

Conservation education in zoos – a literature review

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1 Introduction

Zoos have a very long history: keeping wild and/or exotic animals captive was already known in ancient Greek and Roman times (e.g. Barantay and Hardouin-Fugier 2003; Kisling 2000; Miller 2013). Zoos and aquaria differ from place to place, but in general zoos can be understood as areas designed for the public viewing of animals (Anderson 1995; 1998). Viewing animals is usually the main reason for the zoo visit (Roe & McConney 2015, 879). Thus zoos can be seen as choreographed and constructed places for controlled interaction between human and non-human animals, guiding the interaction between the visitors and the captive animals in many concrete, subtle and practical ways (e.g. Braverman 2011).

In many of today's cities, large areas of land have been designated for zoos, and annually more than 700 million people visit zoos and aquaria worldwide

(Gusset & Dick 2011). Zoos organize themselves into networks for cooperation, research, certification, monitoring and development purposes; these networks include the Association of Zoos & Aquariums (AZA), the European Association of Zoos and Aquaria (EAZA) and the World Association of Zoos and Aquariums (WAZA). In Europe, the mission of EAZA is to facilitate cooperation within the European zoo and aquarium community towards the goals of education, research and conservation (www.eaza.net). In fact, zoos are better conceptualized as a network that circulates and governs animals and information about animals (Braverman 2013; 2015).

Zoos have undergone a transition over the past 40 years, moving the focus from entertainment to conservation-based education (Roe et al 2014; Wijeratne ym. 2014; Bayma 2012;



Ballantyne ym. 2007; Patrick et al. 2007) and this shift is still ongoing. The former legitimization of zoos as places for viewing exotic animals has been increasingly challenged, and new legitimization claims, those of education and the conservation of endangered animals, have been introduced. (Bayma 2012; Beardsworth & Bryman 2001, 89; Fennell 2013). These two are combined in the claim that zoos educate their visitors on conservation by exhibiting live animals – zoos act not only as reservoirs of endangered animals but they also claim to make visitors more “conservation-minded” after their zoo experience (Fennell 2015; Fernandez et al 2009). Thus, it is fundamental to the ethics of keeping animals in zoos (Wijeratne et. al. 2014; Moss & Esson 2013; Fennell 2012;

Fernandez et al. 2009) to ask if seeing animals in the flesh contributes to the visitors becoming more “conservation minded”.

2 Empirical Zoo visitor research and environmental education

In this review, we look at how the alleged conservation education in zoos has been studied in empirical zoo visitor studies. We have undertaken a qualitative meta-analysis (Zimmer 2006; Evans 2008; Walsh & Downe 2004) of the empirical articles on zoo visitors and environmental education, with a focus on methodology and the nature of “nature conservation”. We searched for empirical visitor research particularly on learning, education and conservation, and chose 31 articles for



New signs from the WAZA campaign “Biodiversity is us”. Helsinki zoo, April 2016.

the analysis (see *Table 1* at the end). The list is not meant to be exhaustive but we have strived to choose the most relevant articles regarding our research aim. Most of the articles were published 2007-2016, but we have included two older articles since they were widely cited.

The overall evidence that the visitors learn about conservation and biodiversity, and even more importantly, that this learning results in behavioural changes, remains quite weak. Irus Braverman (2015) notes that the effectiveness of education in zoos has rarely been tested through comprehensive studies. A large study conducted by the AZA (Falk et al. 2007) was heavily criticized because it was based on self-reporting and did not directly measure knowledge or behaviour changes, and also had other flaws connected to the difficulty of surveys and self-reporting in general (Marino, Lilienfeld, Malamud, Nobis & Broglio 2010). The authors later rejected the critique (Falk, Heimlich, Vernon & Bronnenkant 2010). In 2012-2015 WAZA collaborated with researchers and conducted a global survey of zoo and aquaria visitors where biodiversity literacy – “biodiversity understanding and knowledge of actions to help protect biodiversity” – was evaluated. The results were published both in a report (Moss, Jensen & Gusset 2014a) and in scientific articles (Moss, Jensen & Gusset 2014b; 2015; 2016). The report concludes that both biodiversity under-

standing and knowledge of actions to help protect biodiversity had increased as a result of zoo and aquaria visits (Moss et al. 2014a). But establishing the leap to conservation action (behaviour change) is challenging (Moss et al. 2014a) and the connection is not simple and linear (Spanning 2017, 68).

Many have tried to measure the change that environmental education in zoos attempts to make. Interestingly most of these studies use different names for the change they are trying to measure: e.g. “pro-environment sentiment” (Powell & Bullock 2014), “conservation ethos” (Catibog-Sinha 2008), “conservation intentions” (Smith & Sutton 2008; Miller et al. 2013), “conservation mindedness” (Powell & Bullock 2014), “conservation caring” (Skibins & Powell 2013, 530), “conservation attitudes and behaviour” (Ballantyne et al. 2007), “environmental intentions” (Jacobs & Harms 2014) and “biodiversity literacy” (Moss, Jensen & Gusset 2014) were mentioned. These concepts do not necessarily mean the same thing and there doesn't seem to be a consensus on which concept to use. Jacobs and Harms (2014) provide a slightly broader interpretation (as compared to many other authors) incorporating the different, related concepts, and noting that “values, attitudes, knowledge, norms, awareness of consequences, feelings of responsibility, and affect and emotion” are “psychological antecedents

of environmental intentions, and by extension, wildlife conservation intentions.”

The studies also utilize different methods of empirically operationalizing the studied change in the analysis. Swanagan (2000) uses the evidence of visitors signing a petition as a sign of commitment to conservation, but mostly self-reporting has been in use, as when Powell and Bullock (2014) ask about the visitors’ emotional responses and willingness to change their behaviour (e.g. change daily activities or donate to conservation organizations).

This wide variety of concepts and operationalizations probably reflects the fact that measuring learning and tracing behavioural changes is notoriously difficult. Learning is not a fast, simple, one-way process, but complex, slow and interactive. Many writers admit that it is not really possible to study the effects of zoo visits *per se* since information and experience of the visit is processed differently from individual to individual, depending on different background knowledge and attitudes (e.g. Ballantyne et al. 2007, 375). For example, Davidson et al. (2009) conclude that learning during a student field trip depends strongly on the sociocultural context of the classroom and is less dependent on the zoo educator’s agendas. The most important thing for the students is the social context – being with friends. Even if the visitor learns, the step from learning to action is anything

but straightforward (Smith et al. 2008; Spanning 2017).

For this reason, much of the research has focused on which aspects of the zoo visit might make a difference. Studied variables include naturalness and interactiveness of the exhibits (e.g. Swanagan 2000; Ballantyne et al. 2007, 372; Ross et al. 2012; Lukas & Ross 2014), animal activity and eye contact with the animals (Powell & Bullock 2014), animal charisma (Smith & Sutton 2008), interpretation of conservation (by guides) (Jacobs & Harms 2014) or duration of stay (Smith & Broad 2008). The post-visit material has also proved important (e.g. MacDonald 2015; Wu et al., 2013).

To summarize the empirical results of the studies mentioned above, they seem to indicate that the visitor learns best if

- 1) s/he is already a “conservation minded” visitor,
- 2) the visit takes place in an interactive and naturalistic setting
- 3) the animals are active and/or charismatic
- 4) there is contact, such as eye contact with the animal
- 5) the visit is comparatively longer
- 6) the social context (such as that of the classroom) and the post-visit material support the learning aims of the visit.



Fundraising for snow leopard conservation. Helsinki zoo, January 2016



Snow leopard. Helsinki zoo, January 2016

The material and methods vary in the articles under analysis, but surveys and self-reporting connected to quantitative methods are common. The data from surveys and structured interviews used for quantitative analysis, however, give only a narrow view of the different meanings and experiences of zoo visits, and do not seem a good measure of conservation education in zoos. We feel that qualitative, interpretive analyses of visitor experiences are needed to understand this aspect better.

3 What is “nature conservation”?

Environmental and often more specifically conservation education and learning is the objective of zoo education, and many articles strive essentially to measure the effects of this education. But how does this volume of research envision nature, nature conservation and the zoos’ role in conservation?

Nature conservation spans a broad field of practices big and small, ranging from protected areas to international conservation agreements, to zoos and the managing of biodiverse gardens. Zoos have long advocated their conservation role as genetic reservoirs and captive breeding centres, and refugia for species of animals whose natural habitats are severely threatened (Dickie et al. 2007), in addition to conservation education. Some zoos have stronger con-

nections than others to in-situ conservation (see Gusset & Dick 2010) and many have developed conservation campaigns around select species, hoping to raise public awareness and action for conservation among zoo visitors (Skibins & Powell 2013, 529). The ongoing debate between “new conservation” and traditional conservation (see e.g. Braverman 2015a; Gusset & Dick 2010; Soulé 2013) makes defining conservation even more difficult: if there is no wilderness and pristine nature “out there”, what is nature conservation all about?

Anderson (1995) and Braverman (2012; 2014) have shown how zoos separate humans from other animals and from non-human nature. Zoos place humans above and separate from non-human nature, as a threat or a saviour, a learner, a visitor, a tourist. Braverman concludes that in zoos the public is educated about the definition and identity of nature, as well as the proper human relationship to this nature. A zoo’s nature is juxtaposed with modern urban life and it is seen as a pre-existing entity that “reinforces the notion of humans and nature as separate and remote”. (Braverman 2012, 837; also Braverman 2014; 2015.) “Zoo nature” – “wild” animals – is portrayed as different from non-wild nature such as pets but also as inferior to the *in situ* nature of conservation projects. Zoos may separate the visitors from non-human nature, rather than connect them to it. The articles analyzed

here do not take a critical stance on the portrayal of nature in the zoos.

The “conservation” or “nature” of “nature conservation” is often not explicitly defined in the articles studied. Implicitly, however, they reflect the zoos’ own narrow view of conservation: zoos are portrayed as reservoirs and as captive environments for nonhuman and often exotic and charismatic animals, involved in *in situ* and reintroduction projects.

Examples of this separation in the articles include the following:

1. Conservation is often implicitly portrayed as something that is done by someone else, not by the visitors.

This is evident in the way conservation learning or behaviour changes are measured: in the surveys, conservation often means donating money to a conservation programme or signing a petition. Only occasionally does it mean something more personal and active, e.g. recycling (Smith et al. 2008). This also seems to reflect the expectations of zoos – Roe & McConney (2014, 876, 881) found that the zoo representatives believed their visitors are *least* interested in learning about what they can do themselves to help save the animals. Some studies address the issue of connecting visitors’ everyday lives and the fates of endangered zoo animals (Baltantyne et al. 2007, 377; Roe et al. 2014, 538; Smith et al. 2008; Chalmin-Pui &

Perkins 2016). The research cited by Baltantyne et al. (2007, 377) and Smith et al. (2008, 547) suggests that in general zoo visitors are already convinced that conservation problems exist (the only conservation related information often provided by zoos), and they would want to learn about solutions and actions they can undertake themselves.

2. As a consequence of the above, (in situ) conservation and endangerment is often implicitly displayed in the articles as happening somewhere else, somewhere far away from the city or country where the zoo is located.

Zoos have a colonialist history, displaying exotic animals (sometimes even human animals) from faraway countries, and this heritage is still alive today (Anderson 1995). Most of the articles do not take this into consideration at all. As an exception among the articles studied, Chalmin-Pui and Perkins (2016) note critically this same omission in the information provided at the London Zoo’s BUGS exhibit.

3. If visitor post-visit actions were measured (i.e. asked to self-report), these actions would appear rather modest (e.g. recycling paper for hawk conservation as in Smith et al. 2008) when compared to the seriousness of the biodiversity crisis.

In general, however, there seems to be a move towards more effective actions such as lifestyle changes as reported in the more recent literature.

4. The role of human-animal relationships, specifically the role of emotion and affect between human and nonhuman animals is mentioned in a number of articles, but mostly these are studied quantitatively and from survey material.

Analysis of the role of non-human animals in zoo encounters and the relationships between animal and human individuals is largely missing. The so-called “animal turn” is also slowly surfacing in environmental education research (Spanning 2017) and clearly it would also require more attentive and qualitative research in zoos (see Ojalampi & Nygren, forthcoming).

4 Conclusions

Our conclusions based on the literature review are that the studied zoo visitor literature doesn't take a critical enough stance on the zoos' own conservation views, which point to a rather narrow set of practices and to a narrow view of human-animal relationships. Research based on surveys and quantitative methods also give little, if any, room for a diversity of meanings concerning zoo visits and more-than-human practices in zoos.

We believe that more qualitative methods should be used in visitor studies, and that it is urgent to widen the view of nature conservation, human-animal relations and environmental education in zoos.

ACKNOWLEDGEMENTS

This review stems from a project between the Helsinki zoo and research cooperative Tapaus. The authors would like to thank the director of Helsinki zoo, Sanna Hellström for collaboration. In addition we would like to thank the editors for helpful comments and Michael Owston for checking the language. The photos have been taken during the collection of empirical material at the Helsinki zoo in spring and summer of 2016.

Table 1. Articles analyzed in this literature review

	Reference	Object of study	Material and methods
1	Moss, Jensen & Gusset 2016	Biodiversity-related knowledge and self-reported proconservation behaviour	Global survey of zoo visitors
2	Moss, Jensen & Gusset 2015	Contribution of zoos and aquaria to Aichi Biodiversity Target 1.	Global survey of zoo visitors
3	Chalmin-Pui & Perkins 2015	How visitors relate to biodiversity conservation at the London Zoo's "BUGS" exhibit	Personal meaning mindmapping, cognitive world maps. Descriptive and statistical analysis
4	MacDonald 2015	Impact of Wellington Zoo's persuasive communication campaign on post-visit behaviour	Experimentation, survey, quantitative analysis
5	Birenboim et al. 2015	Visitor experiences	SMS reporting, geotagging with GPS, quantitative analysis
6	Roe & McConney 2015	Visitor learning	Mixed methods: questionnaire, staff interviews, case studies. Comparative, quantitative, qualitative analysis
7	Moss, Jensen & Gusset 2014	Biodiversity literacy	Global survey of zoo visitors
8	Roe et al. 2014	Comparison of zoos' reported priorities and what visitors believe they should be	Online questionnaire, mixed methods in case zoos. Quantitative and qualitative analysis
9	Wijeratne et al. 2014	Delivering conservation interpretations	Semi-structured interviews, qualitative analysis
10	Powell & Bullock 2014	Factors affecting emotional responses in zoo visitors and the impact of emotion	Survey, statistical analysis

11	Jensen 2014	Children's conservation biology learning at the zoo	Questionnaires and drawings, qualitative analysis
12	Luebke & Matiasek 2013	Zoo visitors experiences and reactions	Questionnaires, quantitative analysis
13	Wu et. al. 2013	Factors helping visitors convert their short-term pro-environmental intentions to long-term behaviours	Survey, quantitative analysis
14	Millet et. al. 2013	Conservation education at dolphin shows	Survey, quantitative analysis
15	Skibins & Powell 2013	Influence of zoo visitors' connection to wildlife on pro-conservation behaviors	Surveys, quantitative analysis
16	Packer & Ballantyne 2012	Comparing visitor attributes, experiences and outcomes between captive and non-captive wildlife tourism sites	Pre- and post-visit questionnaires, quantitative analysis
17	Marseille et al. 2012	Feelings and cognitions in relation to a visitor's conservation attitude	Interviews with Likert scale answers. Quantitative outcomes.
18	Ross et. al. 2012	The impact of exhibit design on visitor behaviour	Observation: Tracking and timing. Comparative analysis.
19	Carr & Cohen 2011	Public face of zoos	Content and semiotic analysis of the websites of 54 zoos worldwide
20	Marino 2010	Attitude change in visitors. A critical evaluation of the American zoo and aquarium study (Falck et. al 2007)	Theoretical and methodological critique
21	Wagner et. al. 2009	Measuring conservation outcomes	Pre- and post-visit surveys, quantitative analysis
22	Davidson et. al. 2009	Interaction of the agendas and practices of students, teachers and zoo educators	Observation, surveys, interviews, students work. Grounded theory approach.

23	Mony & Heimlich 2008	Message communication in docent-visitor Interactions	Mixed methods: semi-structured interviews, observation, quantitative analysis
24	Smith & Broad 2008	Attending to conservation messages	Observations, quantitative analysis
25	Smith et. al. 2008	Impact of zoo visits on visitor behaviour	Structured interviews, action research. Quantitative analysis
26	Falck et. al. 2007	Impact of a visit to a zoo or aquarium	Literature review, public forums with zoo professionals, mixed methods: quantitative and qualitative methods, including written questionnaires, interviews, tracking studies, and Personal Meaning Mapping (PMM).
27	Mason 2007	Role of zoos	Survey, quantitative analysis
28	Ballantyne et al. 2007	Conservation learning	Literature review
29	Lukas & Ross 2005	Zoo visitor knowledge and attitudes toward gorillas and chimpanzees	Survey, quantitative analysis
30	Swanagan 2000	Zoo visitors' conservation attitudes and behaviour	Survey, observation, solicitation cards (self reporting)
31	Broad & Weiler 1998	Comparing two different captive animal exhibits	Interviews, self-reported perceptions of learning. Interpretive, quantitative analysis

REFERENCES

- Anderson, K. 1995. "Culture and Nature at the Adelaide zoo: at the frontiers of human geography". *Transactions of the British Geographers* 20, 275–294.
- Anderson, K. 1998. "Animals, science, and spectacle in the city." In J. R. Wolch, & J. Emel (eds.), *Animal geographies. place, politics and identity in the nature-culture borderlands*. London: Verso. 25-50.
- Ballantyne, R., Packer, J., Hughes, K., & Dierking, L. 2007. "Conservation learning in wildlife tourism settings: Lessons from research in zoos and aquariums." *Environmental Education Research* 13(3), 367-383.
- Baratay, E., & Hardouin-Fugier, E. 2003. *Zoo: A history of zoological gardens in the west*. Reaktion Books.
- Bayma, T. 2012. "Rational myth making and environment shaping: The transformation of the zoo." *The Sociological Quarterly* 53(1), 116-141.
- Birenboim, A., Reinau, K. H., Shoval, N., & Harder, H. 2015. "High-resolution measurement and analysis of visitor experiences in time and space: The case of Aalborg Zoo in Denmark." *The Professional Geographer* 67(4), 620-629.
- Bostock, S., C. 1993. *Zoos and Animal Rights. The ethics of keeping animals*. New York: Routledge.
- Braverman, I. 2011. "Looking at Zoos." *Cultural Studies*, 25(6), 809-842.
- Braverman, I. 2012. *Zooland: The Institution of Captivity*. Stanford University Press. SUNY Buffalo Legal Studies Research Paper No. 2013-038.
- Broad, S., & Weiler, B. 1998. "Captive animals and interpretation: A tale of two tiger exhibits." *Journal of Tourism Studies* 9(1), 14.
- Catibog-Sinha, C. 2011. "Zoo tourism and Conservation of Threatened Species: a collaborative programme in the Philippines." In Frost, Warwick (ed.), *Zoos and tourism: conservation, education, entertainment?* Bristol: Channel view publication. 133–142.
- Clements, J. M., McCright, A. M., Dietz, T., & Marquart-Pyatt, S. T. 2015. "A behavioural measure of environmental decision-making for social surveys." *Environmental Sociology* 1(1), 27-37.
- Davidson, S. K., Passmore, C., & Anderson, D. 2010. "Learning on zoo field trips: The interaction of the agendas and practices of students, teachers, and zoo educators." *Science Education* 94(1), 122-141.
- Evans, J., & Jones, P. 2011. "The walking interview: Methodology, mobility and place." *Applied Geography* 31(2), 849-858.

- Falk, J.H.; Reinhard, E.M.; Vernon, C.L.; Bronnenkant, K.; Deans, N.L.; Heimlich, J.E., 2007. "Why Zoos & Aquariums Matter: Assessing the Impact of a Visit." Silver Spring, MD: Association of Zoos & Aquariums.
- Fennell, D. A. 2012. "Tourism, animals and utilitarianism." *Tourism Recreation Research* 37(3), 239-249.
- Fennell, D. A. 2015. "The status of animal ethics research in tourism: A review of theory." In K. Markwell (ed.), *Animals and tourism. understanding diverse relationships*. Channel View Publications. 27-43.
- Fernandez, E., J.; Tamborski, M., A.; Pickens, S., R. and Timberlake, W. 2009. "Animal–visitor interactions in the modern zoo: Conflicts and interventions." *Applied Animal Behaviour Science* 120, 1–8.
- Fraser, D. 2009. "Assessing animal welfare: different philosophies, different scientific approaches." *Zoo Biology* 28 (6), 507-518.
- Gusset, M., & Dick, G. 2011. "The global reach of zoos and aquariums in visitor numbers and conservation expenditures." *Zoo Biology* 30(5), 566-569.
- Jacobs, M. H., & Harms, M. 2014. "Influence of interpretation on conservation intentions of whale tourists." *Tourism Management* 42, 123-131.
- Jokinen, A., Asikainen, E., & Mäkinen, K. 2010. "Kävelyhaastattelu tapaustutkimuksen menetelmänä." *Sosiologia* 47(4), 255-269.
- Kisling, V. N. 2000. *Zoo and aquarium history: Ancient animal collections to zoological gardens*. CRC press.
- Laatu, S. 2013. "The development of animal welfare in Finland and how people perceive animal welfare: Case study: Animals in tourism: Zoos." Vaasa University of Applied Sciences.
- Luebke, J. F., & Matiasek, J. 2013. "An exploratory study of zoo visitors' exhibit experiences and reactions." *Zoo Biology* 32(4), 407-416.
- Lukas, K. E., & Ross, S. R. 2005. "Zoo visitor knowledge and attitudes toward gorillas and chimpanzees." *The Journal of Environmental Education* 36(4), 33.
- Lukas, K. E., & Ross, S. R. 2014. "Naturalistic exhibits may be more effective than traditional exhibits at improving zoo-visitor attitudes toward african apes." *Anthrozoös* 27(3), 435-455.
- Lummaa, K., & Rojola, L. (eds.). 2014. *Posthumanismi*. Turku: Eetos.
- MacDonald, E. 2015. "Quantifying the impact of Wellington Zoo's persuasive communication campaign on post-visit behaviour." *Zoo Biology* 34(2), 163-169.
- Marino, L., Lilienfeld, S., O., Malamud, R., Nathan N., Nathan and Brogliod, R. 2010. "Do Zoos and Aquariums Promote Attitude Change in Visitors? A Critical Evaluation of the American Zoo and Aquarium Study." *Society and Animals* 18, 126-138.

- Marseille, M., Elands, B., H., M. and Brink, M. L. van den. 2012. "Experiencing Polar Bears in the Zoo: Feelings and Cognitions in Relation to a Visitor's Conservation Attitude." *Human Dimensions of Wildlife* 17(1), 29-43.
- Mason, P. 2007. "Roles of the modern zoo: conflicting or complementary?" *Tourism Review International* 11(3), 251-263.
- Melfi, V., A. 2009. "There are big gaps in our knowledge, and thus approach, to zoo animal welfare: a case for evidence-based zoo animal management." *Zoo Biology* 28 (6), 574-588.
- Miller, I. J. 2013. *The nature of the beasts: Empire and exhibition at the Tokyo Imperial Zoo*. University of California Press.
- Miller, L., Zeigler-Hill, V., Mellen, J., Koeppel, J., Greer, T., & Kuczaj, S. 2013. "Dolphin shows and interaction programmes: Benefits for conservation education?" *Zoo Biology* 32(1), 45-53.
- Minteer, B. A., & Collins, J. P. 2013. "Ecological ethics in captivity: Balancing values and responsibilities in zoo and aquarium research under rapid global change." *Iilar Journal* 54(1), 41-51.
- Mony, P. R., & Heimlich, J. E. 2008. "Talking to visitors about conservation: Exploring message communication through docent–visitor interactions at zoos." *Visitor Studies* 11(2), 151-162.
- Moss, A., & Esson, M. 2013. "The educational claims of zoos: Where do we go from here?" *Zoo Biology* 32(1), 13-18.
- Nygren, N. V., & Jokinen, A. 2013. "Significance of affect and ethics in applying conservation standards: The practices of flying squirrel surveyors." *Geoforum* 46(0), 79-90. doi:10.1016/j.geoforum.2012.12.006
- Ojalammii, S., & Nygren, N. V. (forthcoming). "Visitor Perceptions of Nature Conservation at Helsinki Zoo." *Anthrozoös*, in print.
- Packer, J., & Ballantyne, R. 2012. "Comparing captive and non-captive wildlife tourism." *Annals of Tourism Research* 39(2), 1242-1245.
- Patrick, P. G., Matthews, C. E., Ayers, D. F., & Tunnicliffe, S. D. 2007. "Conservation and education: Prominent themes in zoo mission statements." *The Journal of Environmental Education* 38(3), 53-60.
- Powell, D. M., & Bullock, E. V. 2014. "Evaluation of factors affecting emotional responses in zoo visitors and the impact of emotion on conservation mindedness." *Anthrozoös* 27(3), 389-405.
- Roe, K., & McConney, A. 2015. "Do zoo visitors come to learn? an internationally comparative, mixed-methods study." *Environmental Education Research*, 21(6), 865-884.

- Roe, K., McConney, A., & Mansfield, C. F. 2014. "The role of zoos in modern society. A comparison of zoos' reported priorities and what visitors believe they should be." *Anthrozoös* 27(4), 529-541.
- Rothfels, N. 2002. *Savages and beasts: The birth of the modern zoo*. JHU Press.
- Skibins J. C. and R. B. Powell. 2013. "Conservation caring: measuring the influence of zoo visitors' connection to wildlife on pro-conservation behaviours." *Zoo Biology* 32, 528-40.
- Smith, L., & Broad, S. 2007. "Do zoo visitors attend to conservation messages? A case study of an elephant exhibit." *Tourism Review International*, 11(3), 225-235.
- Smith, L., Broad, S., & Weiler, B. 2008. "A closer examination of the impact of zoo visits on visitor behaviour." *Journal of Sustainable Tourism* 16(5), 544-562.
- Stoinski, T. S., Ogden, J. J., Gold, K. C., & Maple, T. L. 2001. "Captive apes and zoo education." In B. B. Beck et al. (eds.), *Great apes & humans: The ethics of coexistence*. Washington, DC: Smithsonian Institution Press. 113-132.
- Swanagan, J. S. 2000. "Factors influencing zoo visitors' conservation attitudes and behaviour." *The Journal of Environmental Education*, 31(4), 26-31.
- Wijeratne, A. J., Van Dijk, P. A., Kirk-Brown, A., & Frost, L. 2014. "Rules of engagement: The role of emotional display rules in delivering conservation interpretation in a zoo-based tourism context." *Tourism Management* 42, 149-156.
- Wolfe, Cary. 2012. *Before the law: Humans and other animals in a biopolitical frame*. University of Chicago Press.
- Wu, J., Huang, D., Liu, J., & Law, R. 2013. "Which factors help visitors convert their short-term pro-environmental intentions to long-term behaviours?" *International Journal of Tourism Sciences*, 13(2), 33-56.
- Zelezny, L. C. 1999. "Educational interventions that improve environmental behaviours: A meta-analysis." *The Journal of Environmental Education*, 31(1), 5-14.

ONLINE SOURCES:

- <http://www.eaza.net/about-us/> (accessed 2.12.2015)
- <http://www.aza.org/AboutAZA/mission/index.html> (accessed 2.12.2015)
- <https://www.aza.org/StrategicPlan/> (accessed 18.12.2015)