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A Home for Hope: Examining the History, Role and Purpose of the Modern American Zoo

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"I am personally not against keeping animals at zoos, as they serve a huge educational purpose, but treating them well and with respect seems the least we could do, and with 'we' I mean not just zoo staff, but most certainly also the public."[1]

When Frans de Waal, a preeminent primatologist and author, opened his December 27, 2007 article in the Huffington Post with this assertion, he captured how the landscape surrounding zoos had changed even in the lifetimes of people alive today. Though zoos once only served as entertainment, educational programs are now common at zoos, as are messages about the ways that visitors can and should engage in the conservation of the Earth and its animals. These programs are integral to the picture of the modern zoo and have popped up in the space of only one generation or less for some facilities. The changes aren't only from the human perspective—the animals in zoos are living in larger and more naturalistic enclosures now than they were even in the recent past, and more efforts are being made to save these species from extinction both in zoos and in their native habitats. Simply put, in terms of impact on the greater moral good, modern zoos are contributing greatly in the positive direction based on their programs to better the lives of humans and animals alike.

This will be an examination of the history of zoos, or more accurately of animals being owned and cared for by humans, as the term "zoo" is a more recent invention and its definition is still somewhat contentious. Also up for inspection will be the interplay between their societal roles and their purpose to their animals/visitors. This will be accomplished by evaluating the situations throughout history where humans have kept animals, as these practices have informed the practices at modern zoos and the private/governmental organizations and regulations that oversee them. The

[1] Waal, Frans de. "Jump, Tiger, Jump!" *The Huffington Post*, TheHuffingtonPost.com, 7 Dec. 2017, www.huffingtonpost.com/frans-de-waal/jump-tiger-jump_b_78437.html.

many roles carried out by zoos, such as field conservation, in-house breeding programs, and educational programs, will also be discussed. However, running a zoo is not an easy task, so the constraints which bind them will also be considered. Additionally, there are many groups and individuals which oppose the existence of zoos, and their views will be voiced and critiqued. Finally, this is an era where the media has shaped public perceptions of many topics, so the potential ways that popular media has shaped perceptions of zoos will be considered.

Following the discussion of the history of zoos, this will be a focus on the modern American zoo. This is not meant to be a statement on the superiority of American facilities in this realm, but rather on the fact that the zoological landscape even within this one country is diverse, rife with history, and rife with regulations, so combined with the diversity, history, and regulations from other locations around the world, it would be very difficult to draw conclusions about anything on the global scale. It is also not a malicious exclusion of aquariums—in fact, much of what can be said of the regulations and practices surrounding zoos can be applied to aquariums as well—but the focus on specifically zoos again allows for more specificity in arguments. "Modern" will be defined as the 21st century. There was no single moment in history where practices or mindsets surrounding zoos radically changed—it's been more of a ripple effect—so it is difficult to divide the history into distinct eras, but if one were to compare the landscape even in the 1990s to the landscape today, clear differences would emerge. This is also a period where the role of the Internet and social media has changed the ways that organizations are targeting consumers and framing/mediating discussions.

Defining the terminology of the zoo community

Before the history and role of the modern American zoo can be examined, it is necessary to define what exactly a zoo is. This is a common point of contention, as there is not an official

definition or a set of qualifications that a facility must meet to call itself a zoo.[2] This can lead to confusion not only on the part of the people whose careers revolve around animals, but also for laypeople. Many people only visit a handful of facilities with animals in their lifetime, so it would be easy to extrapolate the conditions in the facilities with which one is familiar to represent the care at large of animals by humans. Because of this ambiguity in what a zoo is, people can use it to sway public opinion on zoos. Those who oppose zoos can cite subpar facilities as the strongest evidence that the entire practice of keeping animals in captivity is cruel and inhumane, while the camp in favor of zoos will attempt to distance themselves as much as possible from such facilities and instead only discuss the benefits contributed to the world by the high-quality facilities. Since both sides are pointing to facilities that are called "zoos," they could both be making valid arguments, but the facilities are very different in terms of care and programming, so oftentimes, they are not arguing about the same places. This suggests that better terminology is needed to separate out different types of facilities. Several agencies have attempted to establish definitions and standards for what a zoo is and is not, but in some cases, these definitions clash with one another, so it is difficult to definitively pin down the identity of a facility.

Therefore, the different definitions will be comparatively analyzed. This will aid in the establishment of a working definition that can be used such that, except in the context of quotes from sources that use the term, the term "zoo" will have a single established meaning and dispel ambiguity. Several terms for non-zoo facilities will also be defined for a similar purpose.

The first term is "zoo" itself. The Merriam-Webster Dictionary defines it as "a facility with usually indoor and outdoor settings where living, typically wild animals are kept especially for

[2] Garner, Rachel. "How to Understand Zoo Terminology." *Why Animals Do the Thing*, 29 Sept. 2016, www.whyanimalsdothething.com/how-to-understand-zoos-glossary/.

public exhibition."[3] The first thing one would notice about this definition is that it has multiple subjective parts—a zoo usually has both indoor and outdoor spaces, but that is not requisite; the animals at zoos are typically wild, but they do not have to be. Leaving the definition this open and subjective could allow many facilities to be classified as zoos that other definitions would exclude. That's not inherently bad, but the goal here is to establish a more firm, objective definition, so further guidelines are needed.

The Association of Zoos and Aquariums (AZA), the agency that accredits the most zoos and aquariums in the United States, defines a zoological park/aquarium as the following[4]:

> "a permanent institution which owns and maintains wildlife, under the direction of a professional staff, provides its animals with appropriate care and exhibits them in an aesthetic manner to the public on a regular basis. The institution, division, or section shall further be defined as having as their primary mission the exhibition, conservation, and preservation of the earth's fauna in an educational and scientific manner."[5]

There is a lot to unpack here. First, the facility must be permanent, which would disqualify circuses and similar traveling groups from consideration. Next, they must both own and maintain the wildlife, so preserves like those in Africa where a person may own the land but does not own or provide care to the wildlife would not qualify. "Professional staff" is subjective—if the definition means that the people caring for the animals are doing it as their main profession for pay, that fits with what happens at zoos (if one excludes interns and volunteers who tend not to be the primary caregivers). "Appropriate care" is also subjective; different people could have different

[3] "Zoo." *Merriam-Webster*, Merriam-Webster, www.merriam-webster.com/dictionary/zoo.
[4] "About Us." *Association of Zoos and Aquariums*, 2018, www.aza.org/about-us.
[5] Staff, AZA. "The Guide to Accreditation of Zoological Parks and Aquariums 2018 Edition." *Association of Zoos and Aquariums*, 2018.

interpretations of what is appropriate. AZA has standards for what they believe to be appropriate, but other groups/individuals could disagree. What qualifies as an "aesthetic manner" for displaying animals is also subjective, as is "a regular basis." The first half is just too subjective to make any sense of—different people and cultures find different things to be aesthetically pleasing—but the second half is more decipherable: it leaves room for animals to be out of the public eye for a certain amount of time each day, or even for entire seasons for some animals. The last sentence seems fine—it only asks that zoos/aquariums have certain primary goals in their mission statements—but mission statements are merely statements of the goals the facility hopes to achieve, so they are not legally binding, and an institution could get away with not living up to their mission statement. Therefore, while this definition gets more closely at the conditions at modern zoos than the dictionary definition, it still contains several words/phrases that are ambiguous, so it is still not the "perfect" definition one would hope for.

It is also important to consider the history of AZA when evaluating their definition. It began in the 1920s as a branch of an organization for executives of parks, so it was initially just an organization for collecting and sharing ideas among zoo directors.[6] It wasn't until the 1970s that membership became selective and the accreditation process was developed. There was a drop-off in zoos that belonged to the American Association of Zoological Parks and Aquariums, as it was known then, after this move. This meant that there were just a handful of zoos on which they based their definition, as they would want to write one that encompassed all the member institutions but excluded (intentionally or unintentionally) non-members. Even today, the board of directors for AZA is made of top executives from member zoos and aquariums; for instance, the current chair

[6] Donahue, Jesse, and Erik Trump. *American Zoos during the Depression: A New Deal for Animals*. McFarland, 2010.

of the board is Jim Breheny, the director of the Bronx Zoo.[7] This would suggest that the people writing the definition would have an incentive to write a definition that unequivocally includes their home institutions, making it a definition that is biased toward zoos with the clout to have their executives in power nationally. In other words, the AZA view of the zoo is often presented as the view of the zoo because of their position within the community, but perhaps they have too limited of a view to encompass all the facilities that could reasonably be included.

Even from this limited discussion of their history and definition, it is easy to see that AZA presents themselves as the preeminent institution in the zoological community.[8] However, as is common in institutions that presents themselves as such, there is a group that has broken away from AZA and is building itself up to be a competitor: the Zoological Association of America (ZAA). For much of its history, AZA was the only such organization, but eventually, malcontent was brewing among some of its members over the focus that they felt AZA was placing on marketing instead of the animals, so they decided to break away from AZA and form their own zoological accreditation agency. [9] This group was led by Ron Blakely, who was also a founder of AZA and was the director of the Sedgwick County (Kansas) Zoo at the time, and they broke away in 1987 to form the International Society of Zooculturists.[10] In 2003, this agency merged with the United Zoological Association to become the Zoological Association of America. Today, ZAA is an organization with fewer members (60, currently), but just as much passion for animal care.

It's difficult to determine how ZAA defines a zoo for their accreditation, because they don't. One hallmark of the organization is that they do not only accredit zoos, but also other animal

[7] Staff, AZA. "Board of Directors." *Association of Zoos and Aquariums*, www.aza.org/board-of-directors.
[8] Garner, Rachel. "How to Understand Zoo Accreditation." *Why Animals Do The Thing*, 4 July 2016, www.whyanimalsdothething.com/how-to-understand-zoos-accrediation/.
[9] "About ZAA." *Zoological Association of America*, zaa.org/about-zaa.
[10] "History of ZAA." *Zoological Association of America*, zaa.org/about-zaa/history-of-zaa.

care facilities that meet a set of criteria. In fact, the word "zoo" is not present in any form in their mission statement, instead referring to "privately funded and publicly funded facilities."[11] This would suggest that the term "zoo" does not carry a formal definition within the organization and is rather just a name for individual institutions to use as they wish. This, of course, contributes to the confusion about what a zoo is, as ZAA is placing zoos and non-zoos in the same basket by not establishing a definition or standards to make zoos unique from other animal care facilities.

This confusion begs the question: if an animal care facility is not a zoo, then what is it? Are there other terms that can be used to signify such facilities? Yes, and there is a professional organization that can help in defining one of them. The most common type of non-zoo facility is the animal sanctuary, which are managed by the Global Federation of Animal Sanctuaries (GFAS). Like AZA and ZAA, they offer accreditation to facilities that they have found to be meeting certain standards, and in the same vein as ZAA, their one stamp of approval is offered to multiple kinds of facilities. However, they more clearly delineate the different types of facilities: sanctuaries provide lifelong care for animals in need, rescue centers offer temporary care for animals destined for private ownership or sanctuaries, and rehabilitation centers provide temporary care for animals and then return them to the wild.[12]

These distinctions between types are not too important, though; the important part is that they are distinguishing themselves from zoos. For instance, the two latter types of facilities are meant to be temporary housing for the affected animals, while zoos are generally thought to be permanent homes for their animals. Another distinction is that all the types of sanctuaries do not necessarily have to be open to the public, while it is stated in the AZA definition of a zoo that the

[11] Staff, ZAA. "Accreditation." *Zoological Association of America*, zaa.org/accreditation.
[12] "Who Can Apply." *Global Federation of Animal Sanctuaries*, 2018, www.sanctuaryfederation.org/for-sanctuaries-2/definitions/.

animals must be displayed to the public on a regular basis. Also, sanctuaries generally do not breed their animals, and they often will even take steps to prevent births if they are the first type, the "true sanctuary," either by housing males and females separately or by sterilizing some or all animals[13]. In contrast, many zoos engage in extensive breeding programs for their animals.

The history and organization of GFAS may call into question the reputations of their accredited facilities as centers of animal welfare, as will be discussed later. However, they have at least established standards of care to which they hold their members. This would seem to place them above those facilities that do not meet the requirements for accreditation by any agency. These would be facilities of the lowest quality, where the welfare of the animals could be seriously questioned.

One trend in the discussion of such facilities is to call them "roadside zoos," to distinguish them from sanctuaries or other zoos. However, like the other terms discussed here, there is not a consensus definition for roadside zoo, so it can be used differently in different contexts to fit the speaker's individual needs and opinions. It is a phrase made from ambiguous parts, so it is easy to manipulate it based on the situation, and it is primarily used to evoke an emotional response rather than describe the facility or its location relative to a road. It is frequently used in literature targeting specific facilities or this type of facility in general, but it is rarely defined in that literature.[14] People for the Ethical Treatment of Animals (PETA) uses it to indicate a facility where the animals are actively being deprived of their basic needs, while the Humane Society of the United States (HSUS) softens their definition to suggest that there is not active deprivation, but there is also not

[13] Staff. "If Tigers Are Endangered, Why Are You Neutering Those You Rescue?" *The Wildcat Sanctuary*, 3 Apr. 2017, www.wildcatsanctuary.org/tigers-endangered-neutering-rescued-tigers/.
[14] "Mobile Zoos." *Freedom for Animals*, 3 Sept. 2017, www.captiveanimals.org/news/2013/11/exposed-horror-as-unspeakable-conditions-for-animals-at-mobile-zoo-business-are-revealed.

skilled care being given.[15,16] AZA has the loosest definition of all, as they have been known to call any facility that doesn't carry their accreditation a "roadside zoo."[17] Even the members of organizations that frequently used the phrase cannot always come to a consensus about what it means; the above organizational definitions only capture the opinions in the room at select times, not well-established and consistent ones. And yet, those organizations continue to ask the public to abhor the roadside zoo without providing clear standards or examples to help people make smart choices about facilities to visit. Therefore, because of this subjectivity and ambiguity, some in the animal care community have proposed eliminating the term in favor of "menagerie."

This new term is not new at all, having been used throughout history to signify collections of animals that people would have on display for entertainment or to show off their prestige. In 17th-century France (the country of origin), it was defined as:

> "…originally for the management of the household or domestic stock, but later primarily for an aristocratic or royal animal collection. The French-language "Methodical Encyclopaedia" of 1782 defines a menagerie as an "establishment of luxury and curiosity." Later on the term was referred even to traveling animal collections that exhibited wild animals at fairs across Europe and the Americas."[18]

In modern times, it is defined by Merriam-Webster as "a: a place where animals are kept and trained especially for exhibition; b: a collection of wild or foreign animals kept especially for

[15] "Zoos and Other Captive-Animal Displays." *PETA*, www.peta.org/issues/animals-in-entertainment/zoos-pseudo-sanctuaries/.
[16] Staff, HSUS. "Roadside Zoos Are Not Zoos." *Humane Society of the United States Close Up Report*, vol. 28, Sept. 1980.
[17] Garner, Rachel. "What's in A Word: Why It's Time to Retire 'Roadside Zoo.'" Why Animals Do The Thing, 7 Sept. 2017, www.whyanimalsdothething.com/whats-in-a-word-roadside-zoo.
[18] "Zoo." *Zoo - New World Encyclopedia*, 2 July 2013, www.newworldencyclopedia.org/entry/Zoo.

exhibition."[19] This definition helps distinguish these facilities from zoos and sanctuaries; it states that the primary purpose of a menagerie is for exhibition and entertainment, while zoos' main purposes tend to be animal-based conservation and education and the main purpose of sanctuaries is care and rehabilitation of animals.

Even so, if menagerie is to be used to denote certain facilities, it must be made clear what exactly the term is implying about a facility. Does being a menagerie automatically mean that a facility is of a poor quality? In short, yes, if that's the meaning chosen for it. Facilities that display some or all of these qualities can be considered menageries: "low quality of animal welfare, a high density of animals in close proximity, animals living in cages rather than exhibits, pay-to-play schemes or other public/animal interactions, and a prioritization of entertainment and/or profit over education and conservation messaging."[20] This hearkens back to the historical menageries where such conditions were typical. This history and the conditions in which animals were kept will be covered later, but for now, it suffices to say that they contrast starkly with the modern zoo, so it is an accurate comparison and menagerie is a good term to use for modern shoddy facilities.

In addition to the terms used to define different types of animal care facilities, it is necessary to define some terms that are frequently used in and around these facilities. The first pertains to the physical space an animal is occupying within the facility. One common term used here would be "cage," but this has not been an accurate description in decades; this phrase evokes images of metal bars, concrete floors, and not much else, but except perhaps in menageries, animals are not kept in such conditions anymore. Even the alternative "exhibit" sells short the full

[19] "Menagerie." *Merriam-Webster*, Merriam-Webster, www.merriam-webster.com/dictionary/menagerie?utm_campaign=sd&utm_medium=serp&utm_source=jsonld.
[20] Garner, Rachel. "'Menagerie': A Proposal For Replacing The Term 'Roadside Zoo'." Why Animals Do The Thing, 7 April 2017, www.whyanimalsdothething.com/menagerie-roadside-zoo/.

purpose of the space at some facilities, as it implies that the animals are just something at which to look. If the animals are present only for exhibition or entertainment, then it could be correct, but the animals at sanctuaries and zoos are there for rehabilitation, conservation, education, or some other advanced purpose beyond entertainment.

Therefore, many prefer "enclosure." This accurately conveys that the animals are constrained to a given amount of space and separated from one another and from humans but does not have any connotations for what the animals are doing within that space or the conditions of that space. This means that even in situations where one could reasonably assign one of the former terms, enclosure could still be used.

The next term also pertains to the condition of animals occupying a certain space, but more specifically to the human-mediated aspect of them being in that situation. The most familiar term for this is that the animals are "in captivity." This is not technically untrue, but it again has negative connotations and sells short the reality of the situation. The animals are held within a certain space and therefore do not have the ability to move around the world freely, so this fits the bill for being "captive." However, when talking about non-menagerie situations of captive animals, that "loss of freedom" tends to mean a gain of other benefits, so to define them only by that one facet portrays a limited perspective. Plus, the term is usually used to evoke an emotional response from people, as it inspires thoughts of animals in small enclosures or in chains such that their movement is restricted, and they are deprived of their basic needs. Because of this, it is more commonly used by those that are opposed to zoos and other such facilities than those in favor of them. Therefore, those who want to put a neutral-to-positive spin on things use "in human care" instead. This conveys the fact that humans are helping the animals meet some or all their basic needs but does not comment on the restricted nature of the situation.

The last set of terms to establish are perhaps the most controversial: animal rights and animal welfare. These terms may seem synonymous, and taking them at face value, they are. However, different groups and individuals have latched onto both and given them greater meaning than the sum of the words. Those who align themselves with "animal rights" are of the belief that animals are endowed with basic rights just like humans are, among these being respect, freedom to live and grow at their own pace, and freedom to not be used for the spectacle of humans, and that it as is immoral for humans to violate these rights as it is to violate a person's human rights.[21] The other side, those who call themselves proponents of animal welfare, believe that humans do have a responsibility to animals that are in their care to provide quality care to them to promote the animals' "collective physical, mental, and emotional states."[22] The relative accuracy of these two positions is not what is so controversial; rather, it is how the two camps choose to assert their positions and what things they think are violations of those positions. In general, animal rights activists are more anti-captivity than animal welfare activists, and this can often be extrapolated or stated outright as them being anti-zoo. The views of both will be fleshed out in greater detail later, but for now, these definitions convey their arguments well enough.

So where does this leave things? Zoos are permanent institutions that own and maintain wildlife, provide their animals with proper care and exhibit them for the public regularly, and have missions that include conservation and education. Sanctuaries are facilities that provide skilled care to animals in need, either temporarily or permanently. Everything else can be considered a menagerie. The preferred terms are enclosure rather than cage or exhibit, and "in human care" rather than "in captivity." Animal welfare proponents believe that humans have a responsibility to

[21] March, B. E. "Bioethical Problems: Animal Welfare, Animal Rights." *BioScience*, vol. 34, no. 10, Nov. 1984, pp. 615–620., doi:10.2307/1309525.
[22] Miller, Lance. "Animal Welfare Committee." *Association of Zoos and Aquariums*, 2017, www.aza.org/animal_welfare_committee.

uphold the wellbeing of the animals in their care, and animal rights proponents take it a step further and believe that animals have a right for the humans to do so for them.

The historical journey toward the modern zoo

For as long as humans have existed, they have been interacting in some way with animals. At first, this was just a hunter-prey relationship, but then at some point, people decided that they could have other uses for animals. This required that the animals be domesticated, which just means that they were adapted to fit human needs.[23] The domestication of both animals and plants first occurred about 12,000 years ago. Thanks to domestication, humans could more easily engage in agriculture, and this is not the only benefit that humans have gained from domestication over the years—we like having domesticated animals as our pets and service animals and we even enjoy watching some of them, like horses and greyhounds, compete in races. In addition, the animals have gotten something out of the deal—to date, no species of domesticated animal has gone extinct.[24] As should be clear, animals and humans have benefited from interacting with one another for many, many years, which has been realized in many ways in different eras.

When someone has excess wealth, it is common to want to show that wealth off. However, the ways in which people have chosen to display their wealth has changed over the years. One way that people hundreds or even thousands of years showed off their status and wealth was with the ownership of non-agricultural animals.[25] This rang especially true during eras of economic downturn or famine—the continued ownership of an animal that was not necessary for feeding

[23] National Geographic Society. "Domestication." *National Geographic Society*, 9 Oct. 2012, www.nationalgeographic.org/encyclopedia/domestication/.
[24] Driscoll, C. A., et al. "From Wild Animals to Domestic Pets, an Evolutionary View of Domestication." Proceedings of the National Academy of Sciences, vol. 106, no. Supplement_1, 15 June 2009, pp. 9971–9978., doi:10.1073/pnas.0901586106.
[25] Urmson, Ceri Jade. "Companions, Playmates and Status-Symbols: Pet-Keeping in Medieval England." *University of Nottingham*, 2016.

your family or otherwise supporting your livelihood showed others that you had enough money after providing for your human family's needs that you were able to feed and care for another creature. In Medieval England, most commonly, these were "companion animals" such as the dogs and cats that are kept as pets today, but for the most wealthy and powerful individuals, this could include more exotic animals. For instance, the royal family of England was gifted several exotic animals that lived in their menagerie, and these animals eventually became the first animals at the London Zoo.[26] However, this was far from the first such facility.

The world's "first zoo" was unearthed by archaeologists in Hierakonpolis, Egypt and is thought to date back to 3500 BCE. [27] This, though, appears to be the private collection of a societal elite, so it would be closer to the world's "first menagerie." A better model for the world's first zoo comes about 2000 years later in the 11th century BCE when the king of Assyria, Ashur-bel-kala, established public zoological and botanical gardens.[28] Like the London Zoo that followed thousands of years later, it was primarily comprised of animals that had been gifted to Assyria by other nations in addition to ones that the king himself had collected while hunting. Reports from the time state that the king was known to have crocodiles, apes, and camels. While the housing situation was likely similar to the private owners of the time, and the animals were just for showing off the wealth and power of the country, what makes this case different from the private owners was that the animals were managed in public and everyone, not just the powerful elites who were

[26] "The Tower of London Menagerie." *Tower of London*, Historic Royal Palaces, 2018, www.hrp.org.uk/tower-of-london/history-and-stories/the-tower-of-london-menagerie/.
[27] Boissoneault, Lorraine. "Leopards, Hippos, And Cats, Oh My! The World's First Zoo." *JSTOR Daily*, ITHAKA, 12 Nov. 2015, daily.jstor.org/leopards-hippos-cats-oh-worlds-first-zoo/.
[28] "Prehistoric Menageries." *Worldwide Zoo Database*, 15 Dec. 2016, www.wzd.cz/zoo/zoo_history/hist_mesopotamia.htm.

privileged enough to visit the king's palace, were able to view the animals. So, no doubt it was still a menagerie, but it was ahead of its time in making the animals a public commodity.

It was situations like this, one or more powerful individuals owning and caring for animals that they allowed (at least some) people to visit, that laid the foundation for the zoos of today. More accurately, though, they are the basis for the world's first menageries, as these animals were not serving any sort of educational or conservation purpose, nor were they being rehabilitated or offered sanctuary with their owners. This is an important distinction to make—facilities that in any way resemble the modern zoo did not appear until the 18th or 19th century, and the naturalistic exhibit designs and missions beyond entertainment were not present until the 20th century. Therefore, the history of the zoo is really the history of the menagerie, which eventually gave rise to the zoos of today.

As mentioned before, pinpointing the first zoo, period, can be difficult, as it depends on the definition of zoo that one uses. The same is true when determining the first "modern" zoo. How far back in history can one go and still consider it to be modern? How accessible to the public did the animals need to be? Can a facility still be called "the world's first zoo" if its conditions and/or mission more closely resemble what we now consider to be characteristic of a menagerie? Because of these questions, many facilities can claim the title of "first modern zoo." However, let's focus in on the last question to get closer to an answer. Zoos can easily be distinguished from menageries because menageries only serve the purpose of entertaining the public, while zoos have other purposes such as conservation or education. These "extra" purposes might appear to be only recent additions to the zoo system, but some zoos have been engaged in this kind of work for hundreds of years. The Ménagerie du Jardin des Plantes in Paris, France, which opened in 1793,

was the first public animal care facility to be founded with the mission of research and education.[29] For this reason, it could claim to be the first zoo; however, as one could notice from the name, it was founded as, and likely resembled, a menagerie.

While perhaps willing to cede the "first" title to their neighbors in France, the Tiergarten Schönbrunn in Vienna, Austria, makes another unique claim about their zoo: the world's oldest.[30] This zoo opened to the public in 1765 and is still open today, although in a form that would look foreign to those who visited in the 18th century as they have updated to fit with modern standards. It is the oldest zoo that is still open, but because it more closely resembled a menagerie in its early day, it does not have as strong of a claim on the "first zoo" title as the Paris facility.

Even the London Zoo could lay claim to the "first zoo" title—when they opened in 1828, they were the first to call their facility a zoological garden; however, the zoo was not accessible to the public until 1847, as it served as a center for scientific study for its first twenty years.[31] The source of those first zoo animals may also lend itself toward London's case for "first zoo"—like the Tiergarten Schönbrunn, some of the first animals came from two royal menageries. Animals from lions to polar bears to elephants had been kept in the Tower of London since the 1200s after they had been given to the king by the heads of other countries.[32] Various animals cycled through the castle for close to 600 years, and reports indicate that many animals lived in cramped, unsanitary conditions—the smell was apparently quite offensive to visitors—and that an elephant

[29] "Ménagerie, the zoo of the Jardin des Plantes." *Muséum national d'Histoire naturelle*, www.mnhn.fr/en/visit/lieux/menagerie-zoo-jardin-plantes. Accessed 16 Sept. 2017.
[30] Parks, Cara. "The World's Oldest Zoo Is a Modern Attraction with a Storied Past." *Smithsonian.com*, Smithsonian Institution, 11 Nov. 2015, www.smithsonianmag.com/travel/zoo-endured-inside-worlds-oldest-zoo-180957191/.
[31] "Landmarks in ZSL History." *Zoological Society of London (ZSL)*, www.zsl.org/about-us/landmarks-in-zsl-history.
[32] "*Tower of London*, 2018.

died after a short time there despite having a dedicated keeper and its own quarters.[33] Because concerns were raised by the Royal Society for the Prevention of Cruelty to Animals about the conditions in which the animals were living and the potential nuisance they created for visitors, all the animals were removed in 1836, with 150 going to the new zoo and the rest to circuses and other zoos.[34] The other menagerie was at Windsor Castle, but tracking down its history has proven more difficult as Windsor Castle both had its own animals and was a favorite stopping place for George Wombwell's traveling menagerie when it was in town.[35] They were also the inventors of the term "aquarium," which they created from the phrase "aquatic vivarium."[36]

The London model of the zoo, a public park full of animals that could be used not only for scientific research but also as an attraction for the people to enjoy, was what inspired the opening of zoos on two new continents around this time; the Central Park Zoo in New York City opened in 1861 and the Melbourne Zoo in Australia opened in 1862.[37,38] The Philadelphia Zoological Society had plans as early as 1859 to open a zoo of their own, but that plan was delayed by the American Civil War, so while the Philadelphia Zoo did not open until 1874, they sometimes claim the title of "America's first zoo."[39] During the late 19th century, more zoos were being founded

[33] BTT Ltd. "The First Jumbo." *Jumbo Water Tower*, Save Jumbo, 2007, www.savejumbo.org.uk/firstjumbo.html.
[34] Phillips, Keri. "The Ethical Evolution of Zoos." *Radio National*, ABC, 21 Oct. 2015, www.abc.net.au/radionational/programs/rearvision/the-ethical-history-of-zoos/6869776.
[35] Casey, Constance. "Hippos and Monkeys and Chimps, Oh My! The History of the London Zoo." *The New York Times*, The New York Times, 3 July 2017, www.nytimes.com/2017/07/03/books/review/london-zoo-history-isobel-charman.html.ele
[36] *New World Aquarium*
[37] de Courcy, Catherine. "Melbourne Zoo – 150 Years in Royal Park." *Culture Victoria,* 2012, cv.vic.gov.au/stories/land-and-ecology/melbourne-zoo-and-you-150-years/melbourne-zoo-150-years-in-royal-park/.
[38] "History of Central Park Zoos." *NYC Parks*, New York City Department of Parks & Recreation, www.nycgovparks.org/about/history/zoos/central-park-zoo.
[39] "Spotlight: The Philadelphia Zoo." *The Philadelphia Zoo | West Philadelphia Community History Center*, westphillyhistory.archives.upenn.edu/history/spotlights/philadelphia-zoo.

across America, with notable examples being those in Cincinnati (1873), Denver (1896), and Chicago's Lincoln Park (1868).[40]

American zoos were steadily multiplying and growing in the first few decades of the 20th century as well…until the Great Depression started. During this time, zoo directors had to justify their continued existence to a disgruntled public—why should the lion in the zoo be fed steak when families are struggling to put even the most basic food on their tables? Zoos responded to this with honesty and cuts of their own.[41] Some zoo animals were fed less frequently, and some zoos chose to forego building new buildings and making improvements to existing ones to devote those funds to keeping their animals fed and alive.[42] Also, most zoos in this era charged little to nothing for admission, so zoos became financially-sustainable places for unemployed or underemployed individuals to visit and break up the monotony of staying home all day.[43]

Interestingly, many zoos benefited from the Great Depression. One of President Franklin Delano Roosevelt's ideas for how to alleviate the unemployment crisis was to create programs to put young people to work through the New Deal program. This had many different iterations over the years—the Works Progress Administration (WPA) and the Civilian Conservation Corps, being the two most popular.[44] These programs provided jobs, albeit labor-intensive and low-paying ones, to young men. One common job was building or renovating government buildings, which was helpful to zoos because many were considered branches of their local governments during this

[40] "History, Mission and Vision." *The Cincinnati Zoo & Botanical Garden*, cincinnatizoo.org/about-us/history-and-vision/.
[41] Donahue and Trump, 2010.
[42] Gustek, Joanna. "Central Park Zoo." *NYC Then/Now: Great Depression & Great Recession*, 2012, macaulay.cuny.edu/eportfolios/brooks12/2012/03/20/central-park-zoo/.
[43] Raponi, Richard, and Cleveland Metroparks. "The Great Depression and the Zoo." Cleveland Historical, clevelandhistorical.org/items/show/615.
[44] Levine, L. (2010). *Job creation programs of the Great Depression: the WPA and the CCC*. Washington, DC: Congressional Research Service. http://digitalcommons.ilr.cornell.edu/key_workplace/708

time. This meant that zoos were able to get new or improved buildings to be built by WPA/CCC workers, while those workers were able to get money to support their families—a win-win situation. Some zoos, such as the Prospect Park Zoo in Brooklyn, New York City, were even able to be created during the Great Depression because of these civil works projects.[45]

Zoos are typically thought of as homes for animals, but the history of the zoo would be incomplete if it ignored the instances where humans were not just the spectators at the zoo—they were also the exhibit. This is a topic that is unquestionably racist, as it was almost always white people putting people of color on display as lesser beings to gawked at and used to spread racist messages. For instance, Ota Benga, an African man from an ethnic group with naturally short stature, was taken from his homeland and exhibited at the 1904 World's Fair in St. Louis. Afterwards, he was moved to New York and housed in the primate area at the Bronx Zoo by zoo director and eugenicist William Hornaday; he was billed as "The Missing Link" between humans and other primates and made to carry around and wrestle with apes.[46] The New York Times reported that few people expressed objection to the exhibit, but Reverend James H. Gordon of the Howard Colored Orphan Asylum in Brooklyn did, stating that people of color faced enough problems in society without being made out as less-than-human.[47] This form of humiliation deeply affected Benga, which was made clear after his suicide in 1916.[48]

This was not the only incident of racialized human displays, nor the most recent. Such exhibits popped up at fairs, festivals, and zoos throughout the 20th century and some even spilled

[45] "Prospect Park Zoo - Brooklyn NY." *Living New Deal*, livingnewdeal.org/projects/prospect-park-zoo-brooklyn-ny/.
[46] "Human Zoos: A Shocking History of Shame and Exploitation." *CBCnews*, CBC/Radio Canada, 17 June 2017, www.cbc.ca/natureofthings/features/human-zoos-a-shocking-history-of-shame-and-exploitation.
[47] "100 Years Ago Today, Ota Benga Ended His Horrible Life after Caged as 'Pygmy' at Bronx Zoo." *RT International*, 22 Mar. 2016, www.rt.com/news/336335-ota-benga-caged-pygmy/.
[48] Ibid.

over into the 21st century. In 2005, the London Zoo held a contest for participants in its "Human Zoo" exhibit.[49] The organizer said the goal behind it was like the goal of Hornaday a hundred years before: to spotlight the similarities between humans and other primates. However, this exhibit was different in that the participants could leave at the end of the day. While this exhibit did not have a racial message, it is undeniably linked to the racist history of human exhibits in zoos. Also connected to this phenomenon is the practice of leading a "safari" trip to observe tribes of native people, as was taking place in the Bay of Bengal in and around 2012. Groups of tourists were taken to the native island of the Jarawa tribe, a group that had only recently begun to interact with outsiders and consequently was exploited for the gain of the tour guides. Visitors were even warned to not feed the natives, but most people ignored that directive, and it was a common practice for the women to dance while food was thrown at them.[50]

Fortunately for the animal zoo community, though, most people do not immediately think of human zoos when thinking of zoos, so while in some cases their histories are intertwined, zoos are not having to constantly confront these shameful practices that just used the same term as them. However, something that zoos do have to contend with more regularly is the conditions in which animals were kept within zoos in the past (and potentially in the present by menageries). It was once the norm for animals to live in small, barred enclosures with concrete floors and not much in the way of vegetation or other enriching content. Though modern zookeepers and veterinarians know that this type of enclosure is not healthy for the animals, the zookeepers of the past were not keeping the animals there out of intentional neglect for their needs—in fact, they had an altruistic

[49] Associated Press. "At London Zoo, Homo Sapiens Is Just Another Primate Species." *The New York Times,* The New York Times, 28 Aug. 2005, www.nytimes.com/2005/08/28/world/europe/at-london-zoo-homo-sapiens-is-just-another-primate-species.html.
[50] Staff. "Deep Racism: The Forgotten History of Human Zoos." PopularResistance.Org, PopularResistance.Org, 15 Nov. 2017, popularresistance.org/deep-racism-the-forgotten-history-of-human-zoos/.

purpose in mind when designing these enclosures.[51] This enclosure design is a relic of the menagerie, where animals were kept in close quarters with one another and often close to their owner; this made disease a major concern, so the enclosures were designed to prevent its spread. This era is known as "the disinfectant era"—everything needed to be designed so that it could easily be cleaned, which meant simple designs dominated by metal and concrete were the most common enclosure designs in zoos for many years.[52] However, they are not as common today, so when and how did things change?

The public works project of the New Deal helped to build enclosures in zoos, some of which were more naturalistic (they more closely resembled the natural habitat of the animal). Monkey Island at the Denver Zoo is a great example of this, as it was built by WPA workers in 1937.[53] Cages began to be phased out in favor of more naturalistic enclosure designs. [54] In addition to the benefits to the animals of being able to live in an environment that more closely matches their natural history, these new enclosure designs also were improvements in terms of redefining the interactions between the public and the animals. Before when the animals were in cage-like enclosures, visitors could walk up to them and throw things into their enclosures, but the animals could potentially also reach out and contact people—this put both the animals and the humans in danger. When the enclosures were redesigned, one common feature was to put a moat between the animals and the public walkway. The moat could be water-filled or not, but it put a physical barrier between the animals and people such that they could not directly interact. This also helped to remove the physical barrier of the cage bars from the humans' (and animals') eyeline and the two

[51] Hosey, Geoff, et al. *Zoo Animals: Behaviour, Management, and Welfare*. Oxford University Press, 2013.
[52] Ibid.
[53] "Denver Zoo: Monkey Island - Denver CO." *Living New Deal*, livingnewdeal.org/projects/denver-zoo-monkey-island-denver-co-2/.
[54] Ebersole, Rene S. "The New Zoo." *Audubon*, Nov. 2001.

creatures were more easily able to see one another. This also helps to establish empathy between the humans and the animals they are seeing, which in turn could contribute to the visitors wanting to learn more about the animals, their histories, and other messages that the zoo would wish for them to take away from their visit to the zoo. Once these more naturalistic enclosure designs became the norm, this helped zoos distance themselves from menageries, as they could more easily be distinguished by the type of enclosure they were using.

Accreditation: a mark of a quality zoo

Another contributing factor toward changes in modern zoos is the establishment of accrediting agencies. While the federal government had certain regulations in place to govern the conditions within zoos, they were not written with zoos in mind nor by people who were knowledgeable about zoos. That's where the accrediting agencies stepped in. The Association of Zoos and Aquariums was the first such agency, as it was founded in the early 20th century by a group of zoo directors who wanted a space in which they could talk about the specific challenges and opportunities facing zoos, as they had previously been grouped in with park directors.[55] When it began, it was just an organization for conversations and advocacy, and it continued in this manner until the 1970s. It was then that the directors decided to create their accreditation standards and use them as a method of gatekeeping to ensure that only zoos of a certain quality would be associated with their name. This caused a drop in their membership as not all former member organizations were of accreditation quality at the time, but more members were added over the following years and now there are over 200 zoos and aquariums accredited by AZA.[56]

[55] Donahue and Trump, 2010
[56] About Us." *Association of Zoos and Aquariums*, 2018.

Over 2000 animal care facilities in the United States are under the purview of the USDA, the government agency that oversees zoos and other animal care facilities in the United States.[57] It is that "over 2000 USDA-licensed facilities" number that AZA uses to portray themselves as exclusive. Because just over 200 facilities are accredited by AZA, they claim that they are the premier organization by only accrediting the top ~10%.[58] While they do exercise a certain amount of exclusivity, as demonstrated by the zoos that they do not accredit, the 10% claim is off-base; it ignores that the USDA license is not as specific as their accreditation, so the list of 2000 facilities includes some that are categorically out of AZA's league, in that they are sanctuaries or other non-zoo facilities, and others just opt out of the AZA process for one reason or another. Regardless of how exclusive they are, the AZA is the foremost private organization in offering accreditation to zoos and aquariums because they have the strictest regulations in place that a facility must meet to be accredited. It would be exhausting and unproductive to explain every requirement they have, so instead, the AZA standards will be compared with those of ZAA, their closest competitor, to highlight key requirements that are common to both programs and point out differences, as well as reinforce AZA's position as having the strictest requirements.

Before discussing that, it would be good to specify what is meant by accreditation. In their standards guide, AZA defines it as the following:

> "the establishment and maintenance of professional standards and the qualitative evaluation of organizations in the light of those standards. Through this process a

[57] Ibid.
[58] Garner, Rachel. "How Many Zoos Are There in the United States?" *Why Animals Do The Thing*, 24 Nov. 2017, www.whyanimalsdothething.com/how-many-zoos.

profession is judged based on criteria selected by experts in that field, rather than by outside agencies and/or individuals that are not actively employed in that field."[59]

In more simple terms, an accreditation is meant to be an evaluation of the conditions at a given facility. It is carried out by officials who are knowledgeable about the type of facility being evaluated and who then report back to the agency about the quality of the facility and its various programs, and those that meet the mark receive the accreditation. AZA states that its "stamp of approval" is meant to send a message to visitors that any facility that bears it is of a high quality and is worthy of people's support. This extends to the implication that any facility that, for any reason, is not accredited by AZA is of poor quality and should not be visited. This, of course, sets up an interesting dynamic between AZA and ZAA and between AZA and individual zoos because of differing definitions of a quality facility and what a lack of accreditation means.

The first major policy difference between the two organizations is their policies regarding the management of elephants. AZA only permits elephant staff to work with their animals using a protected contact protocol, which means that there is always a physical barrier between the elephants and the staff. [60] On the other hand, ZAA promotes free contact (also referred to as full contact), where the elephants and the staff can occupy the same space without a barrier.[61] Interestingly, they also discourage their members from using protected contact, although they state it is ultimately up to the institution to decide what is best for their herd. Both protocols present their own challenges. In protected contact, it can be difficult to interact with the elephants in meaningful ways because the barrier can interfere. In free contact, the keepers must disrupt the

[59] Staff, AZA. "The Accreditation Standards & Related Policies." *Association of Zoos and Aquariums*, 2018.
[60] Staff, AZA. "AZA Standards for Elephant Management and Care." *Association of Zoos and Aquariums*, 2012.
[61] Staff, ZAA. "Animal Care & Enclosure Standards and Related Policies." *Zoological Association of America*, 2018.

herd dynamics by inserting themselves as the leaders to exercise control over the elephants, which can be difficult and dangerous. This way of controlling the elephants is another difference between the two methods; because the human domination must be clear when using free contact, the keepers will sometimes punish the elephants for incorrect behavior or use physical means of getting them to move, whereas the protected contact environment gives the elephants more of a chance to make choices, so they are rewarded for positive actions but not punished for negative ones. Also, because the keepers may want to keep the elephants in a given location, a free contact protocol could involve the use of chains or other physical restraints, whereas protected contact animals are not generally restrained.

While there is a constant concern in zoos of humans being harmed by animals, because the humans and animals are occupying the same space as each other when elephants are managed using free contact, and there is such a size difference between humans and elephants, there is a heightened sense of danger, one that has proven tragic on occasions based on the many examples of elephant keepers being killed by their animals (Char-Lee Torres at the Lowry Park [Tampa] Zoo in 1993, Mike Gatti at the Pittsburgh Zoo in 2002, and many others).[62,63] It was in the wake of these tragic events that AZA decided to only permit protected contact. This specific policy has lost them at least one member; the Pittsburgh Zoo voluntarily gave up their AZA accreditation in 2015 and stated it was because of the elephant management policy—they wanted to engage in free contact management.[64] The zoo then applied for and received ZAA accreditation.[65]

[62] Brazil, Jeff. "Elephants Strong, Smart -- And Dangerous to Handlers." *The Orlando Sentinel*, 15 Aug. 1993.
[63] Belser, Ann, and Marylynne Pitz. *Elephant Kills Keeper at Pittsburgh Zoo*. Pittsburgh Post-Gazette, 19 Nov. 2002, old.post-gazette.com/localnews/20021119zoo1119p1.asp.
[64] Hopey, Don. "Pittsburgh Zoo Drops Accreditation Due to Disagreement over Elephant Handling." Pittsburgh Post-Gazette, 17 Aug. 2015.
[65] Hopey, Don. "Pittsburgh Zoo Loses Sea Turtle Program, Playground Grant after Dropping Accreditation." *Pittsburgh Post-Gazette*, 24 Aug. 2015.

Another difference between the two organizations is the situations in which they prohibit the intentional breeding of certain animals. This is not in AZA's official accreditation standards—it's in a white paper they published in 2011—but AZA does not allow its members to breed for the intentional expression of rare recessive traits.[66] The most common example of this is white tigers. Tigers can be affected by albinism just like many other animals, but there is also a separate "white" gene that can be inherited that causes a different coloration pattern than a "normal" tiger or an albino tiger. Because this trait is so rare, some people want to breed the few white tigers with one another to produce more of them.[67] There are zoo-based breeding programs for many other animals, so if one were to want to breed white tigers, it might make sense to do so at a zoo. However, continuously breeding within the small population will decrease the genetic diversity of that population.[68] It can also lead to higher rates of expression of other traits that are rare in the larger population but common in the small breeding population; for white tigers, this occurred with the cross-eyed trait, which can be harmful for the tigers' health. AZA states that they do not permit this type of breeding because it goes against their principles on ensuring the health of their animals and creating strong breeding populations.

ZAA does not have a stated position on the topic, but in their accreditation standards, they condemn their members against intentionally breeding hybrid animals, or animals with parents of two different species.[69] They acknowledge that it could occur naturally when closely-related species are housed together, but they discourage their members from taking an active part in it.

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[66] Staff, AZA. "Welfare and Conservation Implications of Intentional Breeding for the Expression of Rare Recessive Alleles." *Association of Zoos and Aquariums*, 2011.
[67] Parry, Hannah. "The World's Ugliest Tiger: How Generations of Inbreeding Left Big Cat Looking More like a DOG." *Daily Mail Online*, Associated Newspapers, 23 Feb. 2016, www.dailymail.co.uk/news/article-3460552/The-world-s-ugliest-tiger-generations-inbreeding-create-white-tigers-caused-horrific-deformities.html.
[68] Ralls, K, et al. "Inbreeding and juvenile mortality in small populations of ungulates." *Science*, vol. 206, no. 4422, 30 Nov. 1979, pp. 1101–1103., doi:10.1126/science.493997.
[69] "Animal Care & Enclosure Standards and Related Policies." *Zoological Association of America*, 2018.

AZA does not have a stated position on breeding hybrids but based on their caution against breeding certain members of the same species for rare traits and the meticulous nature of their breeding programs, it would be reasonable to assume that they would not support the intentional breeding of hybrid individuals.

From all these discrepancies in policy, one may think that AZA and ZAA zoos would be completely different from one another if viewed in practice. While many differences have emerged, there are still some similarities. Euthanasia is an inevitable part of the maintenance of healthy animal populations within the zoos, so it is important that it be handled with great care. When it comes time to make that decision, both accreditation organizations ask facilities to follow American Veterinary Medical Association (AVMA) euthanasia standards, which are the standards used by veterinarians in any context (small-animal, zoo, etc.).[70]

One feature that both accreditation programs have is guidelines that are specific to individual species, taxa, or classes of animals. This can be very helpful for enclosure designers and staff, as practices that are fitting for one species may not be fitting for another, or perhaps even for the same species in different situations, so if generalized minimum requirements were set for the animals as a collective, this could be placing the animals and/or humans into danger.

For AZA, this comes in two forms. In the formal accreditation standards document, which is 116 pages long, there are 28 pages devoted just to the care and management of elephant herds, plus 5 more about ensuring the safety of elephant care staff. This means the document is close to 30 percent elephant. This would indicate that elephants are a high priority to this organization, so they want to set very specific standards for their care (which would confirm the tension between

[70] Members of the Panel on Euthanasia. "AVMA Guidelines for the Euthanasia of Animals." *American Veterinary Medical Association,* 2013, www.avma.org/KB/Policies/Pages/Euthanasia-Guidelines.aspx.

AZA and its member facilities over their use of protected or free contact). There are also 9 pages devoted to the care of cetaceans (dolphins and whales).[71] The presence of elephants and cetaceans in the official accreditation document indicates the large commitment this organization is urging its members to make to the wellbeing of these taxa, especially since they are among the taxa that zoos and aquariums are most commonly questioned for keeping.

The other way that AZA regulates the care of certain species is through their Animal Care Manuals (ACMs) which are written collaboratively by staff from member organizations that are familiar with the taxon in question and approved by AZA at 3 different points before they are published and established as official AZA policy.[72] These are 100+ page documents that provide detailed standards for the care and management of specific groups of animals. Some pertain to entire orders of animals, but others are so specific as to cover only a single species. There are 27 ACMs that have been completed, with 25 more that are in progress. The manuals lay out standards for the habitats in which the animals should be living, their nutrition, how their reproduction can be managed, and other factors that can influence their lives in a zoo setting. These standards are separated from the formal accreditation document because it allows the formal document to be more universally-applicable, as it will not contain hundreds of pages about species that might not live at a given zoo. It also grants a greater flexibility and efficiency; the accreditation document is only revised once per year, but since the ACMs are published online once they have been fully approved, the standards in them can be revised again and disseminated to the members more quickly. In addition, it differentiates between hard-and-fast rules (formal accreditation document) and scientifically-supported suggestions (ACMs); AZA member organizations are highly

[71] "The Accreditation Standards & Related Policies." *Association of Zoos and Aquariums*, 2018.
[72] "Animal Care Manuals." *Association of Zoos and Aquariums*, 2018, www.aza.org/animal-care-manuals.

encouraged to incorporate the standards from the ACMs into their management programs, but so long as their programs do not violate USDA regulations or the regulations from the accreditation document, a facility's accreditation status is not threatened by not following the manual exactly. These manuals are meant to be resources for their members (and non-members, as the completed manuals are fully accessible online) rather than hindrances to them.

ZAA's method of explaining animal care standards is a bit of a middle ground between the two ways that AZA delineates these standards. They do not have animal care manuals of their own, but their accreditation standards have more specific guidelines for enclosure design than the AZA standards. The caveat to that is that they do not always give guidelines for specific taxa, but rather for classes of animals; these are not classes as in the scientific classification level between phylum and order, but rather ones that group relatively-similar animals for the purposes of fencing, enclosures, etc. The classes are broken up into groups for other regulations according to taxon (reptiles, mammals, etc.), body size, and natural behaviors (diggers, climbers, etc.), but like some of the ACMs, some of the groups set by the ZAA standards are rather broad. In addition, these standards do not have specific requirements for programs such as nutrition and reproduction; for nutrition, they only specify "Food shall be of a type and quantity that meets the nutritional requirements for the particular species, and shall be provided in an unspoiled and uncontaminated condition," and their only mentions of reproduction are to say that enclosures should have enough room so that reproduction can occur and there is enough room for the offspring.[73] This doesn't mean that ZAA has set forth poor requirements—far from it. In fact, they codify, and therefore

[73] "Animal Care & Enclosure Standards and Related Policies." *Zoological Association of America*, 2018.

enforce more strictly than AZA, specific requirements about the enclosures in which groups of animals should be living, both in terms of size and the features they should contain.

Another major point where they agree is in opposition of keeping of certain animals as personal pets. ZAA states that they "do[es] not support the keeping of Class I wildlife as pets. Class I wildlife are to be maintained solely in breeding or exhibition facilities. ZAA is against having Class I animals and non-human primates as pets."[74] The Class I wildlife include many primates, all the big cats, and all cetaceans. AZA does not state in their accreditation standards that they are opposed to wildlife animals as pets, but they did publish a news release on the topic in 2009 titled "Why Wild Animals Don't Make Good Pets."[75] In this article, they give a few examples of "bad" animals to keep and more examples of animals that are acceptable as pets. This likely comes because of its intended audience—average people who are not familiar with the scientific names of animals and consequently could be deterred by the unfamiliar vocabulary. The ZAA standards, on the other hand, are intended for animal care staff who are familiar with the scientific names and will benefit from the specificity that their use will offer.

Even with these two different accrediting agencies, a zoo might just elect to not be accredited at all. This can happen for any number of reasons, and it's hard to know which, if any, of them was a facility's motivation for not seeking accreditation. It might also be the case that these facilities sought out accreditation at some point and were denied. This makes it difficult to get a count for the number of facilities that have opted out, because along with those who have been denied accreditation, any list of non-accredited zoos could include some facilities that are

[74] "Animal Care & Enclosure Standards and Related Policies." *Zoological Association of America*, 2018.
[75] "Why Wild Animals Don't Make Good Pets." *AZA News Releases*, Association of Zoos and Aquariums, 19 Feb. 2009, www.aza.org/aza-news-releases/posts/why-wild-animals-dont-make-good-pets-.

better suited for GFAS accreditation and some that would be denied if they applied, due to menagerie-like conditions or other practices that do not meet the accreditation standards.

The first reason a facility might opt out is easily predicted—money. Just to go through an AZA accreditation costs a facility at least $4000, not to mention annual dues of an unknown amount.[76] ZAA also has a fee for accreditation—at least $800—and annual dues of $2,500.[77] In addition, AZA-accredited zoos are expected to contribute part of their annual budget to conservation organizations. These fees could be too much for a facility to handle, especially one that is small and/or just starting.

The second reason is tied to the first, as opting out of accreditation for this reason could save a facility some money. As previously mentioned, both accrediting agencies have specific requirements for the enclosures that animals should be living in, plus recommendations or requirements for programs such as enrichment, conservation, and education. If a facility is not meeting these standards but wants to pursue accreditation, the staff would have to devote time, energy and—yes, money—to making the necessary changes. If accreditation is their goal, they might think making all those changes is a necessary hassle, but not everyone will see the burden as so essential. This is especially true if a facility would need to make large-scale changes to their physical structure or add on entire programs/staff.

Similarly, the goals or programs of a given facility might just not align with the goals of the accreditation agencies, so the accreditation would not be a good fit from either perspective. This would be the case for controversial topics such as the elephant management policy, which the Pittsburgh Zoo cited as its main motivation to move from being accredited by AZA to being

[76] "The Accreditation Standards & Related Policies." *Association of Zoos and Aquariums*, 2018.
[77] Staff, ZAA. "Accreditation." *Zoological Association of America*, zaa.org/accreditation.

accredited by ZAA, or if a zoo wanted to breed hybrids or for rare recessive alleles. It could also be the case for other smaller logistical issues; the Mill Mountain Zoo in Virginia was not accredited in 2016 not because it had poor standards of animal care or because its leadership disagreed with any AZA policies but because they were not as financially stable as AZA would have liked for them to have been.[78] This zoo is still allowed to participate in certain AZA programs such as their Species Survival Plans, but this appears to be a rare case, as seen by the privileges and funding that the Pittsburgh Zoo lost after they withdrew from AZA.[79] But that is only important if one is wanting to take part in those national programs, so it might not be worth it for the zoo to go through the time and energy to change all the things that would be barriers to their accreditation.

Even though the accrediting agencies claim to represent the best in animal care, and they have scientific evidence to back up their standards, if animal welfare is still being upheld, a zoo is not inherently a bad facility just for not meeting these specific guidelines. In fact, a zoo may just elect to not seek accreditation because they don't have to. There are benefits that member organizations can reap, and an accreditation serves as a mark of quality both within the zoo community and to the public, so seeking accreditation is far from a pointless pursuit.[80] However, a facility won't get in trouble with anyone for not being accredited; it is the USDA that reports back to the government about things like that, so if the facility is meeting the USDA standards, they are legally fine. Sure, the accreditation mark is supposed to signal something to the public about the quality of a zoo, but one wouldn't really know that a zoo is not accredited unless they sought out that information themselves. And the public appeal of the accreditation only works if

[78] Godkin, Bambi. "...AND NOW THE REST OF THE STORY!" *Mill Mountain Zoo*, 26 Sept. 2016, www.mmzoo.org/uncategorized/and-now-the-rest-of-the-story/.
[79] Hopey, Don. "Pittsburgh Zoo Loses Sea Turtle Program, Playground Grant after Dropping Accreditation." *Pittsburgh Post-Gazette*, 24 Aug. 2015.
[80] "Benefits of Accreditation." *Association of Zoos and Aquariums*, 2018, www.aza.org/benefits-of-accreditation.

the public knows about it. People just want to see "happy" and healthy animals, which are not exclusive to facilities that carry any sort of accreditation, so if a facility is able to provide properly for their animals without an accreditation, then they might just avoid all the financial and logistical hassles and go on without one.

Governmental and private control of animals and zoos

The Association of Zoos and Aquariums, the Zoological Association of America, the Global Federation of Animal Sanctuaries—all these are organizations that offer accreditation to animal care facilities of a certain quality. However, they are not the only agencies, nor arguably the most important ones, to oversee animal care facilities in the United States. In fact, zoos and other facilities are supervised and governed by several agencies and laws on the national level.

The most notable of these is the United States Department of Agriculture, better known as the USDA. This organization predates the private organizations, as well as all but a handful of the zoos in the United States, as it was established in 1862 by President Abraham Lincoln.[81] As the name suggests, its initial purpose (and still its primary purpose today) is to regulate those animals (and plants) that are involved with agriculture. However, the department soon took up the animals that are non-agricultural as well. Today, the organization covers all aspects of animals that live in the United States, so no matter whether animals live in a zoo, sanctuary, menagerie, or farm, they are subject to regulation by the USDA.

Although the USDA predates them, the USDA is the organization that is responsible for enforcing the many laws that exist to govern the keeping of animals. The most significant of these

[81] "USDA Celebrates 150 Years." *USDA*, United States Department of Agriculture, www.usda.gov/our-agency/about-usda/history.

is the Animal Welfare Act, passed in 1966 by President Lyndon B. Johnson.[82] It gave authority to the Secretary of Agriculture to regulate and enforce matters relating to the sale, transport and handling of animals, specifically dogs, cats, nonhuman primates, guinea pigs, hamsters, and rabbits for "purposes of research or experimentation, and for other purposes."[83] While only these taxa were listed in the original law, it has been amended and supplemented to include others, and now all the animals at a facility could be, and are, inspected.[84] This law helped lay the foundation for the inspections that the USDA does now.

The specific branch of the USDA that pertain to the inspection of animal care facilities is the Animal and Plant Health Inspection Service (APHIS); this means that officers from the USDA visit these facilities on a regular basis to ensure that the facility is following the proper regulations.[85] The frequency of the inspections varies from facility to facility; APHIS sets priority levels based on a facility's past performance, with the lowest-priority facilities being inspected every 2 or 3 years and the highest-priority facilities being inspected as frequently as every 3 months.[86] These inspections are quite thorough, with the official inspecting everything from the size of the enclosures to the ambient temperature in the enclosure to the barrels being used to collect feces. Though the inspection process may seem overly detailed, it is through this thorough process that the government ensures that the Animal Welfare Act is being upheld at these facilities, so it behooves the individual facilities to cooperate with them, as it helps to make sure they are providing the best possible care to their animals and are not in legal trouble.

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[82] United States, Congress, *Animal Welfare Act*. 1966. U.S. Dept. of Agriculture, Animal and Plant Health Inspection Service Congress.
[83] Ibid.
[84] "Animal Welfare." *USDA APHIS*, United States Department of Agriculture, www.aphis.usda.gov/aphis/ourfocus/animalwelfare.
[85] Ibid.
[86] "Animal Welfare Act Inspections." *USDA APHIS*, United States Department of Agriculture, www.aphis.usda.gov/aphis/ourfocus/animalwelfare/sa_awa/ct_awa_inspections.

The International Union for the Conservation of Nature and Natural Resources (IUCN) keeps a running register of species from all taxa and how close they are to becoming extinct, which is known as the IUCN Red List.[87] They have seven levels of classification, which range from least concern to extinct. Currently, they list 5583 species as critically endangered, the second-to-last level before extinction, and 69 species as extinct in the wild, the last level before full extinction. The species in both categories are in danger of extinction in the short term. The "extinct in the wild" category is interesting, as it relies on the presence of animal care facilities (or greenhouses or laboratories, for non-animals) for these species to still be around and viably reproducing in this limited capacity. That's a misconception about the term "extinct"—there can still be individuals alive from an extinct species, but if the living population is too small or too geographically isolated to comprise a viable breeding population, then the species can be considered extinct. But the fact that the distinction has been made between being extinct in the wild and extinct in a broader sense reflects the impact that human-managed breeding and conservation programs have played in preserving species.

As the IUCN is an international agency, the creation of the Red List cannot be tied to any one country's laws/policies or any one species' status. However, in the United States, it does tie in well with the Endangered Species Act of 1973 (ESA).[88] This law offers special protections to those species that are classified as threatened or endangered, as well as protections for the habitats of these species. Also included within this law is prohibition against the taking of these animals from their native habitats—fortunately for zoos, they are excluded from that part of the law, or at least there are legal channels through the act where they can still acquire endangered animals. Although

[87] "Overview of The IUCN Red List." *The IUCN Red List of Threatened Species*, International Union for Conservation of Nature and Natural Resources, 2018, www.iucnredlist.org/about/overview.
[88] U.S. Fish and Wildlife Service Endangered Species Program. *ESA Basics*. 2013.

it is not clear what criteria are being used in determining which animals have this status, it is likely that the criteria would be similar enough to the IUCN Red List criteria that species would be classified in similar ways on both lists.

The main reason that the ESA exists is to protect these dwindling species from being taken for private facilities or to be pets, or from being taken for hunting. Both are unfortunate events that are surprisingly common even today. There are some people who choose to have exotic animals, some of whom are endangered, as their pets or in menageries. This is not only a potential violation of the ESA, depending on the method through which these people obtain their animals, but also potentially a violation of local/state laws and other federal statutes. Some localities have nuisance ordinances that prohibit exotic animals, as a matter of preserving public health or making sure that land is being used for the purpose for which it is zoned. [89] At the state level, there is a big disparity from one place to the next: some states outright forbid private ownership of exotic animals (such as in Massachusetts, where all non-domesticated animals are forbidden from private ownership), some allow exotic pets but place regulations on them (such as in Indiana where no taxa are forbidden to own but one needs a permit for ownership of any exotic animals), and others have little to no regulations at all (such as in Nevada, where ownership of animals like raccoons and alligators is forbidden but one can own primates, elephants, and non-domesticated cats without a permit or license).[90] The definition of an exotic animal also varies between locales. Moving to the federal level, the owner may be subject to licensing and inspection by the same USDA process that oversees zoos, and the U.S. Department of Fish and Wildlife may also need to be involved.[91]

[89] Hessler, Katherine, and Tanith Balaban. "Exotic Animals as Pets." *Solo, Small Firm and General Practice Division*, American Bar Association, 2009
[90] Ibid.
[91] U.S. Fish and Wildlife Service Endangered Species Program. *ESA Basics*. 2013.

The preceding laws and regulations attempt to guard species, especially threatened ones, against the serious threats of being housed in a subpar facility and being taken from their natural habitats. Also a threat to the survival of threatened species is the practice of hunting them. This can take place as hunting them in their unrestricted native habitats or as a "canned hunt," where the animals are restricted to a certain area either in their habitat or in a location to which they have been moved.[92] To be clear, this practice is not limited to just threatened species, or even to exotic species—there are canned hunts for deer in the United States, too, though it is illegal in some locations like Indiana.[93] However, it is the hunts of threatened species that cause the biggest problems. First, if the hunts are taking place in the United States, the people or organizations that engage in these practices still must abide by all the same regulations that zoos and private owners do for the importation and keeping of their animals, but they often find ways to circumvent those channels. A 2016 report found that some such organizations were obtaining their import permits from foreign sources for as little as $1,000 and the U.S. Fish and Wildlife Service was not checking up on those sources.[94] Second, there is often a higher premium that comes with rarer animals, so hunting them comes with a certain amount of status of notoriety for the hunter. One wants to be able to show off their status to others, which why this type of hunting is also sometimes called "trophy hunting." Having such artifacts in one's American home was once outright illegal, but in March 2018, President Donald Trump loosened the restrictions on importing products of foreign hunting, so now lion hides and elephant tusks can be brought to the United States on a case-by-

[92] Fernandez, Manny. "Blood and Beauty on a Texas Exotic-Game Ranch." *The New York Times*, 19 Oct. 2017, www.nytimes.com/2017/10/19/us/exotic-hunting-texas-ranch.html.
[93] Rich, Jim. "Fenced-in Deer Hunting Turning into Real Battle." *NY Daily News*, NEW YORK DAILY NEWS, 5 Feb. 2012, www.nydailynews.com/sports/fenced-in-deer-hunting-turning-real-battle-article-1.1017208.
[94] O'Connor, Dianne. "'Pay to Play' Scheme Harms Animals." *TheHill*, 5 July 2016, thehill.com/opinion/letters/286563-pay-to-play-scheme-harms-animals.

case basis.[95] This desire for unique relics of hunts has even driven some people to intentionally breed animals for rare alleles like white lions for the sole purpose of making them available for hunting.[96] This not only feeds a cruel practice, but it could also compromise the breeding populations of these animals, making it more difficult for the species to survive in the long term, which is at least part of the reason that these hunts are heavily-regulated.

Now that the laws which affect zoos on a more peripheral level have been discussed, it is important to talk about the way that the government more directly affects the daily operations of many zoos—ownership and oversight. Many of the zoos and aquariums in the United States are owned and operated by the government of the city and/or county in which they are located, usually as part of the parks department. This relationship is a long-standing one that is reflected by the divergence of the Association of Zoos and Aquariums from a similar group for the heads of parks departments and the key role that the Works Progress Administration had during the Great Depression in building or revitalizing the infrastructure of many American zoos. This governmental oversight can and does have many effects on the running of these zoos.

The most significant effect that government oversight can have on the running of a zoo is in the zoo's finances. When zoos are operated by local governments, their expenses and profits must be factored into the government's budget, which means that the amount of money that is contributed to the zoo can be up for public discussion and debate. If the budget is tight, laypeople might more readily accept that cuts must be made to funding for the zoos instead of programs like schools or infrastructure. However, this also means that there is a consistent source of funds—if

[95] Nuwer, Rachel. "U.S. Lifts Ban on Some Elephant and Lion Trophies." *The New York Times*, 7 Mar. 2018, www.nytimes.com/2018/03/07/science/trump-elephant-trophy-hunting.html.
[96] Hart, Adam. "Breeding Novelty Animals for Trophy Hunting." *CNN*, 24 Aug. 2017, www.cnn.com/2017/08/24/africa/breeding-hunting-rare-animals/index.html.

there is a government, there will be funding for the programs such as zoos that it supports. It also grants the zoo access to certain governmental programs to assist with running the zoo, such as tax breaks and grants for public facilities.[97] When this model is employed, some zoos can even pass along their savings to their guests—there are several public zoos in the United States that do not even have an admission charge.[98]

This also means that the government can exercise control over the running of the zoo. If the public has an issue with the zoo and wants something to change, it can be taken out of the hands of the zoo administration and instead brought before a public committee. On one hand, this is positive—if people's tax dollars are going toward a program and there are changes they would like to see, they should be given a space to share their thoughts and feelings, and it creates transparency in the decisions that the government is making. Conversely, though, it puts potentially-complex decisions in the hands of people who might not be well-informed. For example, there were calls led by animal rights activists in 2012 for the Topeka Zoo to transfer their two elephants to a private sanctuary after the zoo was written up by the USDA for a lack of a strong plan for their health and management.[99] The topic of whether the elephants should stay or go was then brought before the city council, made up of individuals without backgrounds in the field, and publicly debated. The zoo eventually came out victorious—the elephants could stay—but because the zoo was overseen by the city government, it had to go through this public process.

As suggested here, while there is a certain amount of unpleasant oversight in direct government control of a zoo, it is a method that some zoos can successfully employ. The alternative

[97] "Benefits of Accreditation." *Association of Zoos and Aquariums*, 2018, www.aza.org/benefits-of-accreditation.
[98] Gervasi, Melinda Gustafson. "Free Zoos in the United States." *The Upside of Frugal*, 15 Mar. 2012, frugalupside.blogspot.com/2012/03/free-zoos-in-united-states.html.
[99] Hrenchir, Tim. "Group Seeks Move of Elephants to Sanctuary." *The Topeka Capital-Journal*, 11 Jan. 2012, www.cjonline.com/news/2012-01-11/group-seeks-move-elephants-sanctuary.

model of management used by many zoos is private ownership/control of the zoo. Under this system, a private organization oversees the running of the facility instead of the typical governmental model. To be clear, these facilities are still held to the same laws and standards as their publicly-owned counterparts, and they can still be accredited by any of the accrediting agencies—the only differences come from the source of the zoo's funding and the type of oversight it is given.

In effect, private organizations take over the reins of zoos, usually when the government is unable to fully finance them.[100] After all, zoos are expensive to maintain, and if the state of affairs during the Great Depression taught zoo directors anything, it was that many people take issue with zoos running at full capacity on the government dime while their families are struggling. This process also removes some governmental "red tape" from the decision-making processes within the zoo—for example, before the Pittsburgh Zoo was privatized, over 30 people were involved in the purchase of a banana.[101] When privatization occurs, the private organization can take full control of the zoo, but more often, the zoo is operated through a partnership between the organization and the local government.[102,] The proponents of this model believe that when possible, but especially when it is most needed, private agencies should take control of zoos to alleviate governments of the burden of these costly facilities. Some even believe that members of the public will be more willing to donate to privately-run zoos, a belief that is supported by the

[100] Ponti, Grayson. "Creating a Better World for Animals: A Conversation with Gregg Hudson, President and CEO of the Dallas Zoo." *Zoophoria*, 20 Oct. 2017, www.zoophoria.net/single-post/2017/10/20/Creating-a-Better-World-for-Animals-A-Conversation-with-Gregg-Hudson-President-and-CEO-of-the-Dallas-Zoo.
[101] Wade, Keith. "It's a Jungle Out There! What We Can Learn from the Privatization of Zoos." *FEE*, Foundation for Economic Education, 1 Aug. 1998, fee.org/articles/its-a-jungle-out-there-what-we-can-learn-from-the-privatization-of-zoos/.
[102] Vincent, Donovan. "Privatizing the Zoo: It's Been Done Before." *Thestar.com*, Toronto Star Newspapers Ltd, 12 Sept. 2011, www.thestar.com/news/city_hall/2011/09/12/privatizing_the_zoo_its_been_done_before.html.

large donations that some zoos have seen soon after they became private.[103] This belief is even reflected in the names of these organizations; many are given names such as "Friends of _____ Zoo" to emphasize to their donors that they are providing vital support to the zoo and animals.

Employing the private management model has been known to save facilities that were on the verge of being closed from such a fate, but prosperous zoos have also been known to move to a private model—the San Francisco Zoo made the move in 1941 as a means of lifting the burden of financing the zoo off the government amidst rebuilding from the Great Depression and preparing for the Second World War. [104] Some zoos have even operated under non-governmental management systems from the beginning—the San Diego Zoo in California, widely considered to be among the top zoos in the country, is managed by a dedicated nonprofit organization and has been since the zoo opened in 1916.[105]

It's hard to say, though, whether moving from public to private influences the running of such facilities, because there have been mixed results in those few facilities that have made the move. On the one hand, the National Aviary in Pittsburgh, Pennsylvania has been growing and changing the same way any other zoo might since it was privatized in the 1980s, but its employees had to take a large pay cut in its first years as a private facility to lighten up the budget. In the same city, the Pittsburgh Zoo moved to private ownership shortly after at the request of their newly-appointed director, who helped to expand the zoo through increased donations by private donors, but she was the same director who led that zoo's departure from the AZA in 2015.[106]

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[103] Gutowski, Stephen. "Zoos Turn To Public/Private Partnerships To Overcome Budget Cuts, Boost Attendance." *CNS News*, 19 Mar. 2013, www.cnsnews.com/blog/stephen-gutowski/zoos-turn-publicprivate-partnerships-overcome-budget-cuts-boost-attendance.
[104] "Associations." *The San Francisco Zoo & Gardens*, www.sfzoo.org/about/associations.html.
[105] "About San Diego Zoo Global." *San Diego Zoo*, 2 Mar. 2018, zoo.sandiegozoo.org/content/about-san-diego-zoo-global.
[106] Wade, 1998.

The AZA has embraced this model that increasingly more zoos are using. It is even part of the AZA accreditation process that if a zoo has a private organization that is supporting the zoo, that organization will also be reviewed during the accreditation inspection.[107] The absence of a private supporter does not itself mean that a zoo's accreditation will be in jeopardy, nor will its presence guarantee that the zoo will be accredited, but as the case of the Mill Mountain Zoo illustrates, a lack of financial stability can be an issue for the AZA. These organizations do tend to provide an extra layer of support to their zoos, so if that is a concern, it is certainly worth examining if being managed by a private supporting agency would be a good move.

The evolving roles of the modern zoo

The first zoos only had one purpose: entertainment/leisure. They were places for people to be able to go and look at animals and escape from their normal lives for a bit. However, as enclosure designs evolved and the declining state of the wild populations of these animals (and of the planet) came to light, zoos took on more and responsibilities and roles within society.[108,109] The extent to which each of those roles is realized varies between zoos, but each is important.

Enrichment: keeping animals' minds and bodies active

One of these roles that tends to be important throughout the zoo community is that of behavioral enrichment, most commonly just called enrichment. Behavioral enrichment is anything that is added to the animal's enclosure to stimulate their senses and encourage them to behave in

[107] "The Accreditation Standards & Related Policies." *Association of Zoos and Aquariums*, 2018.
[108] Kellert, Stephen. "Zoological parks in American society." *AAZPA ... annual conference proceedings*, 1979, pp. 88–126.
[109] Rabb, George B. "The Evolution of Zoos from Menageries to Centers of Conservation and Caring." *Curator: The Museum Journal*, vol. 47, no. 3, 2004, pp. 237–246., doi:10.1111/j.2151-6952. 2004.tb00121. x.

a certain way.[110] Each of an animal's senses can be engaged through enrichment—maybe they are given a new food to try to stimulate their sense of taste, or a keeper sprays some perfume on a log in the enclosure to get them to smell it, or the enclosure is decorated with bright, crinkly streamers to given them something to look at, listen to, and play with. So long as the item won't cause harm to the animal, enclosure, or people, there is no limit to how enrichment can be used or what form it can take. Even the enclosure itself can be enriching—if there are movable elements, they can be changed around regularly to keep the design interesting and engaging for the animal. If the animal likes to climb, then natural or artificial climbing elements can be added. Some enclosures are even designed so that animals can have visual and/or auditory access to one another, which can be enriching for both those animals. Even being able to see or interact with humans can be considered enrichment for them, so both formal training sessions and more informal interactions can be good for the animals—just by visiting the animals in a zoo, the millions of people who visit zoos worldwide every year are helping to stimulate the animals.

Enrichment sounds like fun, and it indeed can be, but for the zoo animals, enrichment is more than just interesting items that get placed in their enclosures. Enrichment encourages the animals to show certain behaviors that are helpful for their overall well-being and are helpful for the keepers to be able to check up on the animals. Spraying perfume around the enclosure allows the keepers to check the animal's sense of smell. Putting some food on top of a climbing structure checks the animal's ability to walk and climb. Training an animal to jump up when given a hand signal can serve three purposes: testing the animal's eyes, testing their memory of the behavior associated with the hand signal, and allowing the keeper to check their underside for

[110] Garner, Rachel. "How To Understand Zoo Enrichment." *Why Animals Do The Thing*, 5 Aug. 2016, www.whyanimalsdothething.com/how-to-understand-zoos-enrichment/.

cuts/rashes/etc. By using these enrichment items and activities, keepers can get quick snapshots of the animal's state and potentially catch small changes in behavior before the underlying problems become too severe.

Enrichment can also encourage animals in human care to display similar behaviors to the ones which they would be displaying the wild—jumping animals can be given spaces to jump onto, hunting animals can have their food hidden so that they have to search for it, animals that like to swim can be given a pool to splash around in, and so on. Going along with this, enrichment can introduce an element of change to their otherwise-static enclosures to mimic the variability of stimuli that they would encounter if they were living in the wild. No matter how much attention is put into its design, a zoo enclosure is never going to be able to perfectly mimic all the elements that are present in an animal's natural habitat, but enrichment can help bridge that gap and help minimize stereotypic behaviors, or behaviors associated with boredom, among these animals. The image of a "bored" zoo animal is one that is unfortunately common among laypeople. However, studies have shown that stereotypic behaviors are more common among animals living in poor conditions than in animals living in better conditions, so while these behaviors can happen at zoos, they are not common in that setting.[111] This boredom usually comes in one of two forms: pacing around or doing some other behavior repeatedly (stereotypic behaviors) or laying down sleeping. While these are behaviors that can be associated with boredom, they do not always indicate boredom. Some animals pace in anticipation of being fed or being able to interact with their keepers because, like Pavlov's dogs, they have learned the stimuli that are associated with those activities and they use the pacing to mark their anticipation. If an animal is observed to be sleeping,

[111] Swaisgood, Ronald R., and David J. Shepherdson. "Scientific Approaches to Enrichment and Stereotypies in Zoo Animals: What's Been Done and Where Should We Go next?" *Zoo Biology*, vol. 24, no. 6, 22 July 2005, pp. 499–518., doi:10.1002/zoo.20066.

it might be because the animal is bored, or it might be that both in the wild and in human care, this animal tends to sleep for most of the day. Enrichment helps to break up the monotony of an enclosure that might not change much otherwise. It gives the animal something new to discover, a break from their routine, or a new experience, or something else that will spark their brain to stay active and keep them learning.

And as it turns out, more active animals are also helpful to zoos in achieving their other missions. A 1998 study suggested that the activity level of the animals affected the extent to which visitors engaged with and learned from the educational messages that were presented alongside their enclosures—the more active the animal was, the more likely visitors were to stay at that enclosure to observe the animal and learn more about its life and behaviors.[112] Because of this, it would be beneficial for zoos to keep their animals active and moving so that they are having the greatest programmatic impact on their visitors. The visitors themselves can even be part of that—research has shown that at least in some animals in petting zoos that are accustomed to close interactions with humans, humans' presence has been linked to an increase in activity in these animals, although the same study suggests that animals managed in enclosures that members of the public can enter need to be more closely monitored for stress than if they were in a more traditional enclosure.[113]

From all of this, it is easy to see how important enrichment can be for the animals. However, it's not just the animals, and not even just their keepers, who take a vested interest in how the animals are being enriched. Enrichment is a key recommendation that AZA makes both

[112] Altman, Joanne D. "Animal Activity and Visitor Learning at the Zoo." *Anthrozoos*, vol. 11, no. 1, 1998, pp. 12–21., doi:10.1080/08927936.1998.11425083.
[113] Farrand, Alexandra, et al. "The Visitor Effect in Petting Zoo-Housed Animals: Aversive or Enriching?" *Applied Animal Behaviour Science*, vol. 151, 2014, pp. 117–127., doi:10.1016/j.applanim.2013.11.012.

in their accreditation standards and in their animal care manuals for several taxa, and it is also part of the ZAA accreditation standards. AZA requires that there be a designated staff member at each facility to oversee the enrichment program—some zoos even have staff whose sole job is to manage their zoo's enrichment— and they also recommend that a wide variety of enrichment be given to animals on a regular basis. Zoos then take this idea and develop several different kinds of enrichment that can be given to every animal—yes, every animal should ideally be given enrichment regularly—and they may even create an enrichment schedule so that the same type of enrichment is not given every day. That brings up the topic of different kinds of enrichment: manipulative, food, sensory, training, and exhibit are the main types, although not all enrichment fits into this category and some can be put into more than one category. All of these can be used to mentally engage the animals in different ways.

There is even scientific evidence that enrichment is helpful for the well-being of animals. A meta-analytic study of enrichment research done from 1990 to 2003 found that in 53 percent of cases, the addition of enrichment significantly decreased the amount of stereotypic behavior among the animals.[114] However, this same study pointed out that stereotypic behaviors are not always indicative of poor current well-being, as animals who developed those behaviors in a past location often retain them even when moved to a new environment—they are like scars—and it also suggested that stereotypic behaviors could be a coping mechanism in poor conditions, so animals that display these behaviors in this context are better-off than animals who do not in this same location. In short, enrichment can be very helpful for keeping animals' brains active and learning, but just using enrichment will not cure or prevent all issues.

[114] Swaisgood and Shepherdson, 2005.

Education and wellbeing: the human benefits of a visit to the zoo

Another near-universal program for zoos to have is an education program. Education can come in any number of forms in a zoo setting—everything from talking with a staff member to reading a sign on an enclosure to more formal presentations or activities can be considered education. This is one of the biggest goals that the zoo community has set for itself to distinguish newer facilities from their menagerie-style predecessors, to not just entertain the people who walk through their gates but to also help them learn something.[115]

As mentioned before, the signs that one sees posted all over any zoo are a major way that guests can be educated during their visit. These signs vary from zoo to zoo and even from animal to animal within a given zoo, but most feature some information about where the animal's natural habitat is, what kind of food they eat, what their typical adult size is, or other general information about the species. This is an informal way of educating guests about the animals—it is self-paced and doesn't require a staff member to be present. These signs can also pertain to other matter than just the animals' natural histories; they could discuss the zoo's enrichment plan in general or for a specific animal, the conservation work that the zoo is doing, or even ways that guests can get involved with the zoo and the animals.

One method that many zoos have adopted recently to aid in their educational mission is social media. This is a way they can reach people all around the world who might be interested in what goes on at a given zoo or just zoos in general—people who live in the same city as the zoo can be reached just as easily as people on the other side of the country—and use that opportunity to share information with them. Given the ubiquity of social media in the life of the average

[115] Kawata, Ken. "Rambling Thoughts on Zoo Animal Collection and Conservation: A Historical Perspective." *Der Zoologische Garten*, vol. 82, no. 1-2, 28 Jan. 2013, pp. 26–39., doi:10.1016/j.zoolgart.2013.04.003.

American today, this seems like it would be an effective way to consistently educate people without the hassles of the consumers having to pay for admission, the zoo having to pay for advertising, or either side having to expend too much time and energy to educate or be educated in a more traditional setting. Plus, zoos can provide, at a seemingly endless rate, a product that many people cannot get enough of: cute animal pictures. Much like a flashy advertisement, these visually-appealing pictures can be used to draw people in so that they won't just scroll past the educational message the zoo is hoping to convey.

Education can also be more formal, manifested through presentations, camps, or other programs throughout the zoo. Most zoos have dedicated education departments that oversee all the ways that messages are being spread to zoo guests. The programs led by these departments allow for the zoo to be more specific about the information that is being spread, so they can be themed around a given animal, certain areas of the world, or even topics seemingly unrelated to zoos—the Topeka Zoo had a *Star Wars*-themed summer camp during summer 2017. The presence of these departments also follows along with the accreditation requirements for AZA, as AZA has a vested interest in having their facilities present a very positive image of the modern zoo. For accreditation, facilities are required to have education as one of their core missions, follow a written educational plan that each facility develops, and have a paid staff member devoted to education.

AZA also has stated policies on another educational program that some zoos have: ambassador animals. These are animals that live at the zoo, either on display or not, and travel outside the zoo on a regular basis to take part in educational programs.[116] This allows for people to still be able to learn about animals and the zoo's missions without even going to the zoo, which

[116] Staff, AZA. "AZA Ambassador Animal Policy." *Association of Zoos and Aquariums*, 2015.

can be very helpful in communities where admission charges for the zoo could be prohibitively high for some people or transportation would be an issue. It also helps to foster positive relations between the zoo and the community as the two get to interact in a more informal setting. The AZA policies on these animals set rules about the way that these ambassador animals should be transported, housed, and handled when they take part in these programs outside the zoo to minimize the risks of harm, disease, and stress to them.

The messages that are spread formally or informally through these education programs can vary from zoo to zoo, of course, but there are a few themes that pop up frequently among them. The most dominant of these relates to another core mission of the zoo community: conservation. Conservation is sometimes thought of as work that can only be done by trained professionals, but zoos will counter this by highlighting the ways that laypeople can take part. This includes abstaining from harmful practices like big game hunting and keeping exotic animals as pets, monitoring one's energy usage, and recycling. They might even mention that visitors are already helping by supporting the zoo since the zoo is taking part in different kinds of conservation projects. And these messages work—a study of visitors to Disney's Animal Kingdom found that just walking through the park and being exposed to conservation-minded messages increased visitors' likelihood to be engaged in conservation programs.[117] These messages also impact the staff of these parks, as similar studies saw increases in conservation interest in the staff of Animal Kingdom just through their day-to-day exposure to their facility's messaging.[118]

[117] Dierking, Lynn D., et al. "Using a Behavior Change Model to Document the Impact of Visits to Disney's Animal Kingdom: A Study Investigating Intended Conservation Action." *Curator: The Museum Journal*, Wiley/Blackwell (10.1111), 15 Jan. 2010, onlinelibrary.wiley.com/doi/10.1111/j.2151-6952.2004.tb00128.x/full.
[118] Groff, Amy, et al. "An Exploratory Investigation of the Effect of Working in an Environmentally Themed Facility on the Conservation-Related Knowledge, Attitudes and Behavior of Staff." *Environmental Education Research*, vol. 11, no. 3, 3 July 2005, pp. 371–387., doi:10.1080/13504620500081384.

Whether it is through signs, presentations, or any other educational method, zoos commonly bring up the dwindling population sizes and threatened/endangered status of their animals. After all, most of the animals in zoos are not there just for fun—they are there to preserve, and in some cases expand, the living populations of these animals. On one hand, these can be happy stories, and that's often the light in which zoos frame them—look at the good work that the zoos are doing, those baby animals are so cute, and so on. However, one also must consider the reason that this work must be done by zoos; sometimes it is natural phenomena that are threatening these animals, but in many cases, these animals are being negatively affected by human actions. Despite their move past being solely entertainment destinations, zoos still want to make their guests feel good during their visits, so some zoos might choose to mention this human effect only subtly, if at all. Others, however, take just the opposite approach and directly bring humans to task for their harmful actions by bringing up all the positive actions that humans can and should be doing to help these threatened animals. In some cases, they even highlight the direct human threats to these animals such as hunting and habitat destruction. In the case of the former, while hunting by Westerners is also a threat, the messages are usually decrying hunting of these animals by local people; to be clear, hunting of threatened animals is harmful to these populations no matter who is doing it, but in the case of the locals, this hunting is often a long-standing aspect of their culture, so it could be considered hypocritical for Westerners to be calling out these people for observing their culture while they are doing the same thing without the cultural basis for it.

Those messages are fairly universal, but there are also some topics that zoos could bring up that might not be part of the programming at all zoos based on the political climate, namely evolution and climate change. Both are topics that relate directly to the work that zoos do, but they are also politically divisive, so the way they are discussed, if they are discussed at all, could be

adapted to fit the dominant ideologies of the zoo's location. For instance, in an area with a large percentage of Christians, the theory of evolution would be discussed in much more tentative terms than in an area where there is not such a religious majority. And since conservative policies tend to be more skeptical of the existence of climate change, zoos in Republican-majority areas might not bring up the effects that climate change has had on their animals, even if there has been evidence presented that climate change is indeed affecting them.[119]

Zoos might help their guests to learn and grow in ways not directly related to their education programs or signs or anything. Studies have found that just visiting a zoo can help people, especially children, to become more moral.[120] Parents tend to value zoo visits because they are a novel way to teach values of altruism and empathy to their children, as well as to expose them to discussions about conservation and their impact on the world now and into the future.

Interestingly, zoos could even be contributing to the physical and mental health of their visitors. As anyone who has a pet can attest, just having an animal around can improve one's mood, well-being, or sense of security, made evident by those people who register their pets as "emotional support animals." Recent studies have also supported this claim; while there is not yet conclusive evidence on the effectiveness of pet ownership as a therapeutic tool, the common feeling is that people's intuitions are correct: "pets are good for us."[121] At the moment, zoo visitors, and even zookeepers, are not allowed to have physical contact with many of the animals—generally, contact is limited to those animals in "petting zoos" or involved in educational programs—and that contact

[119] Kaufman, Leslie. "Intriguing Habitats, and Careful Discussions of Climate Change." *The New York Times*, 26 Aug. 2012.
[120] Fraser, John. "The Anticipated Utility of Zoos for Developing Moral Concern in Children." *Curator: The Museum Journal*, vol. 52, no. 4, Oct. 2009, pp. 349–361., doi:10.1111/j.2151-6952. 2009.tb00357. x.
[121] Wells, Deborah L. "The Effects of Animals on Human Health and Well-Being." *Journal of Social Issues*, vol. 65, no. 3, 2009, pp. 523–543., doi:10.1111/j.1540-4560.2009.01612.x.

is usually for only a brief period. While this is good for the animals' wellbeing and follows current AZA policy about the portrayal of exotic animals as pets, it also demonstrates a potential area of growth for zoo policy. One could imagine that in the future, zoos could design programs where guests can interact with specific animals for longer periods to gain some of the therapeutic benefits of these animals. A different study found that visiting a zoo not only provided guests with an opportunity to become physically active as they walk around, but the combination of that activity alongside visiting the animals tended to lower guests' blood pressure.[122] This suggests that no matter one's goal in visiting a zoo, one can get something positive out of it.

Conservation: in the field and in the zoo

As suggested above, zoos can contribute greatly to the health of both their animals and their visitors. Unsurprisingly, zoos can also be beneficial for the health of the Earth and the species that live on it through their conservation programs. Conservation is almost always one of the central missions of any zoo—like education, it is one of the areas in which zoos are required to have programming and policies to be accredited by AZA. Defined generally, conservation is the "preservation, protection, or restoration of the natural environment, natural ecosystems, vegetation, and wildlife" for a certain area.[123] Because the definition is so broad, different zoos put it into action differently. [124] In general, conservation efforts can be divided into two categories: in-situ and ex-situ, both of which are important for conserving the Earth and its inhabitants.[125]

[122] Sakagami, Taketo, and Mitsuaki Ohta. "The effect of visiting zoos on human health and quality of life." *Animal Science Journal*, vol. 81, no. 1, 2010, pp. 129–134., doi:10.1111/j.1740-0929.2009. 00714.x
[123] "Why Restoration?" *Hood College*, www.hood.edu/Academics/Departments/Biology/CCWP-Restoration/Why-Restoration-.html.
[124] Braverman, Irus. "Conservation without Nature: the Trouble with in Situ versus Ex Situ Conservation." *Geoforum*, vol. 51, 2014, pp. 47–57., doi:10.1016/j.geoforum.2013.09.018.
[125] Blake, Stephen, and Simon Hedges. "Sinking the Flagship: the Case of Forest Elephants in Asia and Africa." *Conservation Biology*, vol. 18, no. 5, 2004, pp. 1191–1202., doi:10.1111/j.1523-1739.2004.01860.x.

In-situ conservation refers to projects that take place "in its original place," to translate literally, meaning in the animals' natural habitat, away from zoos or other controlled settings.[126] Zoos' engagement with these programs, then, can come in many different forms—the zoo might be financially supporting existing programs, they might partner with such programs to do work on the ground in these locations, or they might even start their own field conservation program. In a recent evaluation of the role of zoos and aquariums to global in-situ conservation programs, it was determined that the first of these—financial support—is the way through which most facilities were contributing.[127] While at first glance one might assume that this is not the most effective way to maximize their impact, one must consider the magnitude of such contributions, as WAZA counts over 300 facilities worldwide as members, most of whom are supporting some form of in-situ conservation.[128] The more money a project has, the more work it can be doing, and zoo-supported projects have been shown to be making a significant impact on preservation of global biodiversity, so it would be reasonable to infer that zoos, too, are making this significant impact. In fact, the same report found that over half of the projects they studied would not have been possible, at least not to the same extent, without the support of their backing zoos and aquariums.[129]

More specifically, most of the zoo-supported in-situ conservation projects focus on species preservation, mostly of species that are threatened or endangered.[130] However, it is also of note that half of these projects were focused primarily on mammals, many of them specifically on

[126] Hutchins, Michael, and William G. Conway. "Beyond Noah's Ark: the Evolving Role of Modern Zoological Parks and Aquariums in Field Conservation." *International Zoo Yearbook*, vol. 34, no. 1, 1995, pp. 117–130., doi:10.1111/j.1748-1090.1995.tb00669.x.
[127] Gusset, M., and G. Dick. "'Building a Future for Wildlife?' Evaluating the Contribution of the World Zoo and Aquarium Community to in Situ Conservation." *International Zoo Yearbook*, vol. 44, no. 1, 2010, pp. 183–191., doi:10.1111/j.1748-1090.2009.00101.x.
[128] Ibid.
[129] Ibid.
[130] Ibid.

primates or carnivores, which left amphibians and fish proportionally underrepresented among species preservation projects. Other types of in-situ projects focus on fighting habitat destruction for threatened species, educating the locals on some of the same things one might learn from a visit to a zoo, or doing research. While species preservation is an important goal, so are the other projects—after all, it doesn't do a species much good to be "preserved" if it does not have a hospitable habitat in which to live. Also, educating the local residents allows the conservation workers to share their knowledge they gained from privilege or experience and then take a step back once the programs are established; this can allow the locals to retain control of their home communities and not have outsiders imposing on them. Therefore, it would behoove future in-situ conservation projects to shift their focus toward more diverse topics—different taxa, different programs, and so on. It has also been suggested that these projects could have an even greater impact if zoos increased their contributions and were more willing to work with one another and share their resources to support them.[131] It might also be helpful for zoos to be more vocal about the in-situ projects they are engaged in, as this work is happening beyond the gates of the zoo and might be difficult for the average visitor to know about without doing research.[132] This information could easily be incorporated into existing signage and education programming.

As one might guess, ex-situ conservation is, then, work that is done outside the animals' natural habitats, so this is the more direct work that zoos are doing. Just by providing care for animals in the zoo setting, these facilities are taking part in ex-situ conservation, as suggested by the "extinct in the wild" status of some animals—human-care facilities represent the only viable

[131] Fravel, Laura. "Critics Question Zoos' Commitment to Conservation." *National Geographic News*, National Geographic Society, 13 Nov. 2003, news.nationalgeographic.com/news/2003/11/1113_031113_zoorole.html.
[132] Miller, Brian, et al. "Evaluating the Conservation Mission of Zoos, Aquariums, Botanical Gardens, and Natural History Museums." *Conservation Biology*, vol. 18, no. 1, 2004, pp. 86–93., doi:10.1111/j.1523-1739.2004.00181.x.

living populations for these species.[133] Even for animals that do have wild populations, zoos can be homes for those whose habitats are facing destruction or individuals that would not be able to thrive in the wild because of injury, human dependence, or some other factor.[134] Because of this aspect, many have drawn comparisons between zoos and Noah's ark described in the Book of Genesis which offered refuge from an epic flood to two animals of every kind to preserve them for the future.[135,136]

Beyond just that base-level conservation work, the most familiar kind of ex-situ conservation programming is the human-directed breeding programs that have been developed to increase the populations of these animals. These programs can exist on a single-zoo level, but more often, they exist as collaborative projects between multiple zoos and can even be managed by the organizations that oversee and accredit those zoos. The European Association of Zoos and Aquaria (the European equivalent of AZA) has developed several for both endangered and non-endangered species, which they broadly refer to as European Endangered species Programmes, or EEPs, while the American counterparts are managed by AZA and are called Species Survival Plans, or SSPs.[137,138] In these programs, individuals of the same species (and in some cases, they must be the same subspecies) of opposite sexes are matched by special teams based on their genetic

[133] Staff, WAZA. "Extinct in the Wild." *WAZA: World Association of Zoos and Aquariums*, WAZA, www.waza.org/en/site/conservation/extinct-in-the-wild.
[134] "Saving Animals From Extinction." *AZA SAFE*, Association of Zoos and Aquariums, www.aza.org/aza-safe.
[135] Balmford, Andrew, et al. "Designing the Ark: Setting Priorities for Captive Breeding." *Conservation Biology*, vol. 10, no. 3, 1996, pp. 719–727., doi:10.1046/j.1523-1739.1996.10030719.x.
[136] Soule, Michael, et al. "The Millenium Ark: How Long a Voyage, How Many Staterooms, How Many Passengers?" *Zoo Biology*, vol. 5, no. 2, 1986, pp. 101–113., doi:10.1002/zoo.1430050205.
[137] Elajos. "America vs Europe?" *ZOOmoments*, www.zoomoments.com/index.php/articles/categories/zoolife/32-america-vs-europe.
[138] "Species Survival Plan Programs." *Association of Zoos and Aquariums*, www.aza.org/species-survival-plan-programs.

compatibility and genetic value to the overall population. Once a match is made, they are introduced with the hopes that they will breed.

AZA manages close to 500 of these programs, and except for their 12 Certified Related Facilities and other special cases like that of the Mill Mountain Zoo, only AZA-accredited facilities may take part.[139] This sets up an incentive for zoos to seek accreditation, but it also contributes to the success of the SSPs; to be in the SSP studbook and ranked for genetic importance to the population, an animal's lineage must be known. If its lineage is not known, as is the case for many animals that live in sanctuaries or are privately owned, an animal could accidentally be bred to a closely-related individual or introduce unwanted traits into the population, both of which would compromise the integrity of the breeding population and undermine the conservation efforts for that animal.

Though there are close to 500 SSPs, there are more than 500 species in zoos in the United States, so priorities have been established for which animals need to be or should be encouraged to reproduce in a zoo setting. This makes sense at first glance—there is no need for zoos to be devoting their time and resources to breeding animals that have sufficient wild populations. Also, just because a species is not being managed by an SSP, that does not mean that species is not reproducing in zoos, but rather that their breeding isn't being dictated on that level and not as much industry-wide attention and not as many resources are being devoted to preserving the species. Still, one can't help but to question how a species qualifies for an SSP, as the species that are managed by these programs run the entire gamut from critically endangered to least concern.[140] In fact, there are declining species that are not being managed by SSPs because of resource

[139] "Species Survival Plans." *Association of Zoos and Aquariums*, 2018, www.aza.org/species-survival-plans.
[140] Ibid.

limitations.[141] One writer compared the difficult process by which zoos decide which species to save as "less like Noah building an ark and more like Schindler making a list," referencing the man who saved many, but not all, Jewish people during the Holocaust by putting their names on his list of employees.[142] Current priorities for breeding and resources favor large vertebrates, even though those species are less likely than smaller vertebrates and invertebrates to breed well in human care.[143]

This points to a need to reevaluate allocations to these various programs. The SSP managers, and by extension the zoos, must decide whether to continue to use their limited resources to support a failing SSP or whether to devote those resources to another species that has been more successful and withdraw the life preserver from a drowning species.[144] There's no one answer on this, and it's a topic of much debate. On one hand, some people argue that extinction is a natural process that has been occurring for the entire history of life, while others argue that humans have a moral responsibility to save species that are in trouble, especially since human activity has shaped the entire planet and potentially contributed to species' threatened status.[145]

The same idea that the resources of a zoo could be potentially misallocated can be applied to zoo collections in general. Zoos are generally thought of as safe havens for endangered species,

[141] Kaufman, Leslie. "Zoos' Bitter Choice: To Save Some Species, Letting Others Die." *The New York Times*, The New York Times, 27 May 2012, www.nytimes.com/2012/05/28/science/zoos-bitter-choice-to-save-some-species-letting-others-die.html.
[142] Ibid.
[143] Balmford, 1996.
[144] Conway, William G. "The Practical Difficulties and Financial Implications of Endangered Species Breeding Programmes." *International Zoo Yearbook*, vol. 24, no. 1, 1986, pp. 210–219., doi:10.1111/j.1748-1090.1985.tb02541.x.
[145] Rolston III, Holmes. "Ethical Responsibilities toward Wildlife." *Journal of the American Veterinary Medical Association*, vol. 200, 1992, pp. 615–622.

but a study of the zoos of Wales found that less than half of the species living there are endangered, which calls their "safe haven" status into question.[146]

Further calling into question the efficacy of Species Survival Plans is the thought that, for those animals that are extant both in zoos and in their natural habitats, the zoo breeding programs are only working with a subset with the entire population, so they have a reduced pool of genetic diversity with which to work.[147,148] Like what can happen when a subset of a population is naturally separated from the rest of the population, there is the possibility that the individuals managed by the zoo could become genetically isolated from their wild brethren and that they could lose some of the genetic diversity present in the total population.[149] This is especially likely when the zoo-managed groups are living in environments that differ from their natural ones, so natural selection would be acting in response to different natural stimuli and promoting the persistence of different traits. This seems positive, as the animals would be more suited to living in that environment than their parents were. However, it throws a wrench in the works if the animals in the zoo are ever to be introduced back into their natural habitat. It also follows that these breeding programs that only utilize a subset of the population, so even though SSPs take care to avoid it, there is the potential that inbreeding could occur. Frequent inbreeding could compromise the integrity of the population by preserving only a few of the genes in the pool, potentially leading to the expression of rare/harmful recessive traits, and as mentioned before, could make them ill-suited for different conditions. The only hope for greater genetic diversity would be mutations, but those occur

[146] "Con in Conservation." *Freedom for Animals*, 2017, www.freedomforanimals.org.uk/con-in-conservation.
[147] Alroy, John. "Limits to captive breeding of mammals in zoos." *Conservation Biology*, vol. 29, no. 3, 18 Nov. 2015, pp. 926–931., doi:10.1111/cobi.12471.
[148] Snyder, Noel F. R. "Limitations of Captive Breeding in Endangered Species Recovery." *Conservation Biology*, vol. 10, no. 2, Apr. 1996, pp. 338–348.
[149] Kraaijeveld-Smit, Femmie J. L., et al. "Captive Breeding and the Fitness of Reintroduced Species: A Test of the Responses to Predators in a Threatened Amphibian." *Journal of Applied Ecology*, vol. 43, no. 2, 2006, pp. 360–365., doi:10.1111/j.1365-2664.2006.01137.x.

infrequently, so they should not be counted upon as a viable backup plan for the long-term survival of these species.[150]

As mentioned before, for species that are part of SSPs, individuals are assigned a ranking for their relative importance to the breeding population. This ranking is based on how represented that individual's genes are in the population—the more closely-related an individual is everyone else, the lower that individual's ranking since that individual's genes are well-represented in the population, so it is not as important that they spread those genes by breeding. This is important for keeping the breeding population viable, especially in species with small populations—the whole purpose of humans managing the breeding is to avoid inbreeding.[151] However, where does this leave the low-ranking individuals? If a suitable match can be found for them, they may still get to breed, but it is not as likely since they do not have priority for mates. They can provide companionship to others of their species, help zoos accomplish some of their other goals like education or research, or maybe take part in a hybrid in/ex-situ program discussed later.

Even so, one may still question the role or, on a deeper level, existence of these individuals—though the rankings are relative based on the other individuals in the breeding population at the time, the people making the breeding pairs can reasonably estimate where an individual would rank before they are conceived based on their parents' rankings. If the purpose of animals living in zoos is to breed and increase their numbers, then one might not see the point in breeding two individuals to produce an offspring that will not contribute to increasing the genetic diversity of the population. In the case of some animals in the Copenhagen (Denmark)

[150] Lacy, Robert C. "Achieving True Sustainability of Zoo Populations." *Zoo Biology*, vol. 32, no. 1, 2012, pp. 19–26., doi:10.1002/zoo.21029.
[151] Montgomery, Margaret E., et al. "Minimizing kinship in captive breeding programs." *Zoo Biology*, vol. 16, no. 5, 1997, pp. 377–389., doi:10.1002/(sici)1098-2361(1997)16:5<377: aid-zoo1>3.0.co;2-7.

Zoo, this is further called into question because of several high-profile incidents in recent years where individuals were euthanized because they were not high-ranking within their breeding populations.[152] This was done to free up space and resources to be used for individuals that would be able to contribute to the genetic diversity of the population. This may hint at a difference in practices within the European zoo system compared to the American zoo community, as there have not been such acts of euthanasia at American zoos. However, no matter where in the world this is happening, even the strongest zoo supporter might question this decision and wonder if perhaps there was another zoo or a sanctuary that could have given refuge to these animals or if the parents should have been kept from reproducing in the first place, which calls into question the efficacy of the breeding program under which the animals are managed.

Despite the attention and resources that are devoted to carrying out SSPs on the industry level, they are not always easy to carry out on the zoo level. As mentioned before, large vertebrates are currently prioritized for breeding, but larger animals mean more space is needed, and if one is wanting these animals to breed, there needs to be enough space for at least two adults plus their offspring (which might be more than one, in some species) for at least however long the offspring are dependent upon their parents. In addition, it costs more to feed carnivores than herbivores, and there must be adequate heating and cooling for the animals based on the location and the animals' temperature needs.[153] All these factors could put a serious strain on zoos, especially those with small areas and budgets. That's not to say that smaller zoos should be excluded from SSPs, but

[152] Parker, Ian. "Killing Animals at the Zoo." *The New Yorker*, 29 Oct. 2017, www.newyorker.com/magazine/2017/01/16/killing-animals-at-the-zoo.
[153] Fiennes, Richard. "Feeding Animals In Captivity." *International Zoo Yearbook*, vol. 6, no. 1, 1966, pp. 58–67., doi:10.1111/j.1748-1090.1966.tb01689.x.

instead, if it truly is a priority of AZA to carry out the SSPs to the greatest extent possible, they should make a stronger effort to support those zoos that are willing to engage in them.

Though there have been many issues identified with the SSPs, they are overall positive programs. Not only do they help to increase the wild populations of the species that are involved by giving them a breeding environment that is free of predators and where all their needs are met, but the funds that are raised by having these animals in the zoo can help their wild brethren. They may not always go to plan, and one could reasonably argue that they need to be more thoroughly researched for the effect they are having on the global populations of their animals, but they are unquestionably making an impact for these species and could be the difference between a species being saved or going extinct.

While SSPs are perhaps the form of ex-situ conservation that receives the most attention, they are not the only such programs that American zoos are taking part in. As if zoos themselves do not draw enough comparisons to Noah's ark, the San Diego Zoo has taken things a step further with a different, more futuristic kind of ex-situ conservation. They have developed a "Frozen Zoo" where they have preserved gametes and cell lines for many species by storing them in a specialized freezer, much like the ark preserved two individuals of every species on board.[154] So long as this freezer stays operational, this is an expensive but effective means of saving the genetic information of these species, one that has already proven to be a good idea because one of the taxa whose genes are saved there, the Hawaiian po'ouli bird, is now believed to be extinct. This information is being used today to identify meat as coming from illegally-hunted primates and duikers as well as to compare modern genomes to ancient versions of the same genomes. However, the existence of

[154] "Frozen Zoo®." *San Diego Zoo Institute for Conservation Research*, San Diego Zoo Global, 5 Jan. 2018, institute.sandiegozoo.org/resources/frozen-zoo%C2%AE.

this program brings up the question of if these preserved gametes should be used to create individuals if their species becomes extinct, and if so, how that should be done. This goes back to the debate over the naturality of extinction versus the responsibility to help if given the ability.[155]

It was previously discussed that most zoos take part in breeding programs where individuals of the same species (or even more specifically subspecies, for some) are matched up and housed together in the hopes that they reproduce. These matches are made based on several factors, all of which contribute to the overall genetic wellbeing of the zoo population of the species, and by extension the global population. The pairings are decided by one or a few zookeepers who serve on a committee. To be included in the breeding program, an individual's entire lineage back to its wild ancestors must be known (which is why animals that are in sanctuaries or are privately owned are not included), because the matches are always made to avoid breeding of closely-related individuals, as this gives a higher likelihood that a deleterious recessive trait will be expressed by the offspring. However, the meticulous nature of the breeding plans could be and has been used for more questionable practices as well.

In Nazi-era Germany, Lutz Heck, director of the Berlin Zoo, designed a breeding program to bring back the auroch, a bison-like animal that lived in Europe but had been extinct for about 300 years at the time of World War II.[156] His goal was to breed together those cattle that most closely resembled the auroch (based on physical traits and behavior—this was before the discovery

[155] Coblentz, Bruce E. "Exotic Organisms: A Dilemma for Conservation Biology." *Conservation Biology*, vol. 4, no. 3, 1990, pp. 261–265., doi:10.1111/j.1523-1739.1990.tb00287.x.
[156]Ackerman, Diane. *The Zookeeper's Wife*. W.W. Norton, 2017.

of DNA) to produce a line of cattle that approximated the auroch. This project, along with Heck's similar projects with tarpans (wild horses) and wisents (European bison), was unsuccessful.[157]

From this discussion of both in-situ and ex-situ conservation projects, it should be evident that both are important to the overall cause of saving species. Accordingly, for a species to be effectively saved, they must be undertaken in tandem, and one could even argue that zoos must actively support that dynamic.

Recent zoo-based projects have developed a way of bridging the gap between in-situ and ex-situ conservation: releasing zoo inhabitants into their native habitats.[158] To be clear, this is a rare situation—few species qualify for this (or they have not been considered for it), and not every member of a qualifying species will be released. Also, it is not always a successful program, as individuals must meet certain criteria to even be included in plans for release and many animals do not breed as well in human care as they do in the wild. Because of these factors and the negative stigma against taking animals from their native habitats, capturing wild animals for breeding is often used only as a last resort when in-situ conservation efforts have not been (fully) successful.

For social species that have extant wild populations, one of the most important aspects of the release into the wild would be to promote the integration of the introduced individuals into the wild population, both socially and reproductively. Therefore, it would be best if the individuals had an opportunity to interact with conspecifics while at the zoo, so they would be familiar with the social responsibilities that members of their groups have to one another. It is especially

[157] Boissoneault, Lorraine. "When the Nazis Tried to Bring Animals Back From Extinction." *Smithsonian.com*, Smithsonian Institution, 31 Mar. 2017, www.smithsonianmag.com/history/when-nazis-tried-bring-animals-back-extinction-180962739/.
[158] Tenhumberg, Brigitte, et al. "Linking Wild and Captive Populations to Maximize Species Persistence: Optimal Translocation Strategies." *Conservation Biology*, vol. 18, no. 5, 2004, pp. 1304–1314., doi:10.1111/j.1523-1739.2004.00246.x.

important for them to have interacted with individuals of the opposite sex, so that they are able to recognize any sexually dimorphic characteristics and perform mating behaviors with those individuals where mating would be successful.

If a cooperation between breeding in human care and wild populations is to be established, it is important to determine what the balance should be. A rule of thumb for those working in this field has been that a population would do better in human care than in the wild if the wild population has fewer than 20 females[159]. This is especially true if the wild population is fragmented, as it may be difficult for females to find unrelated males to mate with. On the other end, the complementary rule is that individuals should not be released until the facilities have reached at least 85 percent of their capacity.[160] This allows for the establishment of both the human-managed breeding population and the wild population, but also provides a cushion in case the released individuals do not thrive.

Several species have been able to thrive through these introductions, though. The Przewalski's horse was the last non-domesticated horse species left, and it was extinct in the wild as of the 1960s.[161] However, several individuals were taken from their habitat in Mongolia around the turn of the 20th century and housed in European zoos, with one last horse taken in 1947. The population was able to bounce back from having only 13 founders to having 500 individuals. At that point, around the 1980s, plans were made to reintroduce some of the horses to their habitat in Asia, and three such introductions have since occurred. They have not been without challenges—

[159] Ibid.
[160] Ibid.
[161] Staff, WAZA. "Return of the Wild Horse Project." *Overview: WAZA: World Association of Zoos and Aquariums*, WAZA, www.waza.org/en/site/conservation/waza-conservation-projects/overview/return-of-the-wild-horse-project.

one of the populations saw a 60 percent mortality rate during a recent harsh winter—but the population is undoubtedly moving in the right direction.

The Père David's deer had a similar journey close to complete extinction, but their recovery has been a bit slower. Wild individuals were slowly taken from their native China and moved to zoos and private collections during the 19th century, and then in the early 1900s, a British royal moved all 18 extant individuals into his estate's private collection to establish a cohesive breeding population. [162] They were able to survive this genetic bottleneck and their population is still increasing, but most of the individuals that have been moved back to China are living within the fences of wildlife preserves, so very few have been fully reintroduced to the wild.

However, not all reintroductions are as large-scale as this one, nor are they as successful. Both are realized in the case of Keiko the killer whale.[163] Most people are familiar with Keiko from his starring role as the titular character in the 1993 film *Free Willy*, but Keiko had an eventful life after his time in Hollywood too. Inspired by the fictional story of Willy, a whale who had been taken from the wild and put in an aquarium when he was young and then released from an aquarium back into the ocean, there were calls by members of the public to release Keiko into the wild, especially since he was taken from the wild when he was young and was a 6-ton whale living in a tank meant for dolphins. Funded initially by Warner Brothers (the studio that made *Free Willy*) and school children, the Free Willy-Keiko Foundation was founded to facilitate that release. He was moved from his tank in Mexico to a specially-built enclosure in Oregon to acclimate to saltwater, and in 1998, he was moved to a sea-pen off the coast of Iceland. The goal of the sea-pen

[162] Jiang, Z. & Harris, R.B. 2016. *Elaphurus davidianus*. The IUCN Red List of Threatened Species 2016: e. T7121A22159785. http://dx.doi.org/10.2305/IUCN.UK.2016-2.RLTS.T7121A22159785.en.
[163] Simmons, Mark A., and Wyland. *Killing Keiko: the true story of Free Willy's return to the wild*. Orlando, FL, Callinectes Press, 2014.

was to readjust Keiko to the Icelandic waters, teach him how to catch live fish, teach him to follow other whales (or boats, for his training) to join a wild pod—teach him how to be a wild whale again. A team of scientists, including former killer whale trainers from SeaWorld, worked with him for three years, but when he was introduced to pods of wild whales, he was not able to integrate. One such attempted introduction went awry to the point that Keiko swam away and was found hundreds of miles away. He died a year later because he was unable to properly feed.

Since the goal was for Keiko to be integrated with his wild brethren (killer whales are a social species and hunt in groups), the project was generally considered to be a failure.[164] Keiko had been living in human care for most of his life, so he had become dependent on humans for food and interactions—all his needs were met by humans, so he did not know how to meet those needs himself. This is a key component of any program to release an animal that has been in human care: they must be able to fend for themselves without human intervention, which becomes more difficult the longer the animal is in human care. For populations that have lived in human care for generations, it might be impossible—in some species such as the beluga whale, hunting and migratory behaviors are learned from older generations instead of being instinctual, so breaking that chain could leave those reintroduced animals stranded.

The failure of the Keiko Project calls into question the similar arguments that have been made for the release of other killer whales in human care. In particular, many have called for the release of Lolita, a killer whale living at the Miami (Florida) Seaquarium.[165] However, Lolita has been in human care for at least 44 years, over twice as long as Keiko was, so it would be doubtful

[164] Ibid.
[165] Wilkinson, James. "No Freedom for Lolita, the Loneliest Killer Whale in the World, as Miami Seaquarium Says She Will Continue to Live in the USA's SMALLEST Whale Tank." *Daily Mail Online*, Associated Newspapers, 27 Mar. 2016, www.dailymail.co.uk/news/article-3511135/No-freedom-Lolita-loneliest-killer-whale-world-Miami-Seaquarium-says-continue-live-USA-s-SMALLEST-whale-tank.html.

that she could be rehabilitated well enough to be successfully released.[166] There were lessons learned from Keiko, and that information could be used to guide future release projects, maybe even for killer whales, but this case illustrates that releasing an animal from human care is never as simple as to just remove the physical barriers.

It can also be the case for some individuals that they will be born in the wild, live for a time in a zoo or aquarium, and then be re-released into the wild—in this way, zoos can resemble the "rehabilitation center" form of sanctuary. These "wildlife rehabilitation" programs, as many are called, do just that—rescue animals in distress (illness, young animals abandoned by their parents, etc.), bring them back to the facility to promote their health, and as soon as the animal is ready, release them into the wild again. These programs tend to involve species that are native to the zoo/aquarium's location—for example, the Monterey Bay Aquarium has a Southern sea otter rehabilitation program for otters located off the California coast.[167] However, they do not necessarily need to—the Cincinnati Zoo has a partnership with coastal facilities to rehabilitate some of the manatees that they save but do not have room for.[168] This type of program is especially useful when disaster strikes, as it allows these displaced animals to seek refuge from whatever events are threatening their natural habitat and not have to start the wild population from scratch once the environment is inhabitable again. There is a balance that must be struck here for how long those animals stay at the zoo, though; as Keiko demonstrated, strong relationships and dependence on humans should be avoided, as this can hamper these individuals' ability to survive in the wild.

[166] D'amato, Pete. "Killer Whale Kept in Captivity for 44 Years Could Be Freed under Endangered Species Act." *Daily Mail Online*, Associated Newspapers, 5 Feb. 2015, www.dailymail.co.uk/news/article-2940193/Now-endangered-captive-Florida-orca-clears-hurdle-freedom.html.
[167] "Southern Sea Otters." *Southern Sea Otter Priority at the Monterey Bay Aquarium*, www.montereybayaquarium.org/conservation-and-science/our-priorities/thriving-ocean-wildlife/southern-sea-otters.
[168] "Manatee Springs." *The Cincinnati Zoo & Botanical Garden*, cincinnatizoo.org/manatee-springs/.

In these cases, the individual would most likely become a permanent resident of that zoo or another, which can be an unexpected drain on a zoo's resources and finances.

In addition to using profits from ex-situ conservation projects to fund in-situ projects and organizing wildlife releases, there is one other important way that zoos can support the in-situ/ex-situ dynamic: engaging in scientific research with their animals. This can allow for not only a better understanding of the lives of zoo animals, but also could contribute to helping their wild counterparts, or even humans in some cases.[169] Zoos present an ideal setting for research, as they allows scientists access to individuals of rare and rarely-studied species that are accustomed to being around humans and can be trained to permit humans to touch them or withdraw blood.[170] Save for the variation presented via enrichment, zoos also represent controlled environments, so they would allow for research that depends on this low level of variation.

Many kinds of research can and have been done on animals in zoo settings. For instance, one could consider the execution of SSPs to be a form of research, as some of these animals had not been bred in human care before, so the individuals organizing them had to set them up to breed and observe the results. The zoo population can also be used to draw conclusions about the population as a whole—its size, its genetic diversity, their typical behaviors. For instance, geneticists were able to sequence the genome of a Sumatran rhino from the Cincinnati Zoo and determine that the global population of this species dwindled to 700 individuals about 9000 years ago.[171] The species is once again in danger—it is estimated that fewer than 100 individuals are

[169] Montali, Richard J, and Mitchel Bush. "A Search for Animal Models at Zoos." *ILAR News*, vol. 26, no. 1, 1982.
[170] Maple, Terry L., and Valerie D. Segura. "Advancing Behavior Analysis in Zoos and Aquariums." *The Behavior Analyst*, vol. 38, no. 1, 2014, pp. 77–91., doi:10.1007/s40614-014-0018-x.
[171] Mays, Herman L., et al. "Genomic Analysis of Demographic History and Ecological Niche Modeling in the Endangered Sumatran Rhinoceros *Dicerorhinus Sumatrensis*." *Current Biology*, vol. 28, no. 1, 2018, doi:10.1016/j.cub.2017.11.021.

alive in the fragmented wild populations—so it would be difficult to access them outside a zoo, and even if one did find a wild individual, it would be difficult and dangerous to do this kind of research on them.[172] To be clear, there is also danger in doing research in the zoo as well, but the zoo animals are habituated to humans, and common sense as well as many regulations would dictate that there would be a physical barrier between the humans and rhinos, so it presents a safer environment than trying to do this research with wild individuals.

Zoos are also a prime environment for behavioral observation and research. The walls and windows of a zoo enclosure provides researchers with an opportunity to observe animal behavior safely in closer proximity to them than would be possible in the animals' natural habitat. It also presents a chance to see them respond to stimuli that they might not encounter in the wild. However, researchers must be cautious about the conclusions that they draw from zoo-based research; some argue that zoos are shaping animals' behaviors just by the animals being in this controlled setting, so conclusions made from this research would not provide an accurate picture of the animals' natural behaviors.[173] That's not to say that this research should not be done—the knowledge gained from studying an animal in one zoo could be helpful for understanding or working with the same animal in another zoo—but conclusions made exclusively from study in zoos or other controlled settings should reflect the limited extent to which they can be applied to other individuals of that species.

Another case where zoo-based research could have implications, albeit limited ones, outside the zoo is in veterinary research that can be used to shape human medicine and vice

[172] "Sumatran Rhino." *International Rhino Foundation*, 2018, rhinos.org/species/sumatran-rhino/.
[173] Maple and Segura, 2014.

versa.[174] Because it deals with manipulating and potentially harming these individuals, this is, of course, an area where there is an extra layer of ethical questioning beyond the base question of whether it is moral to be doing any research on animals. Setting that aside for a moment, one must recognize the scientific contributions that have come from this research. As early as 1982, scientists have looked to zoos for suitable research subjects for understanding human health.[175] Because of physiological differences between humans and other animals, these animals will never be perfect models for this research, but they do present an opportunity to examine the different ways the same medical phenomenon can manifest in both humans and animals and the ways that different treatments can be used—or, more accurately, how the same treatment can be used for different species. And it is not just physical ailments that animals and humans can share—animals have been diagnosed with mental illnesses (or if one is leery of the implications for animal mindedness in saying they have mental illnesses, then with patterns of behavior that resemble human models of mental illnesses) such as depression, anxiety, and addiction. Not surprisingly, these can be treated the same ways in animals that they are treated in humans—for instance, some zoo cheetahs showing signs of anxiety have been given dogs to be their companions, mirroring humans that use emotional support animals for the same purpose.[176] Veterinarians and human doctors have increasingly been collaborating to treat both of their sets of patients, and several conferences/events have been planned to facilitate these connections. The goal of this is to share information that could be beneficial to the health of both species.

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[174] Briggs, Bill. "Wild Science: Breakthroughs in Animal Health Care May Hold Treatments for Humans." *NBCNews.com*, NBCUniversal News Group, 2 Nov. 2015, www.nbcnews.com/health/health-news/wild-science-breakthroughs-animal-health-care-may-hold-treatments-humans-f8C11510306.

[175] Montali, 1982

[176] News, CBS. "How an Unlikely Friendship Is Saving Cheetahs." *CBS News*, CBS Interactive, 5 July 2016, www.cbsnews.com/news/cheetah-conservation-fund-how-unlikely-friendship-with-dogs-is-saving-endangered-cheetahs/.

Veterinary care and medicine in a zoological park setting

Veterinary care is not usually explicitly included in the mission statements of zoos, but it is still one of the most important aspects of those facilities—after all, a zoo of dead animals would just be a museum. Just like with human children and the pets we keep, it is considered immoral if you oversee the care of animals in a zoo setting and do not provide for their medical care. It's also illegal and goes against the tenets of the agencies that oversee zoos—the USDA could easily shut down a zoo if its animals were not receiving veterinary care, and AZA and ZAA would also revoke a facility's accreditation over such a matter. Therefore, zoos have both an opportunity and an obligation to provide quality veterinary care to their animals.

The veterinary staff are an essential part of any zoo. While keepers may have certain knowledge about the health and needs of the animals, they often lack the detailed medical knowledge that veterinarians and veterinary technicians receive in their training, so they would not be well-equipped to meet all the animals' needs without assistance, nor would they be allowed to do so in most medical contexts. For instance, zookeepers can medicate their animals, but they need a veterinarian to prescribe and dispense that medication first. They can train their animals to cooperate during medical procedures, but they cannot carry out most of those procedures themselves. Veterinarians also approve all the enrichment items, diets, and enclosure designs for the zoo animals to make sure they are meeting the animals' needs without putting them (or other animals or zookeepers) in danger, so the zoo literally would be a bare-bones operation without the input from the veterinary staff. While most doctors that treat human patients focus on one type of medicine, veterinarians, and especially zoo veterinarians, wear many hats—they must be prepared to treat nearly any issue presented by any of the animals in the zoo.

Just by having these animals in their care, zoos are obligated to provide them with skilled medical attention, no matter what ails them. This means providing care for every life stage from birth to death and making sure the duration between those two points is as long as possible. Each species, and each individual of a given species, presents its own challenges, so it would be difficult to compare many of the experiences across the board, but there are a few issues that are universal or have affected multiple animals at multiple zoos.

The first of these is utterly fascinating. As previously discussed, zoos across the country have collaborated to develop intricate breeding plans for several species. This means that they need to be able to control not only when breeding occurs, but also when it does not occur—they do not want to run out of space to house the offspring or have one individual's genes be over-represented in the gene pool. Zoos can sometimes physically separate members of opposite sexes they do not want to breed with one another, but when that is not possible, zoos have the option with some species to use birth control to hormonally impede the animals from successfully breeding. This option seems reasonable in theory, but in practice, it has not gone well for several species of big cats in recent years.

The drug deslorelin was developed as a hormonal birth control method that would lower the levels of hormones in the females in which it was used, which were mainly large cat species such as lions and tigers that were living in zoos, for six to twelve months per implant.[177,178] At first, zoos did not notice any issues with it—they were seeing very few offspring from these

[177] Bertschinger, H J. "Control of reproduction and sex related behaviour in exotic wild carnivores with the GnRH analogue deslorelin: preliminary observations." *Journal of reproduction and fertility. Supplement*, no. 57, 2001, pp. 275–283.
[178] Bertschinger, H J. "Induction of contraception in some African wild carnivores by downregulation of LH and FSH secretion using the GnRH analogue deslorelin." *Reproduction. Supplement*, vol. 60, 2002, pp. 41–52.

individuals—but complications soon arose. The problem was, the drug was working too well. Females that readily reproduced before they were on deslorelin were not becoming pregnant even if it had been years since their last implant.[179,180] This was not just a problem in a few individuals—at one point, of the 118 lionesses that had been on deslorelin, only nine were able to "reverse," or have an offspring afterwards. Because the implant was used in genetically-valuable members of endangered species, this lack of offspring was bad news for these zoos and their SSPs. Even worse, veterinarians soon discovered that these implants were associated with higher rates of uterine disease, so it was not just that their hormones were off, but their reproductive systems were enduring serious damage.[181,182] This has led to serious conversations among zookeepers and zoo veterinarians about the implications for these individuals and their species, as well as calls to find new, less harmful methods of birth control. The Depo-Provera shot and plugs for the male's vas deferens are two such methods that have had limited applications but have proven successful in those few applications, so it might behoove zoos to investigate the use of those methods.[183]

This is another instance where knowledge gained in the zoo can help animals outside that setting. Some of the birth control methods that have been tested in the zoo have been implemented in wild populations as well. However, it wouldn't make sense to use them in endangered species—in the wild, those species should be encouraged, not discouraged, to mate. Instead, birth control in

[179] Hunn, David. "What happens when zoo contraceptives work too well?" *Stltoday.com*, St Louis Post-Dispatch, 28 Apr. 2015, www.stltoday.com/news/local/govt-and-politics/what-happens-when-zoo-contraceptives-work-too-well/article_8e71a4c4-2cd1-58d7-b8af-8fe8eb1be30c.html.
[180] Moresco, Anneke, et al. "Location and Removal of Deslorelin Acetate Implants in Female African Lions (Panthera Leo)." *Journal of Zoo and Wildlife Medicine*, vol. 45, no. 2, 2014, pp. 397–401., doi:10.1638/2013-0109r1.1.
[181] Munson, L., et al. "Endometrial Hyperplasia and Mineralization in Zoo Felids Treated with Melengestrol Acetate Contraceptives." *Veterinary Pathology*, vol. 39, no. 4, 2002, pp. 419–427., doi:10.1354/vp.39-4-419.
[182] Moresco, Anneke, and Dalen W. Agnew. "Reproductive Health Surveillance In Zoo And Wildlife Medicine." *Journal of Zoo and Wildlife Medicine*, vol. 44, no. 4s, 2013, doi:10.1638/1042-7260-44.4s.s26.
[183] Asa, Cheryl S. "The Development of Contraceptive Methods for Captive Wildlife." *Contraception in Wildlife Management*, Oct. 1993, pp. 235–240.

wild populations is used for species that are abundant to the point of being nuisances such as the white-tailed deer and wild horses.[184] This is still an emerging field, so there is not much evidence on the applicability of such technology for a variety of species and locations, but those studies that do exist provide evidence that is an effective means of population control when it is used.

Zoo veterinarians can help wild animals in other ways as well. For instance, rabies is an issue in wild African hyenas, but for the past decade, a team from Chicago's Lincoln Park Zoo has been vaccinating the dogs that live in areas with hyena populations to minimize the risk of the disease spreading to the hyenas, which helps not only the dogs and the hyenas, but also the humans which could contract the disease from either of them.[185] Veterinarians can also work with in-situ conservation projects to study the factors such as bacteria and genetic makeup that could be affecting the wild populations of many animals.[186] This is especially useful with endangered species, as the knowledge gained from the veterinary involvement could make a serious difference for the long-term survival of these species.[187]

Animals being born in a zoo gives veterinarians the ability to assist individuals that would have not survived (or not survived for long) in a wild setting. The most public example of this would be the extensive intervention by zookeepers when Fiona the hippo was born premature at the Cincinnati Zoo in January 2017.[188] Not only was she born premature and in need of veterinary

[184] Turner, John W., and Allen T. Rutberg. "From The Pens To The Field: Real-World Wildlife Contraception." *Journal of Zoo and Wildlife Medicine*, vol. 44, no. 4s, 2013, doi:10.1638/1042-7260-44.4s.s102.
[185] Johnson, Steve. "African Rabies Vaccinations with the Lincoln Park Zoo." *Tribunedigital*, Chicago Tribune, 1 Dec. 2012, articles.chicagotribune.com/2012-12-01/entertainment/chi-africa-rabies-lincoln-park-zoo-20121201_1_rabies-transmission-african-wild-dogs-vaccination.
[186] Karesh, William B., and Robert A. Cook. "Applications of Veterinary Medicine to in Situ Conservation Efforts." *Oryx*, vol. 29, no. 04, 1995, pp. 244–252., doi:10.1017/s0030605300021232.
[187] Hutchins, Michael, et al. "The Role of Veterinary Medicine in Endangered Species Conservation." *Journal of Zoo and Wildlife Medicine*, vol. 22, no. 3, Sept. 1991, pp. 277–281.
[188] WLWT Digital. "Baby Hippo Arrives 6 Weeks Early at Cincinnati Zoo." *WLWT*, 27 Jan. 2017, www.wlwt.com/article/hippo-baby-arrives-6-weeks-early-at-cincinnati-zoo/8634819.

care, but her mother "rejected" her by not providing the type of care that mother hippos typically do when they birth an offspring. This is a perfectly natural response that happens in the wild as well as in human care and in other species besides just hippos—mothers wouldn't want to expend their time and resources on an offspring that is not going to survive—but since Fiona was born in a zoo, there was a dedicated team ready to intervene and nurse her toward full health.[189]

In other cases, it's a physical deformity rather than a lack of parental attention that could threaten these individuals' survival. This was the case for Hope the giraffe who was born at the Topeka Zoo in 2010 with hyperextended fetlocks, which meant that her back feet were pulled too far forward and impeded her ability to stand and walk.[190] In 2005, Hope's mother, Dolly, gave birth to another calf that had the same condition and had to be euthanized at 7 months old, so even though they were unsure about what caused the hyperextended fetlocks, the zoo was prepared for the possibility that Hope would have the condition and was prepared to treat her.[191] Immediately after her birth, Hope was fitted with casts that held her feet in the correct position, and a month later, the casts were replaced with "shoes" so that she could learn to walk like normal. Over 7 years later, Hope is doing well, and she is even expecting a calf in spring/summer 2018. [192] Because both Hope and her sibling had hyperextended fetlocks, this would suggest that the condition is genetic, so the zoo community is eagerly awaiting the birth of her calf to see if that is the case.

When humans are nearing the end of their lives, they and their families are sometimes offered hospice care, which is "care designed to give supportive care to people in the final phase

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[189] Dyball, Hannah. "Why Are Some Animals Rejected by Their Mothers?" *VioVet*, 13 Mar. 2015, www.viovet.co.uk/blog/p98-Why-are-some-animals-rejected-by-their-mothers.
[190] Associated Press. "Topeka Vet Gives Deformed Giraffe Permanent Shoes." *Stltoday.com*, St Louis Post-Dispatch, 6 Aug. 2010, www.stltoday.com/lifestyles/pets/topeka-vet-gives-deformed-giraffe-permanent-shoes/article_08384cf6-a0f5-11df-aa9c-0017a4a78c22.html.
[191] Ibid.
[192] Deines, Angela. "Topeka Zoo's Giraffes, Hope and Abi, Expecting." *The Topeka Capital-Journal*, 16 Mar. 2018, www.cjonline.com/news/20180316/topeka-zoos-giraffes-hope-and-abi-expecting.

of a terminal illness and focus on comfort and quality of life, rather than cure."[193] Interestingly, zoos are sometimes able to do the same with their aging animals. In fact, it is becoming more common today as animals can live longer thanks to new veterinary technology and veterinary care provided throughout their lives, although the zoos might not realize that they are providing hospice care. Many zoo animals are on pain medication to deal with arthritis or other age-related issues, while others are on anti-anxiety or anti-depressant medications to deal with other problems. Those are more obvious forms of hospice, but others are subtler. Just the daily activity of asking the animals to move between two or more areas can help if the animal is reticent to move otherwise. Training and enrichment can also encourage animals to move around in new ways. Even catering an animal's diet to their changing nutritional needs could be considered hospice care.

However, as the old quote says, death is one of the few things in this world that is certain, and this is the case for the animals at zoos. An option that is more readily available in the context of animal medicine in comparison to human medicine when an individual is reaching the end of their life is euthanasia, or the intentional ending of a life to relieve pain and suffering (although the suffering aspect is debatable, as not all philosophers believe that any or all animals are capable of suffering). These are discussions that should not be undertaken lightly, nor should it be the first option in those discussions, but it is generally considered to be the most humane option rather than allowing the animal to more slowly succumb to their illness or injury.

The use of euthanasia must be decided on a case-by-case basis, but the American Veterinary Medical Association has developed guidelines to help veterinarians in any setting decide generally when it should be used and the procedures that should be followed.[194] The

[193] Jessup, David A., and Cheryl A. Scott. "Hospice in a Zoologic Medicine Setting." *Journal of Zoo and Wildlife Medicine*, vol. 42, no. 2, June 2011, pp. 197–204., doi:10.1638/2009-0173.1.
[194] "AVMA Guidelines for the Euthanasia of Animals." 2013.

guidelines describe different methods that can be used (inhaled, noninhaled, physical) for different categories of animals and the situations in which euthanasia can reasonably be used. For instance, euthanasia can be used when the animal in question is considered "excess" or when its purpose in a scientific experiment has ended, even though those are not instances of pain or suffering.

The concept of euthanasia of "excess" animals is relevant to zoos, as it can occur when breeding programs produce more offspring than the zoos are capable of housing or the offspring that are produced would not make productive contributions to future generations—think back to the example of the animals at the Copenhagen Zoo who were healthy but were euthanized because they would not contribute to increasing the genetic diversity of their populations. Luckily, most zoos are willing to cooperate with one another to house the animals that others do not have room for. However, some zoos do choose euthanasia in this situation, and they even make it into a teachable moment for their visitors, educating them about the anatomy of the deceased animal and the importance of doing this to contribute to their conservation programs.[195] In some instances where zoo animals die naturally or are euthanized, the veterinarian will even allow the remains to be fed to other animals in the zoo.[196] While killing one zoo animal to feed another should not be the main nutritional plan for those animals, it does provide an opportunity for the public to gain a better understanding of the "circle of life" that moves us all.

It is a common practice that when an animal is moved to a new location that it must go through a quarantine period where it does not share spaces with other animals of its species. This is true for both zoo animals and agricultural animals, and the goal of this procedure is to minimize

[195] Kaufman, Leslie. "When Babies Don't Fit Plan, Question for Zoos Is, Now What?" *The New York Times*, 2 Aug. 2012, www.nytimes.com/2012/08/03/science/zoos-divide-over-contraception-and-euthanasia-for-animals.html?mcubz=0.
[196] Parker, 2017.

the spread of disease and other infectious agents between individuals.[197] In a zoo setting, this is taken seriously—keepers are not even allowed to use the same tools to clean the enclosures of the quarantined and non-quarantined animals. While this might be a hassle, it helps the animals stay healthy, which ensures that they will be able to fulfill the other purposes they serve at the zoo.[198]

On a similar note, just as zoos should attempt to minimize the spread of infections among their populations, they also should try to avoid their animals becoming sick from environmental factors. Therefore, enclosures are cleaned on a regular basis, to inhibit the growth of bacteria or mold and to remove waste material that could be harboring disease or attract disease-carrying insects. It also explains why enclosures are built the way that they are. For example, prior to 2003, although the orangutan enclosure at the Topeka Zoo was surrounded by small-holed mesh, there was not a solid wooden fence around that mesh, which allowed a rabbit that was carrying the bacterium that causes tularemia to get into the enclosure.[199] Several orangutans subsequently caught tularemia—two fell ill and a third died from the disease—which led the zoo to add a rabbit-proof wooden fence.

There is also the concern in zoos that diseases can be passed between the animals and the humans who work with them—in both directions. These are referred to as zoonotic diseases, a category which can encompass any disease that can be passed this way. Zoonotic diseases are especially a concern when the animals with which a person is working are more closely related to humans, because the animals and humans present physiological similarities that make it easier for

[197] Cunningham, Andrew A. "Disease Risks of Wildlife Translocations." *Conservation Biology*, vol. 10, no. 2, 1996, pp. 349–353., doi:10.1046/j.1523-1739.1996.10020349.x.
[198] Travis, Dominic, and Michele Miller. "A Short Review Of Transmissible Spongiform Encephalopathies, And Guidelines For Managing Risks Associated With Chronic Wasting Disease In Captive Cervids In Zoos." *Journal of Zoo and Wildlife Medicine*, vol. 34, no. 2, 2003, pp. 125–133., doi:10.1638/03-009.
[199] Ketz-Riley, Cornelia J. "Tularemia Type a in Captive Bornean Orangutans (Pongo pygmaeus pygmaeus)." *Journal of Zoo and Wildlife Medicine*, vol. 40, no. 2, June 2009, pp. 257–262.

an agent that infects one of them to infect the other. Therefore, primates present the largest concern, and zoos can put extra precautions in place for cleaning primate enclosures such as adding eye protection and surgical masks onto the standard gloves that are used when dealing with animal waste. Further, zookeepers might be asked not to work with their primates if they have been ill.

In other cases, zoonotic diseases lack this specificity and can infect both humans and animals that are not very similar to them. In the zoo community, the biggest threat of this kind is tuberculosis, or TB.[200] There have been several elephants that have tested positive for TB in zoos and sanctuaries in the past few years, so they are a species for which zoos tend to be especially concerned in this regard.[201,202] However, with all their animals, zoos have clearly-defined procedures in place to minimize the spread of zoonotic diseases, and they appear to be effective—at the Auckland (New Zealand) Zoo, a study found that there were incidences of diseases being spread from animals to humans, but these were minor and rare, so the study concluded that the preventative measures were adequately minimizing the risk of disease transmission.[203]

Staying true to the roots: zoos as entertainment

As important as these different roles are that zoos have adopted over the years to grow beyond their original role as just entertainment, it is still true that some people are going to the zoo primarily to be entertained. This is especially true for children. Accordingly, the ideal zoo would

[200] Redden, Jim. "Third Oregon Zoo Elephant Has TB." *Portland Tribune*, Pamplin Media Group, 10 June 2014, portlandtribune.com/pt/9-news/223761-85559-third-oregon-zoo-elephant-has-tb.
[201] Doughton, Sandi. "Zoos clash with sanctuaries over treatment of elephant tuberculosis." *The Seattle Times*, The Seattle Times Company, 30 Mar. 2015, www.seattletimes.com/seattle-news/zoos-resist-guidelines-that-limit-elephant-tuberculosis/.
[202] Holt, Nathalia. "We Are in the Midst of an Elephant Tuberculosis Epidemic." *Slate Magazine*, 24 Mar. 2015, www.slate.com/blogs/wild_things/2015/03/24/elephant_tuberculosis_epidemic_zoo_and_circus_animals_passing_tb_to_humans.html.
[203] Forsyth, M. B., et al. "Investigation of Zoonotic Infections Among Auckland Zoo Staff: 1991-2010." *Zoonoses and Public Health*, vol. 59, no. 8, 2012, pp. 561–567., doi:10.1111/j.1863-2378.2012.01496.x

cater to those people as well by finding a balance between education and entertainment, even within the same feature of the zoo—for instance, many zoos have carousels, and some point out that the animal figures and illustrations on these rides are endangered ones. Many zoos have public demonstrations with their animals that both entertain guests and teach them something about the animals; research has shown that guests respond positively to these shows and they are effective at conveying zoos' messages.[204] The ways in which animals are enriched can also be entertaining—around major holidays, some zoos will theme their enrichment around the holiday and even encourage guests to observe the enrichment in action.

Some have even suggested that some zoos are trending in the opposite direction, that they are becoming "Disney-ized."[205] This because they are displaying commonalities in management to the parks of the Walt Disney Company, as shown through the axes of theming, dedifferentiation of consumption, merchandising, and emotional labor. Zoos use theming to organize animals into zones within the zoo based on home locations, physiology, or some other factor. Dedifferentiation of consumption refers to different forms of consumption blending into one another, with the strongest example being Disney's Animal Kingdom, which is a zoo within a theme park such that one cannot quite tell whether they are at a zoo or a theme park. To get an idea for the role of merchandising, just look at the extensive gift shops that are located throughout the average zoo. The size and extent of them varies in proportion to the size of the zoo, but the biggest of these shops have every kind of item imaginable that even vaguely relates to zoos, and many of these items bear the logo of the zoo so that departing guests not only have a specific reminder of their visit to this zoo but they also serve as mobile advertisers for that zoo. Emotional labor refers to a

[204] Heinrich, Carolyn J., and Barbara A. Birney. "Effects of Live Animal Demonstrations on Zoo Visitors' Retention of Information." *Anthrozoos*, vol. 5, no. 2, 1992, pp. 113–121., doi:10.2752/089279392787011557.
[205] Beardsworth, A., and A. Bryman. "The Wild Animal in Late Modernity: The Case of the Disneyization of Zoos." *Tourist Studies*, vol. 1, no. 1, 2001, pp. 83–104., doi:10.1177/146879760100100105.

desire by the employer that their employees display a given emotion or set of emotions while on the job. Zoos have not been the subject of much research on emotional labor, but since zoo staff members are asked to convey very specific messages to their guests, some of which might go against an individual's personal beliefs, it's possible that there could be some emotional labor involved in doing so.

Bumps in the road: the challenges zoos face

As beneficial as these programs can be for animals and humans alike, there are still some things out there that present challenges to the continued existence of zoos. It is evident, though, from the sheer volume of prosperous zoos that these factors are not automatically roadblocks that stop zoos from being successful, but rather, they are speed bumps that can be overcome with the right amount of effort.

Chief among these is the thing that controls American society as a whole: money.[206] From the source of funding to what that funding must be used for, there are countless ways that the finances of a zoo could dictate its existence. The larger of a financial cushion that a zoo has, the easier it would be for them to expand their programming/enclosures/etc. as they desire or to respond to a disaster if that situation arises. Their budget also dictates the number of animals they will be able to care for, as all the animals need to be properly fed, medicated, housed, and enriched, all of which require a certain amount of funding. And that doesn't even account for the baseline costs of establishing and running the zoo—potentially purchasing the land, building the enclosures, walkways, and structures, membership in an organization like AZA water, electricity, potentially natural gas, and there may even be costs associated with bringing the animals to the zoo.

[206] Josephson, Amelia. "The Economics of Zoos." *SmartAsset*, 25 Sept. 2017, smartasset.com/taxes/the-economics-of-zoos.

In addition to methods like being run by nonprofit organizations, zoos have found ways to combat this issue, many of which are reflective of modern American society. Most notably, some areas or attractions within zoos are sponsored by individuals or companies.[207] This could relate back to the idea of the Disneyization of zoos, as the lines between zoos and other corporate products are being blurred in this process. Still, just like the sizable donations from wealthy alumni that help with capital projects at universities, these corporate sponsorships can speed up progress in building or updating features of zoos, thereby bringing acclaim to both the zoo and the sponsoring company and establishing positive relationships between the zoo and the surrounding community. These sponsorships can even help with the zoos' conservation efforts, as the donors sometimes also donate to conservation projects.

Another way that zoos can offset their operating costs is to charge a fee for admission. Partly because they were often located within city parks, the first American zoos were free attractions, but at some point, most zoos have added an admission charge to reflect the value that they expect their guests to get out of a visit and contribute to their operating budgets.[208] Just like pretty much anything else with zoos, admission fees vary widely from location to location—one can visit some zoos for under $10, while it costs $54 for an adult to visit the San Diego Zoo.[209,210] However, one usually gets what they pay for—the more animals and other attractions there are in the zoo and the larger the zoo is in general, the more one can generally charge for admission. The place where that idea breaks down is with zoos that do not have an admission charge. These zoos are rare (there are only about 10 of them in the United States), but among them are some of the

[207] O'Brien, John. "Does Corporate Zoo Sponsorship Make a Real Contribution to Conservation?" *Sustainable Business Toolkit*, 15 Apr. 2013, www.sustainablebusinesstoolkit.com/corporate-zoo-sponsorship-a-contribution-to-conservation/.
[208] Donahue and Trump, 2010.
[209] "Admission Information." *Topeka Zoo*, 14 July 2017, topekazoo.org/visit/795-2/.
[210] "Buy San Diego Zoo Tickets or Membership Online." *San Diego Zoo*, 6 Apr. 2018, zoo.sandiegozoo.org/tickets.

most respected zoos in the country such as the National Zoo in Washington, D.C. and the Lincoln Park (Chicago) Zoo.[211] These zoos can function without the potential revenue from charging for admission because they are more strongly supported by public funding.

Zoos can also balance their budgets through consideration of which animals to house. As mentioned before, carnivores tend to be more expensive to feed than herbivores, so zoos could reduce their operating costs by shifting their collection to be more herbivore-heavy. Also, animals in the middle of their lives tend to have fewer health concerns than young or geriatric animals, so prioritizing middle-aged individuals could help zoos save on their veterinary bills. Or, if a zoo has an existing empty enclosure that they are looking to fill, they could avoid some expenses and hassle by choosing to house an animal for whom they would have to make few if any modifications to the enclosure to reflect the physiology and needs of the incoming resident.

Another factor that zoos must contend with is their location. This can be as simple as where the zoo is situated within a city or as complex as being in an unstable country. Location can dictate which and how many animals can be housed in a given zoo, how many people will visit it, or even the degree to which that zoo will be able to survive in the long term.

Because of both ancient cultural practices and modern technology, humans have been to inhabit nearly every corner of the globe with relative ease, and thanks to zoos, so have animals. One major attraction of zoos for many people is an opportunity to see animals that they would never have a chance to see outside this setting. However, for some of those animals, it does take the marvels of modern technology to allow them to live comfortably in a zoo. For animals that are native to the area where the zoo is located, there don't need to be any special provisions made to

[211] Gervasi, 2012.

create an enclosure and environment that matches their needs, but this is not the case for more exotic animals. The enclosure might need to include features—substrates, climbing trees, etc.—that are not natural for the location so that the enclosure can more closely mimic their homes. A bigger concern, though, is based on discrepancies between the local climate and the climate for which the animals are adapted. Cold-adapted species like emperor penguins or polar bears must be provided with cooled waters and cold air, especially when it is warm outside, and the same is true for warm-adapted species when it is cold outside—African elephants are not naturally prepared to deal with winter in the Midwest. Advances like sophisticated cooling systems or heated floors make it easier for these animals to live in areas with more foreign climates, as do USDA regulations about at what temperatures these animals should not be allowed outdoors.[212] However, the greater the climate discrepancy is, the more work that must be done, so zoos might choose to avoid housing animals for whom they would have to make too many accommodations, as this could save them both time and money.

Zoos must also find ways to manage the space available to them. If a zoo is in a more rural or suburban place, there would not be much of an issue if they wish to expand. But then consider the case of the National Zoo, located in the urban heart of Washington D.C. It would be much more difficult for the National Zoo to acquire additional land if they wanted to add onto their facility, so instead they would have to negotiate the existing space to fit their needs. But even zoos in more remote locations are facing challenges with the amount of space they want or need. One reason for this is that people have come to expect zoos to be "one-stop shops" for seeing all their favorite animals. This, along with the pressures zoos are under to expand their populations of SSP-

[212] "Animal Welfare." *USDA APHIS*, United States Department of Agriculture, www.aphis.usda.gov/aphis/ourfocus/animalwelfare.

managed animals, means that zoos are expected to be as large as possible. There are two main ways that have been suggested for zoos to alleviate this: becoming more like arks and specialization.[213] Under the first plan, zoos would retain a wide diversity of animals but have smaller populations of any given animal, and under the second plan, zoos would be allowed to have larger populations, but they would only be caring for a smaller number of species. Neither of these plans is perfect, but both would allow for meaningful utilization of the limited space.

However, not every zoo would be open to either of those plans. Zoos prefer to stack their makeup in a specific way—favoring large vertebrates. These animals even have a collective term within the zoo community: charismatic megafauna, which refers to animals of 100 pounds or more. The charismatic megafauna are usually the ones that bring people through the gates and attract the most attention from visitors (in addition to receiving the most conservation funding and attention, which draws ire from advocates for other taxa). Because of this, zoos tend to enjoy having these animals, and a lot of them, as they can bring people in to spend money and be immersed in the zoo's messages. Therefore, if zoos were told which or how many animals they would be allowed to house, it could have a negative impact not just on their contributions to their SSPs or the educational messages they would be able to spread, but even their finances could take a hit.

All these issues have been ones that zoos could combat themselves, but there is another locational concern that zoos could have that would be out of their control: political unrest or war. On more than one occasion, places with zoos have gotten involved in wars and those wars have affected the animals within the zoos. One example that has received increased attention in the past few years is that of the Warsaw Zoo in World War II as depicted in the nonfiction book *The*

[213] Anzilotti, Eillie. "Bringing Urban Zoos Into the 21st Century." *CityLab*, 7 July 2016, www.citylab.com/life/2016/07/a-way-forward-for-urban-zoos/490184/.

Zookeeper's Wife which was adapted for film in 2017.[214] As the city was being attacked and invaded by German forces, many of the enclosures at the zoo took a hit, which endangered not only the animals (a few were killed in early attacks) but also potentially the people of Warsaw if a dangerous animal got loose. Dr. Jan Żabiński, the director of the zoo, lent most of the animals to other zoos in Europe for the duration of the war (or saw them taken to the Berlin Zoo by Lutz Heck), although not many survived. Interestingly, he and his wife Antonina then used their shuttered zoo to hide about 300 Jewish people over the course of the war on their way to more permanent safe houses. They were able to rebuild the zoo after the war, albeit with a different cast of animals, and the zoo remains open to this day.[215]

More contemporarily, several Middle Eastern zoos have been devastated by the unrest there. The zoos in Baghdad and Mosul, Iraq and in Aleppo, Syria have all felt the effects of conflicts in the area during the 21st century.[216,217] The case of the Mosul Zoo is especially shocking, as it had taken some severe damage from the conflict and the animals were not being cared for or fed, so there were many animal casualties.[218] It was even being used at one point as a staging ground for ISIS forces. And yet, in January 2017, two animals were still living: Lula the bear and Simba the lion. As the fighting persists even now, the pair was moved out of the crumbling facilities in the crosshairs to a safer location. Whether Mosul will be able to have a zoo again when and if the conflict is resolved remains to be seen, but cases of recovery after devastation like the

[214] Ackerman, 2017.
[215] "Jan and Antonina Zabinski." *Yad Vashem*, The World Holocaust Remembrance Center, www.yadvashem.org/righteous/stories/zabinski.html.
[216] Holmes, Michael. "Baghdad Zoo: A Different Battle." *CNN*, 17 Apr. 2003, www.cnn.com/2003/WORLD/meast/04/16/sprj.nilaw.baghdad.zoo/.
[217] Guynup, Sharon. "How Syrian Zoo Animals Escaped a War-Ravaged City." *National Geographic*, 5 Oct. 2017, news.nationalgeographic.com/2017/10/wildlife-watch-rescuing-animals-aleppo-syria-zoo/.
[218] Wright, Robin. "Rescuing the Last Two Animals at the Mosul Zoo." *The New Yorker*, 19 June 2017, www.newyorker.com/news/news-desk/rescuing-the-last-two-animals-at-the-mosul-zoo.

Warsaw Zoo are not just relics of the past. The zoo in Kabul, Afghanistan sustained a lot of damage and loss of animals during the conflicts of the 1990s, but even amid continued threats of violence within the country, they were able to start rebuilding and revitalizing the zoo in 2001.[219] This was possible largely due to assistance from the global zoo community. Today, though the country is not completely stable, the zoo is able to thrive as a rare bastion of peace in the tense city, bringing a bit of serenity to these animals and their visitors.

The vocal opposition: criticism of the zoo community

As should be evident by now, there are many benefits of zoos for the animals, the staff, the community, and the planet. However, not everyone sees them in such a positive light. Zoos are far from perfect, but there are people and organizations who choose to focus on only those negative aspects of zoos, as well as spread misinformation about them in some cases. These organizations do not usually only target zoos—many criticize doing experiments on animals, eating meat/other animal products, etc. as well—but since zoos are so public, they make for easily-accessible examples of the larger moral ills that the organizations believe exist in modern American society.

Whether they publicly align themselves with the term or not, these organizations tend to be classified as "animal rights" groups which again means they believe that animals are endowed with basic rights just like humans are. Before examining some of these groups and their beliefs, it might be good to examine if the basis for the term is correct—do animals have rights? After all, if they have rights in the same vein as humans', it would follow that humans then have a responsibility to treat them a certain way to avoid violating the animals' rights to the same degree that we are obligated to treat other humans a certain way to not to violate their human rights.

[219] Kumar, Ruchi. "Beasts of a Nation: Rebuilding the Kabul Zoo in a Time of War." *Pacific Standard*, The Social Justice Foundation, 12 Oct. 2016, psmag.com/news/beasts-of-a-nation-rebuilding-the-kabul-zoo-in-a-time-of-war.

From a legal perspective, animals do have a right to be free from harm—the USDA regulations and laws against animal cruelty speak to this, although both can be vague and subjective and could be setting the bar for cruelty at a level that does not mesh well with nonlegal descriptions of the matter. Putting aside that potential qualm for a moment, these are strong mechanisms of control that could positively affect the animals which they assist.

Moving out of the more strictly-defined legal sphere, it is even more difficult to give a definitive answer, as the typical argument is that animals have a right to certain treatment if they are morally considerable. Seemingly every philosopher who has written on the topic of animals and morality has set a different set of criteria for moral considerability, so there is no single answer here either. These definitions usually depend on an ability to attribute a given cognitive capacity to the animal, so they tend to vary between species and even between individuals of the same species—just at face value, one would be more willing to say that a chimpanzee has rights than a worm, and one could even say that a chimpanzee can communicate with humans presents a stronger case for rights than one who cannot. However, many are unwilling to make these attributions and claim that these properties, and therefore moral considerability, are unique to humans. This does not bring one any closer to a conclusion on whether animals have ethical rights to certain treatment—it truly depends on the moral philosophy to which one subscribes. That's not to say that animal rights activists are inherently right or wrong, but rather that there could be one or more philosophy where it is subjectively true that animals have rights. Let's look, now, at some of the most notable groups to believe in those philosophies.

The most well-known animal rights organization is the People for the Ethical Treatment of Animals, better known as PETA, which was founded in 1980 by Ingrid Newkirk and Alex Pacheco. Newkirk was first inspired to work toward the protection of animals ten years earlier after she

visited an animal shelter in the Washington D.C. area and was shocked by the conditions she observed.[220] She pursued a career as an animal-protection officer, and it was at the shelter where she worked that she met Pacheco, a college student who was also passionate about protecting animals. The group's "big break," so to speak, came a year after its founding when they took up the case of the "Silver Springs Monkeys," a colony of rhesus monkeys living in unsanitary and unenriching cages and being used in harmful neurological research by a lab in Maryland. A multi-year battle ensued over the head researchers' methods of housing and testing, and PETA came out arguing that all animal experimentation is morally wrong. They also advocate for a vegan lifestyle and against animals being used for entertainment.

It is on the grounds of the final point that PETA opposes zoos. They claim that zoos are exploiting animals for entertainment and research and keeping animals in poor conditions, all of which have a strong negative impact on their wellbeing. They describe very generally the conditions which they oppose that supposedly exists in zoos, but they do not list specific facilities where one could see such conditions and instead leave it vaguely as just "zoos" and then list some more specific categories of animal care facilities to which they object. However, the conditions they describe more closely align with menageries than with AZA-accredited zoos, so to not differentiate between them paints an inaccurate picture of the zoos that have been judged to be of high quality by other agencies.

Another anti-zoo group in the United States is In Defense of Animals, or IDA, which was founded in 1983.[221] The group is especially critical of zoos' management of elephants, and they

[220] Guillermo, Kathy Snow. *Monkey business: the disturbing case that launched the animal rights movement*. Washington, D.C., National Press Books, 1993.
[221] "Our Mission." *IDA USA*, In Defense of Animals, www.idausa.org/about-ida/.

publish an annual list of the 10 worst zoos in the United States for elephants.[222] However, they do not cite the source of the information they use to make this list, so it could very easily be based on misinformation, information taken out of context, or hearsay. In a way, though, zoos can thank groups like IDA, or even IDA specifically, for forcing tough conversations and pushing for better conditions for the animals. Case in point: the 2012 conversation about the fate of the Topeka Zoo elephants came about at least in part because IDA placed a billboard near the zoo calling for the animals to be moved to a sanctuary.[223] As a result, the zoo tightened their elephant management practices and those two elephants are still living at the Topeka Zoo today.

Even if it has helped zoos in some respects, IDA is part of an alarming trend of organizations devoted to animal liberation, or "the freeing of animals from exploitation and cruel treatment by humans."[224] These organizations usually target animal laboratories, but they can target zoos as well; their main form of "activism" is removing animals from their enclosures and setting them free, sometimes accompanied by other destruction of the laboratory. This has not only sidetracked research projects, but also places the animals in danger by introducing them to unfamiliar conditions and stressful situations. And it's not just animal welfare advocates and researchers who take issue with these organizations; the United States Federal Bureau of Investigation (FBI) has classified the Animal Liberation Front, the most prolific of these groups, as a domestic terrorist organization since 2012 because that group has been known to use

[222] "Ten Worst Zoos for Elephants." *IDA USA*, In Defense of Animals, 2018, www.idausa.org/campaign/elephants/10-worst-zoos/.
[223] Hrenchir, 2012.
[224] Woodhouse, Leighton. "How The Pursuit Of Animal Rights Activists Became Among The FBI's 'Highest Domestic Terrorism Priorities'." *The Huffington Post*, 7 Dec. 2017, www.huffingtonpost.com/leighton-woodhouse/animal-liberation_b_2012426.html.

incendiary devices as part of their activism. However, other "eco-terrorism" groups have been drawing federal attention for at least 30 years.[225]

One group that is not nearly as threatening but is still just as vocally opposed to zoos is the Performing Animal Welfare Society, or PAWS.[226] Like IDA, this organization has set elephants as a priority for their advocacy. They've even gone a step further and established an elephant sanctuary in San Andreas, California named ARK 2000, one of only two such facilities in the United States (the other is The Elephant Sanctuary in Hohenwald, Tennessee)[227]. This sanctuary's directors and supporters believe that it is a "better" place for elephants to live than in a zoo, so it is commonly cited, including by IDA, as a location to which zoo elephants should be moved, even if the conditions at the zoo are properly meeting the animals' needs. Putting aside the ways that the elephants arrive at this sanctuary, once they get there, it appears that they are provided with a high level of care and have large enclosures in which to live. ARK 2000 has even embraced new methods of testing for tuberculosis that some zoos are more hesitant to adopt.[228] They do harbor elephants that have tuberculosis, but so do some zoos, and it appears that they take precautions against it spreading to humans or other elephants.[229] The other elephant sanctuary has not fared as well; they, too, house elephants with tuberculosis, and in 2009, several employees there contracted tuberculosis because the office building shared a ventilation system with the elephant barn.[230] Returning to PAWS, even though they provide good care for their elephants, they have positioned

[225] Ibid.
[226] "About PAWS." *Performing Animal Welfare Society*, www.pawsweb.org/about_paws_home_page.html.
[227] Cantrell, Aaron. "Elephant Sanctuary in Tennessee Answers Questions Surrounding Tuberculosis at the Facility." *WHNT.com*, Tribune Broadcasting, 21 Nov. 2017, whnt.com/2017/11/20/elephant-sanctuary-in-tennessee-answers-questions-surrounding-tuberculosis-at-the-facility/.
[228] Doughton, 2015.
[229] Associated Press. "California Refuge Puts down Former Zoo Elephant." *Daily News*, 28 Aug. 2017, www.dailynews.com/2014/11/29/california-refuge-puts-down-former-zoo-elephant/.
[230] Murphree, Rendi. "Elephant-to-Human Transmission of Tuberculosis, 2009." *Emerging Infectious Diseases*, 2011, doi:10.3201/eid1703101668.

themselves in direct opposition to zoos by criticizing the conditions and care at those places, often without a factual basis for their claims, and have allied themselves with other anti-zoo/animal rights organizations, so they have earned a place among the anti-zoo organizations.

Another middle-of-the-road organization in this realm is the Humane Society of the United States (HSUS). Like PETA, they have a loose definition of zoos and roadside zoos, so they can aggregate many kinds of facilities for criticism.[231] They have also lobbied for very restrictive animal ownership laws that are intended to crack down on menageries and private ownership of exotic animals, but they are worded vaguely, and zoos can get caught in the crossfire.[232] That's basically the case for all their statements—they are vaguely worded, so they are not immediately alienating either end of the spectrum and can ally with either animal rights groups or animal welfare groups depending on the issue or moment.[233] Interestingly, after a history of leaning more toward the animal rights end, HSUS has recently been making inroads with the zoo community. In fact, Wayne Pacelle, the former CEO (he resigned in February 2018 amid allegations of sexual misconduct), was the keynote speaker at the 2017 AZA national conference, which hinted at a partnership between the two organizations, or at least a softening of their opposition for one another.[234,235] Pacelle's presence at the conference angered many in the zoo community who oppose the positions and actions of HSUS and questioned his motivations for being there—did he

[231] "Statement on Wild Animals." *The Humane Society of the United States*, m.humanesociety.org/about/policy_statements/statement_wild_animals.html?credit=web_id66433060#Zoos_and_aquariums.
[232] Birnbaum, Jeffrey H. "The Humane Society Becomes a Political Animal." *The Washington Post*, WP Company, 30 Jan. 2007, www.washingtonpost.com/wp-dyn/content/article/2007/01/29/AR2007012901861.html.
[233] Garner, Rachel. "HSUS & AZA?" *Why Animals Do The Thing*, 17 June 2017, blog.whyanimalsdothething.com/post/161940576867/hsus-aza.
[234] Bosman, Julie, et al. "Humane Society C.E.O. Resigns Amid Sexual Harassment Allegations." *The New York Times*, 2 Feb. 2018, www.nytimes.com/2018/02/02/us/humane-society-ceo-sexual-harassment-.html?ribbon-ad-idx=9&rref=us&module=ArrowsNav&contentCollectio%E2%80%A6.
[235] Staff, AZA. "Statement from the Association of Zoos & Aquariums." *AZA News Releases*, Association of Zoos and Aquariums, 20 July 2017, www.aza.org/aza-news-releases/posts/statement-from-the-association-of-zoos--aquariums.

really want to form a relationship with zoos, or was it just for publicity for HSUS? No large-scale partnerships have been formed yet (the two have allied on individual projects), but it has been less than a year since Pacelle spoke at the conference, and he is no longer affiliated with HSUS, so it may be some time before HSUS positions itself firmly as for or against zoos, if they ever do.[236]

Animal sanctuaries are not always thought of as the opposite of zoos, but that's exactly how some animal rights organizations have framed them. In their literature against zoos, PETA lists the types of facilities that they urge people to avoid and then suggests that they instead visit sanctuaries, specifically ones accredited by the Global Federation of Animal Sanctuaries. As suggested above, this indicates that organizations like PETA see animal sanctuaries as different from and more acceptable than zoos. It's not possible to measure the relative morality of these two very broad categories of facilities—both present positive and negative attributes, the weights of which are up for debate—so PETA is not quite right or wrong. As for HSUS, while they do not have a set position on zoos, they are in favor of sanctuaries: several members of the GFAS board of directors are current/former executives of HSUS, and HSUS owns the GFAS website.[237,238]

The next topic relates more to aquariums than to zoos, but because they are accredited by the same agencies, and because the discussions could have implications beyond this limited realm, it bears mention here. In 2013, a "documentary" called *Blackfish* was released by Magnolia Pictures and CNN Films.[239] It followed the life story of an orca whale named Tilikum who lived at SeaWorld in Orlando, Florida at the time of shooting. Tilikum was involved in the death of his

[236] Sherman, Kris. "Government Of the People, For the Animals." *Association of Zoos and Aquariums*, May 2016, www.aza.org/government-of-the-people-for-the-animals-initiative-1401.
[237] "Board and Staff." *Global Federation of Animal Sanctuaries*, www.sanctuaryfederation.org/about-gfas-2/board-and-staff/.
[238] "SANCTUARYFEDERATION.ORG." *ICANN WHOIS*, Internet Corporation for Assigned Names and Numbers, whois.icann.org/en/lookUP?name=www.sanctuaryfederation.org.
[239] Cowperthwaite, Gabriela, director. *Blackfish*. Magnolia Pictures and CNN Films, 2013.

trainer Dawn Brancheau in 2010, so he was used by the filmmakers as a spotlighting case for why SeaWorld was keeping their animals in inhumane conditions and how that is "making the whales angry and sad" to the point where Tilikum intentionally killed his trainer.

Blackfish was marketed as a documentary, but to qualify as a documentary, it must be portraying the truth, and that is not the case for this film. It relies heavily on commentary from SeaWorld trainers, who would hypothetically be good sources, but many of the staff who were consulted were not in positions to know the things they were claiming—some never even met Tilikum.[240] The film also misrepresents aspects of Tilikum's physiology and SeaWorld's practices. A SeaWorld trainer claims that his collapsed dorsal fin was a direct side effect of being in human care, and that fewer than 1 percent of wild killer whales have this anomaly; in actuality, close to 25 percent of wild killer whales have collapsed fins, and it is just a harmless result of spending most of his life in shallow water.[241] The film claims SeaWorld trainers stopped getting in the water with the whales in response to being investigated by the federal Occupational Safety and Health Administration months after Brancheau's death, whereas they voluntarily stopped doing so immediately after her death.[242] They also claim that SeaWorld deprived their animals of food for training purposes, but that has never been a SeaWorld policy—they only practice operant conditioning, where the animals are rewarded for positive behaviors and neither rewarded nor punished for negative behaviors.[243]

[240] Cookish, Danielle. "Top 5 Claims Made By Blackfish Fans: Debunked." *Awesome Ocean*, 18 Jan. 2016, awesomeocean.com/top-stories/blackfish-fans-debunked/.
[241] "TOP 7 Myths About Tilikum - Blackfish: EXPOSED!" *Simply Love Orcas*, 14 July 2017, simplyloveorcas.weebly.com/blog/top-7-myths-about-tilikum-blackfish-exposed.
[242] Ibid.
[243] Ibid.

In the wake of this film, SeaWorld has seen reduced visitor numbers at all its parks, with some people even calling for boycotts or the parks to be closed, so they have been struggling financially.[244] The good news, though, is that they were re-accredited by AZA for another 5 years most recently in 2015.[245] In short, the filmmakers capitalized on the death of a dedicated whale trainer to call out one facility for which this was an isolated incident and used the documentary format to spread misinformation about the whole situation. Is it bad that Dawn Brancheau died? Absolutely. But do Tilikum and SeaWorld deserve such intense criticism? It does not appear so.

The case of Dawn Brancheau and Tilikum presents a reason that some people are opposed to keeping animals in human care: it is dangerous to work with these animals. This may seem obvious, but plenty of other jobs are inherently dangerous and there are not calls for those industries to shut down like there were after Brancheau's death. And these concerns are not unfounded—Tilikum was involved in two other deaths before Brancheau's, and countless other keepers and visitors have been injured or killed by zoo animals.[246,247] Like any other job, zoos and aquariums are monitored for workplace safety by the Occupational Safety and Health Administration (OSHA), and as mentioned before, SeaWorld Orlando was investigated thoroughly, and later cited, by OSHA after Brancheau's death.[248] OSHA claims that her death was her own fault because she did not follow proper safety precautions, but they also recommended

[244] Rhodan, Maya. "SeaWorld's Profits Drop 84% After 'Blackfish' Documentary." *Time*, 6 Aug. 2015, time.com/3987998/seaworlds-profits-drop-84-after-blackfish-documentary/.
[245] SeaWorld Parks & Entertainment. "AZA Grants Accreditation to SeaWorld Parks in Orlando and San Diego and Discovery Cove." *SeaWorld Parks and Entertainment*, 24 Mar. 2015, seaworldparks.com/en/corporate/media/company-news/2015/aza-accreditation.
[246] Sanchez, Ray. "Killer Whale at Center of 'Blackfish' Dies." *CNN*, Cable News Network, 6 Jan. 2017, www.cnn.com/2017/01/06/us/sea-world-orca-tilikum-dies/index.html.
[247] Jones, Sam. "Caged behind a Deep Moat and Six-Metre Walls but Tiger Escaped to Kill Zoo Visitor." *The Guardian*, Guardian News and Media, 27 Dec. 2007, www.theguardian.com/world/2007/dec/27/usa.conservation.
[248] Surbey, Jason, and Michael D'Aquino. "US Labor Department's OSHA Cites SeaWorld of Florida Following Animal Trainer's Death." *Occupational Safety and Health Administration*, 23 Aug. 2010, www.osha.gov/news/newsreleases/national/08232010-0.

that trainers not be allowed in close proximity to the animals to prevent future incidents. SeaWorld took that precaution even without being told to, Tilikum was taken out of performances for more than a year, and they also called in outside experts to reevaluate their practices involving human-whale interactions.[249] Zoos have done the same—after a keeper was killed by an elephant in an open contact situation at Tampa's Lowry Park Zoo, the zoo moved to protected contact, and other zoos did the same.[250] In other words, serious injuries and deaths at zoos are terrible, but the tragedy can become a teachable moment for the entire zoo community. Stringent regulations from OSHA and the Animal Welfare Act already govern the safety of the workers and animals, respectively, but then when the unthinkable happens, the zoos start thinking, and they make changes to preserve everyone's safety.[251] Working in close proximity with dangerous animals is never going to be danger-free, but the safety guidelines in place and the training that zoo staff go through help make it not so dangerous—plus, the people stepping into these roles are aware of the inherent danger and are willing to take the risk.

Other critics, including PETA and similar organizations, believe that being in a zoo is putting these animals in potentially-dangerous situations that they did not willingly accept the risk of. There have been claims that zoos are not properly meeting their animals' needs or providing them with proper care. A notable example of this concerns elephant feet.[252] In case it was not obvious, elephants are large animals, so they are constantly putting a large amount of weight onto their feet and healthy feet are essential for a healthy elephant. Elephant feet reflect their close

[249] Sanchez, 2017.
[250] French, Thomas. *Zoo Story: Life in the Garden of Captives*. Hyperion, 2015.
[251] Hassan, Kamal Halili. "Occupational And Animals Safety In Zoos: A Legal Narrative." *American Journal of Animal and Veterinary Sciences*, vol. 9, no. 1, 2014, pp. 1–5., doi:10.3844/ajavsp.2014.1.5.
[252] Newmanthe, Barry. "Zoo Confinement Gives Elephants Problem Feet." *Pittsburgh Post-Gazette*, 17 Nov. 2006, www.post-gazette.com/news/nation/2006/11/17/Zoo-confinement-gives-elephants-problem-feet/stories/200611170141.

phylogenetic relationship with ungulate animals like horses and giraffes—they are basically walking on their tiptoes, as they have a bony structure that runs through to the front of their feet with a soft cushion behind it.[253] The bottoms of their feet, then, build up a callus just like those that form on a worker's hands. However, zoo elephants are prone to having foot problems because the ground they walk on does not file down that callus and their nails as much as their natural environment would. If left untreated, this can lead to serious problems. However, elephant managers realize this and develop preventative treatment programs where the zookeepers file down the calluses and nails before there are any issues. There might be other isolated cases where zoos are not perfectly responding to every need their animals have, but, to say that zoos are being negligent is untrue.

There are also claims that zoos are causing their animals psychological or physiological stress. Repetitive behaviors like pacing are used as "evidence" for this, as is their reluctance to breed as well in zoos as they do in the wild. One of the most psychologically stressful aspects of zoo, according to research, is one that is inherent to the zoo system: the presence of visitors.[254] Visitors can be disruptive to the animals through their noises and actions, not to mention that some animals dislike eye contact or feeling like they are being watched, so it makes sense that animals could be experiencing stress from this. However, it appears that zoos are aware of this and have designed or modified their enclosures to give animals the opportunity to retreat from public attention if they choose or to create a visual barrier between the animals and visitors. As far as physiological stress, or levels of stress-related hormones, it is again an important conversation to

[253] Frei, Georges. "Elephant Foot and Foot Care." *Upalich Elephant Encyclopedia,* 5 Nov. 2016, en.upali.ch/foot-and-foot-care/.
[254] Fernandez, Eduardo J., et al. "Animal-Visitor Interactions in the Modern Zoo: Conflicts and Interventions." *Applied Animal Behaviour Science*, vol. 120, no. 1-2, 2009, pp. 1–8., doi:10.1016/j.applanim.2009.06.002.

have, as it could have long-standing effects on the survival of the animals in the zoo.[255] However, it goes back to the same thing as psychological stress: it seems that the high-quality zoos have it covered. The main causes of this kind of stress are poor living conditions and a lack of enrichment, so if zoos are using the standard enclosure and enrichment policies, this should not be an issue, and therefore it is not a valid criticism for most zoos.

Based on how different their views appear to be and how incompatible their missions are, animal rights groups are generally presented as the complete opposite of zoos, but this is not always true—the two sides can find some topics on which they can agree. They agree that (at least some) animal lives are valuable and should not be easily expended. They agree that animals should be treated with respect. They agree that animals' needs should be met (though they may disagree about what needs the animals have and how those needs should be met). This seems like a very basic list, but these are broad topics which both sides can and do interpret as they please.

However, from the polarity of their beliefs and the degree to which they have been vocal in their opposition of zoos, it would appear that the animal rights proponents would greatly prefer to ignore those similarities and instead see the abolishment of zoos. What would the world look like, though, if starting tomorrow, they got their way and all the zoos and aquariums in the United States were shut down? It's easy to imagine what the short-term implications would be. Because of their frequent advocacy for zoo elephants to be moved to sanctuaries, it is likely that is where the elephants would end up. If GFAS-accredited sanctuaries exist for the other zoo animals, those animals would likely also move to sanctuaries. If the sanctuary is high-quality, the animals would be able to keep living on like they did in zoos, but that's not a guarantee. Any animals that do not

[255] Parnell, T., et al. "Evaluating Physiological Stress in Sumatran Tigers (*Panthera Tigris Ssp. Sumatrae*) Managed in Australian Zoos." *Conservation Physiology*, vol. 2, no. 1, 2014, doi:10.1093/conphys/cou038.

have a home in sanctuaries would likely be released—hopefully to their natural habitat, so that they would be in a suitable climate, could attempt to reintegrate with their wild brethren and would not be an invasive species in a foreign location. However, food acquisition in the zoo is not the same as for wild animals, so the released animals would likely struggle to find food. They may have formed associations between humans and food, so they might seek out humans and accost them for food. Basically, these individuals would be put into serious and immediate danger.

Thinking long-term, though, whole species and ecosystems could be threatened. Remember that zoos are major players in global conservation efforts, so their absence could leave large gaps, financially and otherwise, in existing projects and make it more difficult to start new ones. Also, if zoos no longer existed, neither do any of their programs, most notably the Species Survival Plans. It is a policy of GFAS-accredited sanctuaries that the animals not be bred, so save for the limited, or in some cases non-existent, wild populations, these species would no longer be reproducing.[256] For those species nearing extinction, this would be devastating and could essentially lead to their extinction. One must also consider the ubiquity of zoos in comparison to sanctuaries. AZA accredits over 200 facilities that are open for regular visits, whereas GFAS accredits fewer than 50 facilities in the United States that one can tour, most of which are on either coast.[257] This means that if people wanted to see some animals, they would either need to travel great distances to their nearest sanctuary or would instead visit facilities that lack accreditation. Zoos offer people an opportunity to satisfy this curiosity close to where they live in a way that is well-regulated, which would seem to justify their continued existence.

[256] "Standards of Excellence." *Global Federation of Animal Sanctuaries*, www.sanctuaryfederation.org/for-sanctuaries-2/standards.
[257] "Find a Sanctuary." *Global Federation of Animal Sanctuaries*, www.sanctuaryfederation.org/find-a-sanctuary.

Many perspectives both in favor of and opposing zoos have been brought up, but where does the public fall on the issue? Are zoos widely-favored institutions with a few vocal opponents, or are they persisting despite being poorly received by their communities? A study of public perceptions of zoos found that people who were surveyed while at a zoo had a more favorable opinion of zoos than people surveyed on the street, which suggests either that people are more willing to visit zoos if they have a more positive opinion of them or that being in a zoo allows people to observe the conditions and programs for themselves and then form their opinions based on that.[258] This is supported by the trend of younger people to have stronger negative opinions of zoos, perhaps influenced by the media. Therefore, it is difficult to say that the public has a generally positive or negative opinion of zoos, especially since this study appears to be the only such study to be done, but it does seem that people tend to leave zoos with better opinions than they entered with, so the educational methods zoos are using appear to be successful.

The role of popular media in shaping public perceptions of the modern zoo

As mentioned before, it seems that the media could be influencing people's perceptions of zoos—especially today when people all seem to be glued to their electronic devices, they are bombarded with information about anything and everything, good and bad, which could include when there is news from a zoo. News of the death of the gorilla Harambe at the Cincinnati Zoo spread quickly, as did every update on Fiona, the baby hippo at the same zoo. However, the nightly news is not the only type of media that could be shaping public perceptions of zoos. There have been several films and television shows that depict life within zoos, all of which carry different levels of accuracy and put their own spin on the concept of the modern American zoo.

[258] Reade, Louise S., and Natalie K. Waran. "The Modern Zoo: How Do People Perceive Zoo Animals?" *Applied Animal Behaviour Science*, vol. 47, no. 1-2, 1996, pp. 109–118., doi:10.1016/0168-1591(95)01014-9.

One of today's best examples is the Animal Planet show *The Zoo*.[259] This is a documentary-style show that chronicles life at the Bronx Zoo from the perspective of the zookeepers and other behind-the-scenes staff. Storylines focusing on a given animal or area are created, but it is still a nonfiction show. This show is important because it allows laypeople to get a glimpse behind the scenes of a zoo in a way that they would not be able to from a regular visit to these places and see the ways that zoos are accomplishing their other goals beyond just entertainment. Although the show is set at one zoo, the lessons that viewers learn from watching can be generalized to other facilities, so the show is positively supporting the entire zoo community.

A fictionalized but realistic account of the goings-on of a modern zoo was seen on the big screen in the 2011 film *We Bought a Zoo*, which was based on a book of the same name.[260,261] This film told the story of a single dad who found the perfect house for himself and his two young children, but it came with a rundown zoo. He then works with the zoo staff to repair the facility so that it can be open to the public again, which they eventually accomplish. As mentioned, this film is based on the true story of the Dartmoor Wildlife Park in Devon, England, but since it was an American-made film, the setting was moved to California. This means that the fictional Rosemoor Wildlife Park is under the purview of the USDA—the USDA inspector is the antagonist of the film—and many zookeepers who have experienced a USDA inspection firsthand say that the portrayal of the inspector and inspection procedure are quite accurate. The challenges that the owner and staff face are real as well—funding, meeting their animals' nutritional needs, low staff morale. Therefore, while not quite as accurate as the preceding documentary show, this film was able to give an accurate portrayal of a zoo and its struggles and convey it to a different audience

[259] *The Zoo*. Animal Planet, 2017.
[260] Crowe, Cameron, director. *We Bought a Zoo*. 20th Century Fox, 2011.
[261] Mee, Benjamin. *We Bought a Zoo: The Amazing True Story of a Young Family, a Broken Down Zoo, and the 200 Wild Animals That Changed Their Lives Forever*. Wrinstrin Books, 2008.

than might be watching the television show. It also presents an opportunity to build empathy between zookeepers and the public—if people watch this film, they can better understand the struggles and hard work that goes into running a zoo, so they might be slower to judge when zoos are not running flawlessly.

We Bought a Zoo was a realistic depiction of what happens at a zoo, but most of the remaining fictional depictions of zoos are not nearly as realistic. For instance, in the same year, Kevin James starred in the film *Zookeeper* where he gave an accurate picture of the life of a zookeeper, but then the film took a drastic turn away from reality when the zoo animals were shown to be able to speak, in English, to one another and to James's character.[262] The animated *Madagascar* movies and their accompanying television show make the same factual error.[263] These portrayals do a disservice to zoos and the community because they are not accurately depicting what happens and are spreading misinformation, albeit with a slightly-positive slant.

2016's *Finding Dory* is mainly set in an aquarium, and while it does not depict animals communicating with humans, the animals can speak to one another and they are shown to be performing feats that actual animals could not do.[264] Unrelated to its unrealistic depiction of the animals, this film has a strong anti-aquarium message that was reportedly added in response to similar feelings brought up by *Blackfish* three years prior—the goal of the animals is to escape the aquarium and return to the ocean, "where they belong."[265] This is a very interesting position for this movie to be taking—while it makes sense that they wanted to avoid the backlash experienced

[262] Coraci, Frank, director. *Zookeeper*. Sony, 2011.
[263] Darnell, Eric and Tom McGrath, directors. *Madagasar*. DreamWorks, 2005.
[264] Stanton, Andrew, director. *Finding Dory*. Disney / Pixar, 2016.
[265] Barnes, Brooks. "'Finding Nemo' Sequel Is Altered in Response to Orcas Documentary." *ArtsBeat*, The New York Times, 9 Aug. 2013, artsbeat.blogs.nytimes.com/2013/08/09/finding-nemo-sequel-is-altered-in-response-to-orcas-documentary/?_r=3&.

by Sea World after *Blackfish* if they portrayed their aquarium in too positive of a light, it is a hypocritical stance. *Finding Dory* was created by Disney/Pixar, and Disney essentially runs a zoo and an aquarium at Walt Disney World in Florida, and they do not appear to have any plans to release the animals from those facilities. While the Pixar films and the Florida theme park are different arms of the company, they are after all the company on which the phenomenon of Disneyization is based, so since there is a cohesive brand uniting them, they are both still Disney products and can be reasonably compared to one another. And based on this example, it seems that Disney is not always living up to the values it is presenting in its films.

Concluding remarks

Returning to Frans de Waal's perspective on zoos, it seems that he has a realistic expectation for what the modern zoo can do and be. "I am personally not against keeping animals at zoos, as they serve a huge educational purpose, but treating them well and with respect seems the least we could do, and with 'we' I mean not just zoo staff, but most certainly also the public," he said. With this, he recognizes that zoos are not without their flaws—he must start by clarifying that he is not opposed to keeping animals at zoos, as that is a reasonable position for him to take based on a long history of animals being kept in objectionable conditions. He points to the tremendous educational purpose that zoos serve in their communities, which are inexplicably tied to the other purposes of the modern zoo. And he asserts that zoo animals should be treated with respect by both the staff of the zoo and by the public, which is something that zoos tend to emphasize both internally and externally.

This truly points at the role and responsibility that zoos have in the 21st century. In an ideal world, the animals that live in zoos would be able to survive and thrive in the wild, but in many cases, that is not possible. That's where zoos come in—they provide care for the animals that need

it the most, the individuals that would die without the assistance of the skilled zoo veterinarians and the species that would soon become extinct if they were not given the opportunity to reproduce in a safe, clean, predator-free environment. This even enables those zoos to give back to the world and assist the animals and environments threatened in the wild, as well as to educate the public on ways that they can take part in this dynamic.

One could even argue that humans would be obligated to provide the kind of care for animals that is provided by zoos. This is not necessarily because the animals have rights to this care (though they might), but because oftentimes, it is directly or indirectly a result of human action that the animals need human assistance. In addition, humans, at least in some locations, have the resources to do it and people who are passionate and excited to be doing this kind of work, so it's almost a no-brainer that, as long as the animals are safe and healthy, zoos would continue to exist.

Zoos can be homes for learning about the big wide world that exists beyond one's own backyard. Homes for an evolution of thought about the needs and lives of fascinating animals. Homes for hope for a future where zoos are not needed to ensure that species do not go extinct. But sometimes, they can just be homes for a giraffe named Hope.

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