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Analyzing conservation content and bias in zoo animal death announcements

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Abstract

Animal death announcements are one way that zoos communicate with their audiences, not only about individual animals but also about the conservation of the species they represent in the wild. However, the manner and content of these announcements varies substantially and it seems there are no best practice guidelines on how to write such announcements. This study investigates trends in how zoos communicate animal deaths through online press releases using a database of press releases posted on zoo websites from 2019 to the present. We analyse the announcements' conservation content, test for bias in the types of animals that receive such announcements, and identify trends in the verbiage zoos use to describe animal death. We found that over half of the animal death announcements (53.7%) did not explain the conservation context for species in the wild. Nearly 60% used anthropomorphizing language. Few announcements (11.9%) included a call to action for conservation. Most animals featured were mammals (90%), and 53.4% were either vulnerable or endangered species, though only 24.4% were noted as part of a species survival plan (SSP). Words like "loss," "mourn," and "death" were common in titles, while a smaller subset of articles included words such as "tribute," "celebrate," and "honour," and nearly 80% of announcements included images of the animals. The study aims to provide a comprehensive understanding of how zoos present animal deaths in their press releases. We make several "best practice" recommendations for how zoos can craft these announcements to maximize their conservation impact and minimize any potential negative effects, including recommending that information about a species' status and conservation threats in the wild be incorporated into every animal death announcement. These suggestions are offered with the intent that they will contribute to the development of basic guidelines for the curation of zoo press releases.

Introduction

Zoological parks are centres for conservation, education, animal care, and entertainment (Gusset & Dick, 2010; Moss et al., 2015). In the US, there are more than 200 Association of Zoos and aquariums (AZA)-accredited institutions housing at least 780,000 animals of 8,600 species (AZA, 2024). They lead and fund a range of conservation initiatives and related educational programming (Gippoliti et al., 2023; Brereton et al., 2023; Patrick et al., 2007; Clifford-Clarke, 2022). These conservation initiatives include *in situ* and *ex situ* breeding programs, habitat preservation efforts, scientific fieldwork, educational projects, policy work, and conservation advocacy (Neves et al., 2022; Roznik et al., 2023; Godinez et al., 2019; Andersen, 2003; Fraser & Sickler, 2009; Fraser & Switzer, 2021; Spooner et al.,2023). These practices contribute to the larger mission of advancing wildlife conservation and habitat protection, both in the US and internationally (Roznik et al., 2023; Primm et al., 2014; Beery et al., 2022; Costillo, 2015).

One way that zoos shape the conversation around biodiversity conservation is through their public messaging (Echeverri et al., 2017; Mellish et al., 2018). Zoos can positively impact visitor awareness about conservation issues and foster pro-conservation behaviours (Fraser & Switzer, 2021; Echeverri et al., 2017; Learmonth et al., 2021; Macri & Wells, 2023) through factual, engaging messaging tailored to their audiences. Such public messaging occurs in several forms, including text, image, and video-based

social media posts; in-person communications through educational programming and keeper/docent engagements; traditional and digital marketing campaigns; and written communications on zoo websites in the form of press releases, blog posts, and/or announcements. This study focuses on this latter group of website-based communications.

One type of information zoos use website-based communications for is the news of deaths of animals in their care (Browning, 2018). This is an important topic to communicate, but can also be difficult to talk about for several reasons. Audiences may react poorly to animal deaths or question the sometimes difficult decisions zoos must make, such as euthanization of popular animals (Schäfer, 2015). Some vocally disagree with keeping animals in captivity, and animal deaths may inspire public backlash from them (Learmonth et al., 2021; Roe et al., 2015). Zoos may also wish to focus on their image as positive places of learning and entertainment that provide safe environments for animals instead of tackling more serious issues, a concept sometimes referred to as Disneyization (Beardsworth, & Bryman, 2001). Finally, animal deaths are sad occurrences, not only for zoo-goers but also for the keepers and other zoo staff who cared for them (Macri & Wells, 2023).

Despite these risks, transparency is a priority for AZA-accredited institutions particularly when it comes to animal deaths (Stein, 2022). Transparency directly confronts public mistrust in and misperceptions of zoos and ensures audiences have a clear view of the “realities and challenges of conservation” (Rank et al., 2018), including zoo safety protocols, exhibit design, animal behaviour, and animal lifespans (Kalenda, 2019; Pravitt & Moss, 2019). It is also a form of accountability, giving audiences the information they need to form their own opinions about these institutions (Godinez & Fernandez, 2019). Transparent disclosure of animal deaths potentially provides zoos another way to connect their collections to the conservation threats to wild animal populations (Grajal et al., 2016; Clayton et al., 2009). This study focuses on this latter point, as we are interested in to what extent zoos are taking advantage of this opportunity.

While it is important for zoos to both communicate transparently and maintain a focus on wildlife conservation, there is no existing set of best practices for writing animal death announcements that achieve these goals. The question of how to approach sharing sensitive information about zoo animals in a way that is both direct and mission-driven gets to the heart of what zoos do, and inspires deep discussion among zoo communication professionals, including at the AZA Annual Meeting in September 2024 (Freund, pers. obs.). There is a clear need for guidelines on this issue. The first step toward developing a list of best practices is to survey how zoos currently approach writing these announcements, including examining which types of animals warrant such announcements, how language is used to connect with audiences, the connection of animal deaths to a broader conservation context, and the inclusion of a call to action for readers. Here, we present the results of such a survey. We then synthesize our findings to provide four best practice recommendations for zoos to write impactful animal death announcements that both inform the public and promote conservation.

Methods

Animal death announcements for analysis were collected from US-based AZA-accredited institutions. We did not survey all institutions, but prioritized collecting information from large, well-known zoos representing all regions of the US. An initial set of facilities of interest was identified by selecting at least one institution from each US state and the District of Columbia from the list available at https://www.aza.org/inst-status. Only facilities accredited through at least September 2024 were considered to avoid the possibility that a facility would lose its accreditation during our data collection period. Aquariums were also excluded from the study, though institutions with both a zoo and aquarium component were included. This procedure yielded a final list of 61 zoos with wide geographic distribution across the US.

Between April-May 2024, we searched each institution's website for animal death announcements, which were generally found on their news, media/press, or blog pages. Announcements took the form of formal press releases, news articles, and blog posts. Though zoos often post animal death announcements on social media, we did not collect any information from social platforms for this study. All announcements we could find back to January 2019 were included in our study with the exception of one that detailed a mass bird mortality event, as it did not fit our data collection scheme. We collected the title and date of each announcement, as well as the animal's species, name, and sex. We also recorded the hyperlink to the announcement and downloaded a copy of it.

To examine whether animal death announcements were more often written about certain types of animals, we recorded several additional data points. Using the species data and assessment records on the IUCN Red List website (https://www.iucnredlist.org/), we recorded the animal's IUCN status as of the time the announcement was written. If an animal's subspecies was listed in its death announcement and that subspecies had been evaluated for the Red List, we used the subspecies status. We also grouped the animals by class (e.g., Mammalia) and recorded whether they were considered one of the 20 most charismatic species by Albert et al. (2018). Because defining a charismatic species is subjective, we relied on these classifications as they had been systematically derived and peer-reviewed (Albert et al., 2018), though we acknowledge it should not be construed as an authoritative list. Finally, we also collected whether an announcement stated an animal was part of a Species Survival Plan (SSP). SSPs are comprehensive plans to manage captive animal populations long-term and include oversight of animal breeding and inter-facility transfers to ensure genetic diversity (AZA, 2025). They are one of AZA's key *ex situ* conservation initiatives.

To measure the announcements' potential conservation impacts, we scored each on a series of binary (yes/no) criteria: whether the announcement (a) mentioned the broader conservation context for the species involved, (b) used anthropomorphizing or human-cantered language, and (c) included a call to action, meaning a way that the reader could get involved with or contribute to species conservation. We defined 'mentioning the broader conservation context' as stating a species' status in the wild and describing threats to wild populations. Both aspects of this definition were imperative; an announcement that only mentioned a species' population numbers or endangered status in the wild without elucidating its conservation threats was assigned a "no" value. Species ranked as Least Concern by the IUCN were

exceptions to this rule, because their status indicates minimal threats to wild populations. Anthropomorphizing or human-centred language was defined as any descriptives typically attributed to human characteristics, thoughts, ideas, feelings, emotions, and behaviours that were applied to the deceased animal.

Finally, to survey the language and aesthetics of animal death announcements, we recorded the key terms used to describe the animal's death from each announcement's headline. These were most often verbs or their noun counterparts (e.g., dies, death), though occasionally we also recorded other particularly emotive words (e.g., tragic, shocked) that we considered relevant to our survey. We also recorded whether an announcement included photographs of the deceased animal. We summarized the data for both key terms and presence of photographs.

Results

We compiled 258 animal death announcements published by 41 institutions between January 2019 and April 2024. Ten announcements shared detailed information about multiple animal deaths, so in total the dataset includes announcements of the deaths of 270 individual animals belonging to 103 species and subspecies. Twenty zoos (32.8% of the 61 targeted) did not publish animal death announcements on their websites during this time period.

Of the 270 total announcements of animal deaths in our dataset, more than half were about animals listed by the IUCN as vulnerable (26.7%) or endangered (26.7%; Fig. 1A). Animals listed as least concern were almost as numerous (24.1%). The remaining ~ 25% of announcements were about animals listed as critically endangered, near threatened, and extinct in the wild. Three animals were domesticated species not listed on the IUCN RedList: one dromedary camel, one Percheron/Belgian draft horse, and one Arabian horse. As noted in Table 1, these animals were excluded from the conservation context and SSP analyses, as those variables were not applicable to them.

Our dataset included five classes of animals, though 90% of animals featured in death announcements were mammals (Fig. 1B). Of the remaining animals, 16 were birds (Aves), 9 were reptiles (Reptilia), one was a ray-finned fish (Actinopterygii) and one was a cephalopod (Cephalopoda). Less than half of the announcements (47.8%) were about charismatic species, and 24.4% stated the deceased animal was part of an SSP (Table 1). The full list of species and subspecies appearing in our dataset is available as Supplementary Information (SI Table 1).

A summary of the announcements' conservation characteristics is shown in Table 1. Approximately 53.7% of announcements did not explain the broader conservation context for wild populations of the deceased animal (Table 1). A similar percentage, 59.6%, used anthropomorphizing or human-centered language to describe the deceased animal. Just under 12% included a call to action, meaning the vast majority (88.1%) did not provide readers a way they could contribute to conservation or otherwise honor the life of the deceased animal.

Table 1
Percentages are of the total number of animals whose deaths were announced (n = 270). *Denotes variables which do not sum to 100%, as domesticated animals (n = 3) were excluded.

Variable	Yes (%)	No (%)
Mentioned broader conservation context*	45.2	53.7
Used anthropomorphizing or human-centred language	59.6	40.4
Included a call to action	11.9	88.1
Stated animal was part of SSP*	24.4	74.4

We identified nine common words or groups of words zoos used in announcement titles or headlines to communicate the animals' deaths (Table 2), with additional words appearing fewer than five times each classified as "miscellaneous - negative" or "miscellaneous - positive". In total, these words appeared 352 times across all announcement titles. The word loss and its derivatives were the most common expression, appearing 77 times, followed by mourn and its derivatives (75 times). The word death and its derivatives appeared 70 times. The word euthanized appeared in just six titles. Nearly all of the words were sad or neutral in tone, with the exception of four: honours, celebrates, tribute, and legacy. Collectively, these positive words were used 11 times. Finally, 79.2% of announcements were accompanied by one or more images of the deceased animal.

Table 2
List of words or word groups commonly used in animal death announcement headlines, listed in order from most to least common.

Word/Word Group	**Number of times used**
Loss, losses, loses	77
Mourns, mourning	75
Die, dies, died, death	70
Passes, passing, passes away	40
Says goodbye, saying goodbye, goodbye, farewell	26
Sad, saddened	19
Remember, remembering, in memory	13
Miscellaneous negative (Tragic, succumbs, devastated, gone, grieves, miss, shocked)	10
Euthanized	6
Miscellaneous positive *(Legacy, celebrates, honors)*	6
Heartbroken, heartbreaking	5
Tribute	5

Discussion

The results of our survey provide significant insights into how zoos communicate animal deaths. First, we found fewer biases than anticipated in terms of which animals receive death announcements. Overall, mammals like big cats, great apes, and elephants were the most common class of animal included in our dataset, a result we expected given that mammals are the most interesting group of animals for zoo guests (Howell et al., 2019; Skibins et al., 2017). However, we were also interested to discover death announcements for a cephalopod (giant Pacific octopus) and ray-finned fish (alligator gar). Despite the preponderance of mammals, we did not discover a bias toward charismatic species. We interpret this as a conservation positive: Highlighting lesser-known species can direct attention toward species that face conservation threats but are largely overlooked by the public, potentially raising awareness of their plights (Hosey et al., 2020)

We also did not detect a notable bias in IUCN statuses for animals in the dataset. The two most common statuses were vulnerable and endangered (26.7% each), followed by least concern (24.1%). This latter statistic is surprising, though likely related to the popularity of animals such as the California sea lion and North American river otter in US zoos. Additionally, we expected to find a bias toward animals that were part of an SSP, but did not. Approximately one-fourth (24.4%) of announcements

specifically mentioned the animal was part of an SSP. However, we are not confident saying that the other ~ 75% of animals were not. Based on our background knowledge and information from other animal death announcements or zoo websites, we know some of the animals classified as “no” for this variable almost certainly were part of an SSP, but their death announcements did not mention it. As we wanted to read these announcements as the general public would, we did not incorporate outside information when classifying announcements. SSPs are key to AZA’s mission and a symbol of the organization’s long-term commitment to healthy animal populations, both in captivity and in the wild (AZA, 2025), so we see neglecting to mention the SSP for animals to which it is relevant as a missed educational opportunity.

It is important to acknowledge that there are many other reasons beyond an animal’s conservation status, class, and charismatic nature that determine whether a zoo animal’s death is publicly announced or kept private among zoo staff. One zoo PR professional we spoke to while analysing our data pointed toward whether an animal was named as one important factor (J. Wallace, pers. comm.). While we did not initially set out to quantify this variable, we did have the data to do so and found that all except five (98.1%) of the animals in our dataset were named individuals. These animals were likely better-known to the public during their lifetimes than unnamed individuals (Borkfelt, 2011), making death announcements more likely. Finally, chance and circumstance also play a role. According to information presented at the “PR Hot Seat!” session of the 2024 AZA Annual Meeting, other newsworthy zoo events, or even other animal deaths, may take precedence over a given animal’s death announcement for busy zoo communications/PR staff. Situations in which an animal’s death is particularly traumatic for their keepers may also be kept private and only shared internally among zoo staff.

Wildlife conservation is a main priority for AZA-accredited institutions, and “a key part of their mission to save species from extinction.” (AZA, 2025) However, we found that less than half of animal death announcements explained the broader conservation context for animals in the wild (Table 1) in a way that met our definition. We see this as another missed opportunity for zoos to further their missions. Zoo visitors often connect with individual animals (Grajal et al., 2017; Levin, 2015), which become well-known and beloved among local audiences. Zoos can, and do, leverage these animals as ambassadors for their wild counterparts to talk about conservation threats to their species in the wild. Our findings show this approach of using individual animals as ambassadors for species conservation does not always extend to death announcements. However, within our dataset we saw many examples of announcements that did link an individual animal’s death to larger conservation issues, such as habitat destruction, illegal wildlife trade, and other threats that provide a blueprint for other zoos to do this effectively.

Our findings also revealed that approximately 60% of animal death announcements used anthropomorphic language, and we observed a wide range of ways and extents to which such language was employed. Anthropomorphic language presents humanized words and phrases to describe an animal’s behaviour and personality. Some announcements used anthropomorphic language to highlight an animal’s personality, such as one about a bird that had “just the perfect mix of spunk and independence.” Others were more extreme in their use of anthropomorphic language; for example,

another announcement describes how an animal would often vocalize when humans were talking nearby as if it wanted to “get in on those discussions.” One trend we noticed was that the announcements with the most extreme anthropomorphic language were often partially or fully written by the animals’ keepers. Reading these was more akin to reading an obituary for a human than reading about a zoo animal death.

Finding the right balance of anthropomorphic language in animal death announcements is important. Anthropomorphism can strengthen engagement in pro-environmental choice-making, increase empathy, and enhance public concern for environmental and conservation issues (Tam 2015; Manfredo et al., 2020; Ienna et al., 2022; Echeverri et al., 2017; Williams et al., 2021). The inclusion of anthropomorphic language in conservation communications can serve as a powerful catalyst for cultivating long-term pro-environmental attitude change and behavioural adoption (Tam, 2019; Ballantyne et al., 2021). However, too much anthropomorphic language can also be problematic. Writing about a zoo animal as one would about a beloved pet, or distilling it to simply a quirky, friendly, or charming individual that will be dearly missed, can prevent audiences from connecting the animal to its wild counterparts (Tam et al., 2015). It can also potentially detract from conservation efforts, including by fuelling demand for exotic pets. Further, this language impedes any critical discussions about species-level threats, such as poaching and habitat destruction (Roznik et al., 2023; Tam et al., 2013). We suggest zoos should use anthropomorphic language strategically and sparingly in animal death announcements to remain aligned with their conservation missions.

A large majority of the animal death announcements surveyed in this study neglected to include calls to action, concrete steps readers could take to memorialize the animal and/or contribute to the conservation of its wild counterparts. This a third missed opportunity for zoos to bolster their conservation mission (Ballantyne et al., 2018; Povey et al., 2005; Curtin & Papworth, 2018). The concept of a call to action is a familiar one in the marketing world, and has important applications for shifting audiences’ behaviors from simply reading about animals to doing something to protect them (Wright et al., 2015). The story of Cecil the lion, who was killed by a trophy hunter, illustrates how the death of a beloved animal can be a powerful motivator for people to learn more about, and get involved in, conservation (Bekoff,2018). Our results show that there are ample opportunities for zoos to channel this energy into meaningful action by providing the public with clear ways they can contribute alongside news of an animal’s death.

Finally, our analysis of the words used in the announcements’ headlines illuminates how zoos frame these statements. We found the words loss and mourns (and their derivatives) were most often used to describe animal death, appearing 75–77 times in our dataset (Table 2). In contrast, the term euthanized only appeared six times. The word die and its derivatives, the most direct way to describe an animal death, was the third most common term used. The vast majority of words shown in Table 2 are negative in emotional tone; we found just 11 instances of positive terms (legacy, celebrates, honors, tribute). Research suggests that audiences are more motivated to donate to and participate in biodiversity conservation when subjected to positive messages as opposed to negative ones (Jacobson et al., 2018), so when appropriate for the circumstances it may be worthwhile for zoos to frame animal death

announcements more positively, for example by focusing on the legacy the animal left behind, celebrating its life, or paying tribute to its contributions to conservation.

One caveat of this study is that we focused only on the content of the animal death announcements in our dataset, and did not examine how audiences respond to them. There are several aspects of our research, such as the emotional framing of the headlines, that could use more in-depth attention or even experimentation through A/B testing. Many zoos post animal death announcements on social media (Facebook, Instagram) as well as on their websites. Information about audience reactions could be collected from the likes, shares, and comments on those posts. This would be a useful next step to fine-tune the basic best practice recommendations we provide below, as well as to discover what other aspects of animal death announcements may resonate with audiences.

Recommendations

At the most basic level, we recommend that all zoos post animal death announcements on their websites for the public to discover. Based on our findings and the analysis presented above, we have four best practice recommendations for zoo professionals interested in writing animal death announcements that are both transparent and mission-aligned:

1. 1. Whenever possible and appropriate, compile announcements for the deaths of any individuals belonging to species listed as endangered, critically endangered, or extinct in the wild by the IUCN. While it may be uncomfortable to acknowledge the deaths of rarer animals, it is important for raising awareness about their species and its conservation threats.
2. 2. Discuss the broader conservation context for the species in every animal death announcement, including its IUCN or federal conservation status, population size, and the threats it faces in the wild. This does not need to take up too much space; we have seen some zoos touch on conservation effectively in as little as two sentences. Linking the presence of an animal in a zoo directly to the challenges it faces in the wild is critical for helping audiences make the same connection.
3. 3. Use anthropomorphic/human-centred language strategically and sparingly in public-facing animal death announcements. While a small amount can be helpful for conservation, too much can be counterproductive. We recognize that animal keepers and other zoo staff may wish to write more elaborate, emotional tributes to deceased animals. We recommend restricting those to internal communications, as zoo staff are less likely to misinterpret anthropomorphic language and/or descriptions of the extensive human-animal interactions involved in the day-to-day care of zoo animals.
4. 4. Include a call to action in every animal death announcement. An effective call to action can be specific to the deceased animal (e.g., telling zoo-goers how to recycle their old cell phones in an announcement about a gorilla death) or more general (e.g., asking readers to donate to the zoo's conservation work in a specific region of the world). Regardless of the ask, it gives the audience a way to channel their emotions into something with a positive conservation impact.

References

1. Albert C, Luque GM, Courchamp F (2018) The twenty most charismatic species. PLoS ONE 13(7):e0199149–e0199149. https://doi.org/10.1371/journal.pone.0199149
2. Andersen (2003) Zoo education: from formal school programmes to exhibit design and interpretation. Int Zoo Yearbook 38(1):75–81. https://doi.org/10.1111/j.1748-1090.2003.tb02066.x
3. Association of Zoos and Aquariums (2025) *Species survival plan programs*. AZA. https://www.aza.org/species-survival-plan-programs
4. Association of Zoos and Aquariums (2025) *Leaders in animal care and welfare*. https://www.aza.org/about-us
5. Ballantyne R, Hughes K, Lee J, Packer J, Sneddon J (2021) Facilitating zoo/aquarium visitors' adoption of environmentally sustainable behaviour: Developing a values-based interpretation matrix. Tour Manag 84. https://doi.org/10.1016/j.tourman.2020.104243
6. Ballantyne R, Packer J, Hughes K, Gill C (2018) Post-Visit Reinforcement of Zoo Conservation Messages: The Design and Testing of an Action Resource Website. Visitor Stud 21(1):98–120. https://doi.org/10.1080/10645578.2018.1503871
7. Beardsworth, Bryman A (2001) The wild animal in late modernity. Tourist Stud 1(1):83–104. https://doi.org/10.1177/146879760100100105
8. Beery T, Olafsson AS, Gentin S, Maurer M, Stalhammar S, Albert C, Bieling C., Buijs
9. Bekoff M (2018) Cecil the lion: His Life, Death and Effects on Conservation. Psychol Today. https://www.psychologytoday.com/us/blog/animal-emotions/201803/cecil-the-lion-his-life-death-and-effects-conservation
10. Brereton SR, Brereton JE (2023) Investigating Market and Conservation Education Influences on Global Zoo and Aquarium Animal Collections. J Res Social Sci Humanit 2(1):25–34. 10.56397/JRSSH.2023.01.04
11. Browning H (2018) No Room at the Zoo: Management Euthanasia and Animal Welfare. J Agric Environ Ethics 31(4):483–498. https://doi.org/10.1007/s10806-018-9741-8
12. Borkfelt S (2011) What's in a name? Consequences of naming non-human animals. Animals 1(1):116–125. https://doi.org/10.3390/ani1010116
13. Clayton S, Fraser J, Saunders CD (2009) Zoo Experiences: Conversations, Connections, and Concern for Animals. Zoo Biol 28(1):377–397. 10.1002/zoo.20186
14. Clifford-Clarke MM, Whitehouse-Tedd K, Ellis CF (2022) Conservation Education Impacts of Animal Ambassadors in Zoos. J Zoological Bot Gardens 3:1–18. https://doi.org/10.3390/jzbg3010001
15. Costello MJ (2015) Biodiversity: the known, unknown, and rates of extinction. Curr Biol 25(9):368–371. https://doi.org/10.1016/j.cub.2015.03.051
16. Curtin P, Papworth S (2018) Increased information and marketing to specific individuals could shift. Mar Policy 88(1):101–107. https://doi.org/10.1016/j.marpol.2017.11.006

17. Echeverri A, Chan KMA, Zhao J (2017) How Messaging Shapes Attitudes toward Sea Otters as a Species at Risk. Hum Dimensions Wildl 22(2):142–156. https://doi.org/10.1080/10871209.2016.1272146
18. Fa JE, Gusset M, Flesness N, Conde DA (2014) Zoos have yet to unveil their full conservation potential. Anim Conserv 17(2):97–100
19. Fagerholm A, Garcia-Martin N, Plieninger M, T., Raymong CM (2023) Disconnection from nature: Expanding our understanding of human–nature relations. People Nat 5(2):470–488. https://doi.org/10.1002/pan3.10451
20. Fraser J, Sickler J (2009) Enjoyment in zoo. Leisure Stud 28(3):313–331. https://doi.org/10.1080/02614360903046649
21. Fraser J, Sickler J (2009b) Measuring the cultural impact of zoos and aquariums. Int Zoo Yearbook 43(1):103–112. https://doi.org/10.1111/j.1748-1090.2008.00064.x
22. Fraser J, Switzer T (2021) The social value of zoos. Cambridge University Press
23. Gippoliti S, Battisti C (2023) The humanised zoo: decolonizing conservation education through a new narrative. Ethics Sci Environ Politics 23:1–5. https://doi.org/10.3354/esep00204
24. Godinez A, Fernandez EJ (2019) What is the zoo experience? How zoos impact a visitor's behaviors, perceptions, and conservation efforts. Front Psychol 1746–1746. https://doi.org/10.3389/fpsyg.2019.01746
25. Grajal A, Luebke JF, Kelly L-AD, Matiasek J, Clayton S, Karazsia BT, Saunders CD, Goldman SR, Mann ME, Stanoss R (2017) The complex relationship between personal sense of connection to animals and self-reported proenvironmental behaviors by zoo visitors. Conserv Biol 31(2):322–330. https://doi.org/10.1111/cobi.12780
26. Gusset M, Dick G (2010) Building a Future for Wildlife? Evaluating the contribution of the world zoo and aquarium community to in situ conservation. Int Zoo Yearbook 44(1):183–191. https://doi.org/10.1111/j.1748-1090.2009.00101.x
27. Hosey G, Melfi V, Ward SJ (2020) Problematic animals in the zoo: The issue of charismatic megafauna. Problematic wildlife II: New conservation and management challenges in the human-wildlife interactions. Springer Nature Switzerland AG, pp 485–508
28. Howell, McLeod EM, Coleman GJ (2019) When zoo visitors connect with a zoo animal, what does that mean? Zoo Biol 38(6):461–470. https://doi.org/10.1002/zoo.21509
29. Ienna M, Rofe A, Gendi M, Douglas HE, Kelly M, Hayward MW, Griffin AS (2022) The relative role of knowledge and empathy in predicting pro-environmental attitudes and behavior. Sustainability 14(8):4622
30. Jacobson SK, Morales NA, Chen B, Soodeen R, Moulton MP, Jain E (2018) Love or Loss: Effective message framing to promote environmental conservation. Appl Environ Educ Communication 18(3):252–265. https://doi.org/10.1080/1533015X.2018.1456380
31. Kalenda P (2019) The benefits of collaborative zoo exhibit design through action research. Mus Social Issues 14(1–2):23–44. 10.1080/15596893.2021.1964934

32. Learmonth MJ (2020) Human–animal interactions in Zoos: What can compassionate conservation, conservation welfare and duty of care tell us about the ethics of interacting, and avoiding unintended consequences? *Animals*,10(11), 1–14. https://doi.org/10.3390/ani10112037
33. Levin A (2015) Zoo Animals as Specimens, Zoo Animals as Friends: The Life and Death of Marius the Giraffe. Environ Philos 12(1):21–44. https://www.jstor.org/stable/26169819
34. Macri AM, Wells DL (2023) Connecting to Zoos and Aquariums during a COVID-19 Lockdown. J Zoological Bot Gardens 4(2):476–489. https://doi.org/10.3390/jzbg4020035
35. Manfredo MJ, Urquiza-Haas EG, Carlos AWD, Bruskotter JT, Dietsch AM (2020) How anthropomorphism is changing the social context of modern wildlife conservation. Biol Conserv 241:108297
36. Mellish S, Ryan JC, Pearson EL, Tuckey MR (2019) Research methods and reporting practices in zoo and aquarium conservation-education evaluation. Conserv Biol 33(1):40–52
37. Moss A, Jensen E, Gusset M (2015) Evaluating the contribution of zoos and aquariums to Aichi Biodiversity Target 1. Conserv Biol 29(2):537–544. https://doi.org/10.1111/cobi.12383
38. Neves J, Giger J-C, Alves V, Almeida J (2022) The Social Representations of Zoo Goers toward Crocodiles and Turtles: Structural Analysis and Implications for Conservation. Social Sci 11(1):1–15. https://doi.org/10.3390/socsci11120571
39. Patrick, Matthews CE, Ayers DF, Tunnicliffe SD (2007) Conservation and Education: Prominent Themes in Zoo Mission Statements. J Environ Educ 38(3):53–60. https://doi.org/10.3200/JOEE.38.3.53-60
40. Pimm, Jenkins CN, Abell R, Brooks TM, Gittleman JL, Joppa LN, Raven PH, Roberts CM, Sexton JO (2014) The biodiversity of species and their rates of extinction, distribution, and protection. Am Association Advancement Sci 344(6187):987–987. https://doi.org/10.1126/science.1246752
41. Pavitt B, Moss AG (2019) Assessing the effect of zoo exhibit design on visitor engagement and attitudes towards conservation. J Zoo Aquarium Res 7(4):186–194. https://doi.org/10.19227/jzar.v7i4.422
42. Povey KD, Rios J (2002) Using Interpretive Animals to Deliver Affective Messages in Zoos\\. J Interpretation Res 7(2):19–28. https://doi.org/10.1177/109258720200700203
43. Rank S, Voiklis J, Gupta R, Fraser J, Flinner K (2018) Understanding organizational trust of zoos and aquariums. Underst Role Trust Credibil Sci Communication. https://doi.org/10.31274/sciencecommunication-181114-16
44. Roe K, McConney A, Mansfield CF (2015) How do zoos 'talk' to their general visitors? Do visitors 'listen'? A mixed method investigation of the communication between modern zoos and their general visitors. Australian J Environ Educ 30(2):167–186. 10.1017/aee.2051.1
45. Root-Bernstein M, Douglas L, Smith A, Veríssimo D (2013) Anthropomorphized species as tools for conservation: utility beyond prosocial, intelligent and suffering species. Biodivers Conserv 22(8):1577–1589. https://doi.org/10.1007/s10531-013-0494-4

46. Roznik EA, Buckanoff H, Langston RW, Shupp CJ, Smith D (2023) Conservation through Collaboration: Regional Conservation Programs of the North Carolina Zoo. J Zoological Bot Gardens 4(2):292–311. https://doi.org/10.3390/jzbg4020025
47. Schäfer F (2015) On communicating critical issues of population management in zoos to the public. Der Zoologische Garten 84(3–4):173–183
48. Skibins JC, Dunstan E, Pahlow K (2017) Exploring the influence of charismatic characteristics on flagship outcomes in zoo visitors. Hum Dimensions Wildl 22(2):157–171. https://doi.org/10.1080/10871209.2016.1276233
49. Spooner SL, Walker SL, Dowell S, Moss A (2023) The value of zoos for species and society: The need for a new model. Biol Conserv 279:109925. https://doi.org/10.1016/j.biocon.2023.109925
50. Stein MA (2022) The value of a fresh set of eyes. Association Zoos Aquariums. https://www.aza.org/connect-stories/stories/accreditation-brings-new-perspectives-to-zoos
51. Tam KP (2015) Mind attribution to nature and proenvironmental behavior. Ecopsychology 7(2):87–95
52. Tam KP (2014) Anthropomorphism of nature and efficacy in coping with the environmental crisis. Soc Cogn 32(3):276–296
53. Tam KL, Lee SL, Chao MM (2013) Saving Mr. Nature: Anthropomorphism enhances connectedness to and protectiveness toward nature. J Exp Soc Psychol 49(3):514–521. https://doi.org/10.1016/j.jesp.2013.02.001https://doi.org/10.1080/00958960009598648
54. Tam KP (2019) Anthropomorphism of nature, environmental guilt, and pro-environmental behavior. Sustainability 11(19):5430. https://doi.org/10.3390/su11195430
55. Wang X, Fielding KS, Dean AJ (2023) Nature is mine/ours: Measuring individual and collective psychological ownership of nature. J Environ Psychol 85:101919
56. Williams MO, Whitmarsh L, Chríost DMG (2021) The association between anthropomorphism of nature and pro-environmental variables: A systematic review. Biol Conserv 255:109022
57. Wright AJ, Veríssimo D, Pilfold K, Parsons ECM, Ventre K, Cousins J, McKinley E (2015) Competitive outreach in the 21st century: Why we need conservation marketing. Ocean Coastal Manage 115:41–48. https://doi.org/10.1016/j.ocecoaman.2015.06.029

Figures

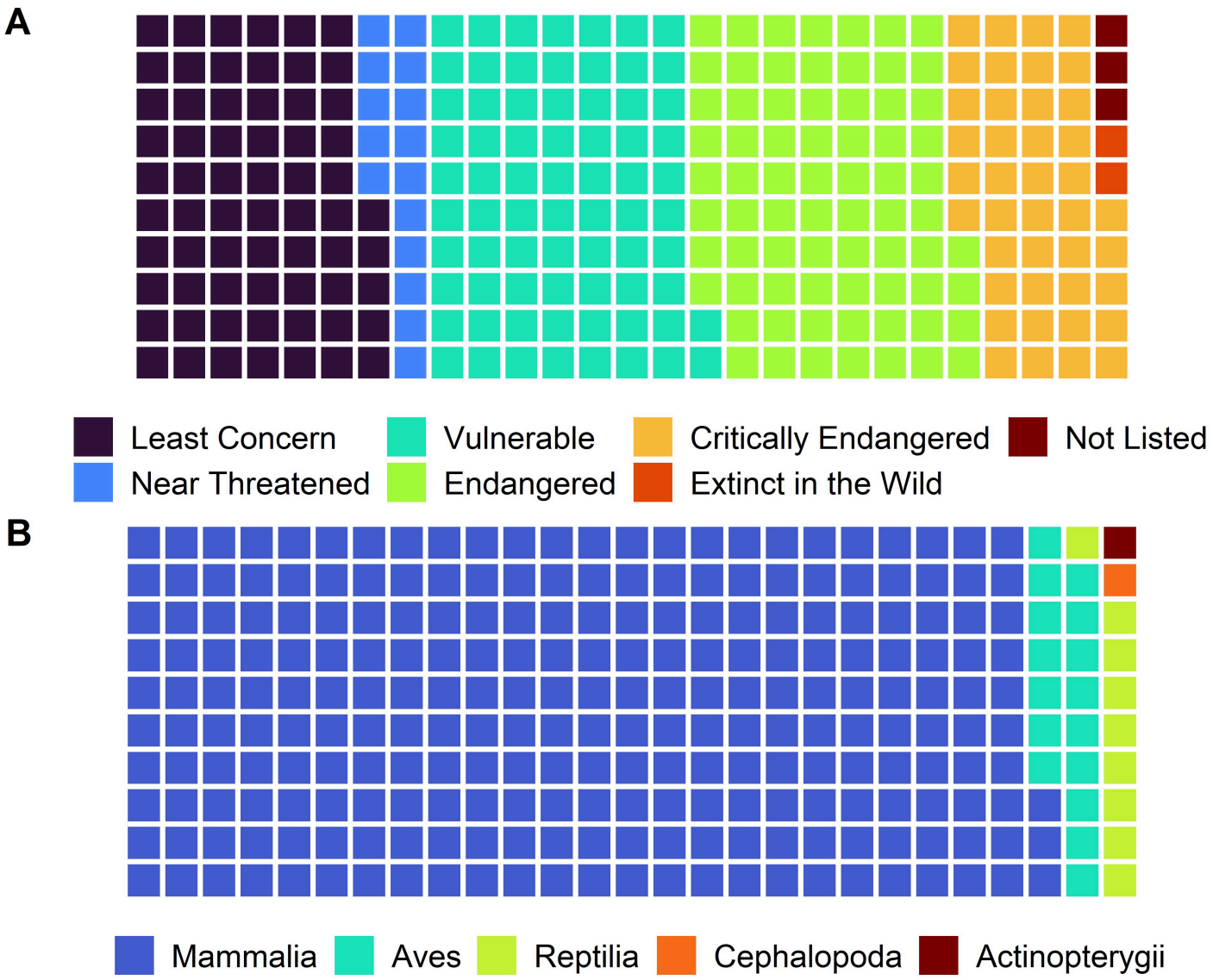

Figure 1

Figure 1. Waffle charts depicting (A) the distribution IUCN statuses of animals whose death announcements were included in our dataset and (B) the class each of these animals belonged to. While there is a somewhat even distribution of IUCN statuses between least concern, vulnerable, and endangered, nearly all animals belonged to class Mammalia.

Supplementary Files

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- SupplementaryInformation2.docx