards for circus performances. Furthermore, Learmonth (2019) indicates that animal mistreatment deteriorates animal's mental health by increasing their stress levels. Therefore, zoos pose concerns about cruel animal handling techniques, which suggest the need for the shutting down of zoos if zoo management does not uphold animal rights.

Animal husbandry, which is the science of breeding, caring, and farming animals, is another cause of concern in zoos. According to Kohn (2001), concerns with regard to husbandry can be looked at from two perspectives: nutrition and health. Animal species require adequate but different feeds to aid in their development. At the same time, there are numerous reports of captive zoo animals suffering from under-nutrition or malnutrition, as numerous facilities across the world can barely meet the nutritional needs of various animals. A more recent study by Skovlund et al. (2021) found that polar bears hosted in multiple zoos across the world often exhibit signs of malnutrition. For the most part, such instances of malnutrition can be attributed to limited knowledge among zoo workers about the appropriate nutrition or lack of funds by zoos to buy the appropriate food.

Health is also inseparable from significant husbandry practices within zoos. Zoos experience numerous medical problems and cannot meet the health needs of varying wild animals. In most instances, animals are usually treated when they are clinically ill and, therefore, left alone when they do not exhibit any health problems. According to Kohn (2001), this practice would prove to be devastating for wildlife, especially for numerous species (owing to their adaptive survival needs), who tend to show little or no clinical signs of illness until the state of the diseases are highly advanced. During such stages, medical interventions may achieve limited success.

Lastly, zoos also subject animals to poor living conditions. For example, animals are subjected to predator-prey housing, whereby predators and prey are sometimes rotated in the same enclosures at alternate time intervals. According to Learmonth (2019), such circumstances tend to invoke responses such as fear amongst prey or arousal among predators, in turn leading to a broad range of adverse psychological effects such as stress. Likewise, in addition to being enclosed in limited spaces, animals are also overcrowded. Overcrowding of animals has been witnessed in the National Zoo in Washington, DC, United States, when six cheetahs were added to double the population, despite evidence that there was no extra space (Kantamneni, 2014). In fact, incidences of broken animal necks after running into barriers, multiple injuries, and deaths are common in the zoo as a result of overcrowding.

Specialized Zoo Trainers and Natural-like Structures

Some opponents argue that zoos are well-equipped with specialized trainers or zookeepers, who strive to provide zoo animals with a natural environment that resembles their natural habitats. In contemporary years, zoos are properly supervised and are required to go through the process of accreditation to maintain their operations. According to Olive and Jansen (2017), this process entails ensuring that zoos have specialized staff who are well-aware of varying animals' needs. These zookeepers are responsible for feeding and providing adequate daily care for the animals. Irwin et al. (2013) add that professional zookeepers are

well-versed with various husbandry and care practices for multiple animal species, and are better positioned to understand animal behavior, training, and enrichment to ensure that these animals live a stress-free life. In order to provide a stress-free life for animals, zookeepers make an effort to ensure that the zoo enclosures closely resemble the natural habitat of respective animal species. Furthermore, it is common to find monkey shelters in zoos being equipped with multiple branches and ropes that aid in monkeys in their movement similar to the trees in the wild. As such, zookeepers practice the best techniques to promote the natural habitat within the zoo captivity for the wild animals.

Although zookeepers are specially trained to look after zoo animals, the natural habitat replicas inside zoos are inadequate and do not always meet all the natural needs of the animals. The zoo enclosures are often quite small and restrict the movement of animals. On the other hand, national reserves that host most wild animals are thousands of hectares of land. Furthermore, animals traverse these reserves for differing reasons such as territorial domination among lions or for food among ruminants based on weather patterns (Kantamneni, 2014). Zoos compare unfavorably to reserves and it is nearly impossible to replicate all the factors that contribute towards wildlife survival. For instance, zoos cannot replicate factors that contribute to the migration and other survival habits of many ruminant animals. Ruminants such as wildebeests are known to travel thousands of miles based on seasonal changes and weather patterns. Carisch et al. (2017) found that high mortality rates among zoo ruminants were observed during autumn and winter months, thereby indicating that ruminants enclosed in zoos are susceptible to seasonal mortality. By contrast, ruminants in the wild can easily migrate to new grounds with an ideal environment and food. Therefore, zoos fail to provide favorable environments for animal species to lead stress-free and longer lives.

Animals Attacks and Biodiversity Conservation Within Zoos

Within zoos, humans, either as tourists or as zookeepers, are constantly in close contact with wild animals. Some of these wild animals are dangerous, which puts humans at

risk of fatal attacks. This section highlights how humans are vulnerable to attacks from wild animals.

Animal Attacks Within Zoos

Zoos place tourists at increased risks of being attacked by animals. At the same time for these tourists, zoos are meant to be fun places where families can learn about several animal species. Additionally, animal enthusiasts can also closely observe a broad range of the world's most fascinating creatures from a safe distance behind established glass or concrete barriers or under controlled conditions (Packer & Ballantyne, 2010). However, in circumstances where tourists come into close proximity to wild animals, horrific tragedies strike and have been witnessed across multiple zoos around the world. To elaborate, on January 7th, 2009, a 32-year-old male tourist accidentally fell in a giant panda enclosure. The panda injured himself severely by biting his left calf, which left the panda leaving him with skin defect (Zhang et al., 2014). In some extreme attacks, the tourists lose their lives from animal attacks. For example, in 2012, a 21-year-old tourist visiting the Copenhagen Zoo in Denmark was killed by a Siberian Tiger after finding himself inside the tiger's den (Lovett, 2012). Therefore, the zoo environment is a danger to tourists who could end up suffering fatal attacks.

Zookeepers and trainers are also vulnerable to animal attacks. Zoos justify staying operational based on the fact that they have specialized trainers and staff members that can integrate with the animals, at times on a personal level (Zhang et al., 2014). However, there have been numerous reported incidents of zoo animals attacking zookeepers and other staff members. For example, in 2008 at the Singapore zoo, Nordin bin Mondong, a 32-year-old zoo cleaner, was mauled to death by three Bengal Tigers in front of visitors (Lovette, 2012). Other staff members could do little about it, and by the time the tigers were distracted, the damage had already been done. In another recent event in Zurich, Switzerland, a 55-year-old female zookeeper was attacked by a Siberian Tiger and died at the scene in front of visitors and her peers ("Tiger kills Zurich zookeeper," 2020). These series of devastating events go to

show that despite being versed with certain animal species, wild animals can still attack at any time. Furthermore, in the wild, big cats such as Bengal and Siberian tigers are naturally inclined to attack both prey and enemies. As such, in enclosed spaces, their natural instincts may prompt such attacks against humans.

The general human population surrounding zoos is also vulnerable to attacks once these wild animals escape. While zoos are designed to lock down dangerous animals and ensure that they do not pose significant danger to humans, these animals can also leap or climb their enclosures and find their way into cities or small towns. One such incident, involving a Siberian Tiger known as Tatiana, shocked residents of the U.S. Tatiana, despite not having prior aggression records towards humans, managed to escape its den and mauled three people in the nearby community (Lovett, 2012). Brothers Kulbir Dhaliwal and Amritpal Dhaliwal suffered multiple injuries, and a 17-year-old, Carlos Eduardo Sousa Jr., unfortunately succumbed to the attack by Tatiana. According to King (2021), investigations about the incident found that the San Francisco Zoo had inadequate trained staff and safety precautions, which led to the shocking incident. In fact, despite being at fault, the zoo eventually ended up killing Tatiana after she was found sitting beside one of the surviving brothers. Such incidents would be prevented if zoos are shut down when not properly monitored.

Incidents involving animals that are not caged can also be devastating to humans. The aforementioned incidents all involve animals usually locked in cages and are not always in direct contact with humans. At the other end of the spectrum, animals such as elephants, which are considered as relatively harmless to humans, are also a source of safety concern. Globally, there are numerous zoo-villages that provide people with the ability of interacting freely with animals (King, 2021). However, such environments can prove to be risky for humans. For instance, despite spending a significant amount of time with Patience, a 41-year-old elephant at the Springfield Municipal Zoo, John Bradford, a 62-year-old zookeeper, was killed by Patience after the elephant aggressively charged at him (Hamilton, 2013). Hamilton

(2013) further adds that humans tend to have a perilous relationship with elephants, especially since an estimated 500 individuals across the globe die annually from elephant related attacks. In this light, regardless of whether animals are enclosed or not, zoos certainly account as risky environments that could lead to the loss of life.

Conserving Biodiversity

Some critics may argue that zoos help conserve biodiversity by protecting endangered species that are on the verge of extinction. According to Olive and Jansen (2017), accredited zoos by the Association of Zoos and Aquariums (AZA) have the ability of participating in species survival plan programs. These programs incorporate multiple aspects of survival such as captive breeding, reintroduction programs, public education, and field conservation, all with the aim of ensuring that Earth's most endangered species survive. Globally, multiple accredited zoos have helped conserve many animal types from the verge of extinction. To elaborate, thanks to conservation efforts by zoologists in Phoeniz Zoo, the Arabian Oryx, a critically endangered species that was hunted to near extinction, was revitalized. According to Garnett et al. (2018) the captive breeding and reintroduction programs that saw 1,000 animals being released back into the world were a success. Likewise, combined efforts by Los Angeles Zoo and San Diego Wild Animal Park helped save the California Condor (where only 27 were left), from extinction (Browning, 2017). Currently, there are hundreds of California Condor birds flying in the Californian skies. These conservation efforts by zoos across the world are laudable.

Zoos' species survival plan programs (breeding and conservation efforts) have come under intense scrutiny over the years. First, studies indicate that a bulk of animal species being kept in most zoos across the world are not critically endangered or on the verge of extinction and only a few animals kept or bred in zoos are usually reintroduced back into the wild. In fact, in the decade between 2009 and 2019, Greenwald et al. (2017) mentions that only 23 endangered species have been successfully reintroduced, yet there are hundreds of species on allegedly zoos' breeding programs. Second, breeding programs are scrutinized for

creating some form of dependency. In other words, and as Gaille (2017) argues, young animals born from these breeding programs are likely to die immediately they are introduced into the wild, owing primarily to the dependency accrued during captivity. While examining the success and failure of captive breeding and reintroduction of Arctic foxes in Norway, Landa et al. (2017) found that the bred foxes were not adapted to the wild, and often ended up dying during the initial stages of the program. Therefore, it can be deduced, that these breeding programs are not as effective and reliable.

For Profit Zoos and Public Education

Zoos and large aquariums (e.g., those that host dolphins) attract large audiences from which zoo owners can profit. On the other hand, zoo proponents often cite that zoos are important to fund because they help educate the public. This section examines whether zoos are primarily established for profit-making.

For Profit Zoos

Some zoos charge high ticket prices, profits collected from which are not used for animal conservation. Indeed, zoos attract a large number of tourists that pay for the zoo tickets. Packer and Ballantyne (2010) state that globally "more than 600 million people – approximately 10% of the world's population – visit over 1300 zoos and aquariums throughout the world each year" (p. 25). From a business perspective, this statistic suggests that there is a significant customer base that both state and privately owned zoos can profit from. As previously highlighted, several zoo animals are neither endangered nor released back into the wild (Greenwald et al., 2017). Furthermore, Kantamneni (2014) adds that zoos often spend a major part of their profits in devising new ways to earn more income such as constructing meaningless attractions that focus more on appeasing tourists, and less on promoting animal welfare such as ensuring the facilities have proper sanitation. Kantamneni provides the example of United States' National Zoo that was being investigated for neglecting animal welfare, and the zoo cited lack of resources and funds, yet it had

established expensive facilities for visitors. Such examples suggest that zoo management and owners are more interested in profit-making than looking after the animals.

Zoos also exploit animals in the name of entertainment for substantial profits. While distinguishing between bad and good zoos, Safina (2018) found that bad zoos are those that use animals for entertainment shows among other cruel practices. Essentially, bad zoos are usually in the form of circuses and theme parks, which may be entertaining for the audience but are objectionable for the animal rights activists. In bad zoos, thousands of animals are trained to perform in circuses, and are usually caged in zoos to prepare them for the next shows. In China for instance, Baihu Park in Yongqiao District, a 67,000-square-meter park is said to be home to an estimated 200 circuses (You, 2016). Li Ping, head of art and culture at the Yongqiao Bureau of Culture, acknowledges that the circuses play a significant role in enhancing the district's economic development (You, 2016). Therefore, zoos and circuses are considered as a country's source of valuable income.

Apart from entertainment shows as an avenue for profits, many other zoo operations are also primarily designed to make profit. Zoos function similar to museums and make funds from a combination of stakeholders and sources such as private donors, admissions, selling merchandise, institutional donors, state governments, and financial aid from the city (Asch & Mulligan, 2017). For instance, in the case of San Diego Zoo, the most famous zoo across all of the United States, the zoo charges adults $50 for just a one-day ticket pass and $46 for children aged between 3 and 11 (Josephson, 2018). These charges are a substantial amount of money and often large families are disadvantaged when purchasing several tickets for just a day. Nevertheless, Asch and Mulligan (2017) argue that ticket sales alone cannot sustain the zoo. Since, the San Diego zoo is a not-for-profit organization, donors can provide tax-deductible donations that go directly to the zoo's budget. Additionally, the zoo also incorporates a broad array of opportunities to make money such as the annual Zoo Gala fundraiser that sells tickets at very high prices during the event and it attracts mass crowds. As such, the zoos are often oriented towards profit maximization through various means.

Zoo operations that focus extensively on raising funds, help explain the high salaries for zoo employees across the United States. In an article published in the *Philadelphia Times*, Weyrich (2006) mentions that Pete Hoskins, former head of the Philadelphia Zoo, was being paid $340,000 per month and was handed a golden parachute upon retirement. Further, Weyrich (2006) adds that despite such gross overpayment, the zoo ranked lowest among its counterparts based on the "'fund-raising efficiency' – basically, the Zoo spend too much money raising money" (para. 3). In addition, in 2004, when Philadelphia Zoo was laying off staff members because of a shortfall in its operating budget, the chief operating officer still pocketed an exit package and salary that totaled $473,770 (Kantamneni, 2014). These sums of money highlight the corruption in the zoo community, where officials pocket significant amount of money when the actual purpose of the collected money is to conserve endangered species and educate the public about animals. Therefore, it may be argued that a key reason for operating zoos is to make profits, usually at the expense of animals.

Zoos in Educating the Public

Critics may argue that zoos are an important educational resource. They educate the public, especially families and children, about the numerous animal species across the world, including some of which are usually not found within their countries' borders (Gaille, 2017). Staff members and specialized trainers are usually responsible for disseminating knowledge to the public on zoo grounds. According to Parker and Ballantyne (2010), for most urban city dwellers, a zoo visit is a rare but perfect opportunity to connect with and learn about nature. In fact, in the study by Parker and Ballantyne, one respondent was quoted saying that, "my strongest feelings were when I saw the dolphins and what smart amazing animals they are. Also the bears as to what their thought patterns are about people looking at them" (p. 29). The study also found that four months after the participants visited the zoo, 39% of them were able to cite new information about a certain species or a better understanding they had gained. In addition, 7% reported about adopting new actions geared towards supporting wildlife such as environmental responsibility, seeking further information, and volunteering

in environmental cleanups. Therefore, zoos should remain operational because they help people, especially children, realize the importance of nature and why it is necessary to take care of it.

Indeed, some zoos consider education about conservation and protection of wild animals as a part of their mission. However, over the years, researchers claim that there are some limitations to this increasing role (Irwin et al., 2013; Kantamneni, 2014). According to Irwin et al. (2013), in most instances, zoo visitors are usually on-site for a limited time and mostly for fun, and they therefore rarely get to comprehend the underpinnings behind animal conservation. Likewise, given that there is a lack of formal structure in zoos that builds on existing knowledge or reinforces visitors' knowledge, visitors may actively choose to be distracted or be disengaged completely with the learning experiences being offered by zoo staff members or trained specialists. In a different approach, Kantameni (2014) argues that zoo animals do not always exhibit their natural behaviors in enclosed spaces, but rather tend to lazy around and show signs of psychosis – a mental disorder usually in the form of a disconnection from reality. Therefore, despite being touted as being educational, zoos are mostly perceived as fun destinations to unwind for friends and families.

Conclusion

Zoos have been in existence for centuries, but their roles have changed over the years. In contemporary times, scientists largely consider them as entertainment hubs or research institutions. However, animal activists propose that zoos pose more harm to animals and humans than their perceived benefits. Essentially, zoos are criticized for promoting animal cruelty, animal attacks on humans, and for profit making.

There are many reasons for suggesting the shutting down alongside increasing scrutiny over the functioning of zoos. First, zoos are considered as hubs for promoting animal cruelty. Essentially, animals in the zoos are kept in in small cages, exposed to torture, and provided insufficient food. In addition, zoo animals are often considered a threat to tourists and zookeepers. Many zoo animal attacks have been reported in the past few years, thereby

there is a need to shut down of zoos. Another issue is that zoo owners often operate these facilities as profit-making centers in the name of conservation efforts. In order to accumulate profits, many zoos charge high ticket prices and hold fund raising events.

Opponents argue that such claims are exaggerated, and these facilities are often well-maintained by zookeepers that work hard to provide animals with environments similar to their natural habitats. Further, zoos are considered as important facilities for scientific research and educating the public about conservation efforts and animal species. Despite the critics' support for the functioning of zoos, these institutions pose more harm than benefits for the society in general by exposing helpless animals to artificial harsh environments and living conditions as well as exposing tourists and zookeepers to dangerous attacks.

Zoos are unlikely to be completely banned over the next few years and will likely continue to be built in multiple cities across the world. Nevertheless, it is important to realize that these facilities are often more beneficial for zoo owners to make profits rather than protecting animals. Therefore, governments and animal right activists must work toward stringent legislations that zoos should be forced to follow and shut down zoos that operate against animal welfare practices.

References

Asch, S., & Mulligan, T. (2017). Organizational resiliency: The world-famous San Diego zoo way. *Leader to Leader*, *2017*(83), 53-58. doi:10.1002/ltl.20277

Browning, A. (2017, May 19). 10 endangered species saved from extinction by zoos. *Medium*. https://medium.com/taronga-conservation-society-australia/10-endangered-species-saved-from-extinction-by-zoos-682c454d0125

Carisch, L., Müller, D.W., Hatt, J.M., Bingaman Lackey, L., Rensch, E.E., Clauss, M., & Zerbe, P. (2017). Seasonal mortality in zoo ruminants. *Zoo Biology*, *36*(1), 74-86. doi:10.1002/zoo.21337

Gaille, L. (2017, June 4). 21 Pros and cons of zoos. *Vittana*. https://vittana.org/21-pros-and-cons-of-zoos

Garnett, S., Woinarski, J., Lindenmayer, D., & Latch, P. (Eds.). (2018). *Recovering Australian threatened species: A book of hope*. CSIRO Publishing.

Greenwald, N., Suckling, K. F., Hartl, B., & Mehrhoff, L.A. (2019). Extinction and the US endangered species act. *PeerJ*, *7*, e6803. doi:10.7717/peerj.6803

Gupta, B.K., & Chakraborty, B. (2005). The role of zoos in the rehabilitation of animals in the circus. *Journal of Applied Animal Welfare Science*, *8*(4), 285-294. doi:10.1207/s15327604jaws0804_5

Hamilton, M. (2013, October 11). Elephant named patience attacks and kills Missouri zookeeper. *Los Angeles Times*. https://www.latimes.com/nation/nationnow/la-na-nn-elephant-kills-missouri-zookeeper-20131011-story.html

Irwin, M. D., Stoner, J. B., & Cobaugh, A. M. (Eds.). (2013). *Zookeeping: An introduction to the science and technology*. University of Chicago Press.

Josephson, A. (2018, May 21). The economics of zoos. *Smart Asset*. https://smartasset.com/taxes/the-economics-of-zoos

Kantamneni, V. (2014, August 4). Top 5 misleading clams zoos make. *One Green Planet*. https://www.onegreenplanet.org/animalsandnature/top-misleading-claims-zoos-make/

King, B. J. (2021). *Animals' best friends: Putting compassion to work for animals in captivity and in the wild*. University of Chicago Press.

Kohn, B. (2001). Zoo animal welfare. *Revue scientifique et technique (International Office of Epizootics)*, *13*(1), 233-245. https://www.oie.int/doc/ged/D8882.PDF

Landa, A., Flagstad, Ø., Areskoug, V., Linnell, J. D., Strand, O., Ulvund, K. R., ... & Eide, N. E. (2017). The endangered Arctic fox in Norway—the failure and success of captive breeding and reintroduction. *Polar Research*, *36*(1), 9. doi:10.1080/17518369.2017.1325139

Learmonth, M.J. (2019). Dilemmas for natural living concepts of zoo animal welfare. *Animals*, *9*(6), 318-331. doi:10.3390/ani9060318

Loh, T.L., Larson, E.R., David, S.R., de Souza, L.S., Gericke, R., Gryzbek, M., ... & Knapp, C.R. (2018). Quantifying the contribution of zoos and aquariums to peer-reviewed scientific research. *Facets*, *3*(1), 287-299. doi:10.1139/facets-2017-0083

Lovett, E. (2012, July 19). Five shocking zoo attacks. *ABC News*. https://abcnews.go.com/International/shocking-zoo-attacks/story?id=16814294

Mihailovic, Z., Savic, S., Damjanjuk, I., Stanojevic, A., & Milosevic, M. (2011). A case of a fatal Himalayan black bear attack in the zoo. *Journal of Forensic Sciences*, *56*(3), 806-809. doi:10.1111/j.1556-4029.2011.01721.x

Olive, A., & Jansen, K. (2017). The role of accredited zoos in the recovery process for species at risk in Canada. *The Canadian Geographer/Le Géographe Canadien*, *61*(3), 319-333. doi:10.1111/cag.12394

Packer, J., & Ballantyne, R. (2010). The role of zoos and aquariums in education for a sustainable future. *New Directions for Adult and Continuing Education*, *2010*(127), 25-34. doi:10.1002/ace.378

Safina, C. (2018). Where are zoos going—or are they gone?. *Journal of Applied Animal Welfare Science*, *21*(sup1), 4-11. doi:10.1080/10888705.2018.1515015

Skovlund, C.R., Kirchner, M.K., Moos, L.W., Alsted, N., Manteca, X., Tallo-Parra, O., ... & Forkman, B. (2021). A critical review of animal-based welfare indicators for polar bears (Ursus maritimus) in zoos: Identification and evidence of validity. *Animal Welfare*, *30*(1), 1-18. doi:10.7120/09627286.30.1.001

Tiger kills Zurich zookeeper in front of visitors and staff. (2020, July 5). *BBC News*. https://www.bbc.com/news/world-europe-53294245

Weyrich, N. (2006, July 24). Contrarian: Dialing for dollars. *Philadelphia Times*. https://www.phillymag.com/news/2006/07/24/philadelphia-magazine-contrarian-dialing-for-dollars/

Zhang, P., Wang, T., Xiong, J., Xue, F., Xu, H., Chen, J., ..., & Jiang, B. (2014). Three cases giant panda attack on human at Beijing Zoo. *International Journal of Clinical and*

Experimental Medicine, *7*(11), 4515-4518.

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4276236/