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Editorial: Future Perspectives in Conservation Education

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In the European Association of Zoos and Aquaria (EAZA) *EAZA Conservation Education Standards* document there is the following mission statement: 'To mitigate the extinction of biodiversity through quality conservation education that raises awareness, connects people to nature and encourages sustainable behaviours in the millions of people that engage with EAZA zoos and aquariums annually' (EAZA, 2016). The main thrust of this mission statement is replicated through many regional zoo and aquarium associations, individual zoos and aquariums, and conservation organizations globally. The mission statement complements the changing notion of biodiversity conservation (Adams, 2007; Sandbrook, 2015), and of the role of modern zoos and aquariums (Byers *et al.*, 2013; EAZA, 2013), but it is still a relatively new and innovative way of thinking about the aims and outcomes of conservation education. As zoological institutions evolve to meet the increasing crisis in biodiversity loss, conservation education must also embrace a change in its remit, and expand its scope and approaches accordingly. The papers published in Volume 50 of the *International Zoo Yearbook* – Future Perspectives in Conservation Education – give a brief insight into how zoos and aquariums and their associated organizations are currently fulfilling this conservation-education mission, and how the future of conservation education has a vital role to play in supporting the diversity and complexity of the work undertaken by zoological institutions

and like-minded conservation organizations.

The term conservation education is now used universally within the global zoo and aquarium community. However, in this introduction, the complexity and scope of education needs to be acknowledged and explored. When translated, the word 'education' has many nuanced meanings in different languages and cultures. In zoos and aquariums it is used to reflect education and learning in its broadest sense. Education in zoological institutions is not confined to programmes for schools and children but includes a wide range of opportunities and experiences for the diverse audiences that interact with and support zoos and aquariums (Andersen, 2003). Furthermore, the term 'conservation education' reflects the concept that biodiversity conservation is at the core of the educational programmes being delivered by zoos and aquariums (EAZA, 2016). Conservation education can be thought of as an umbrella term for a whole host of educational programmes that contribute to biodiversity conservation. These can be on-site at an institution (Hughes & Allan, 2016), as part of an outreach programme in the local community (Jacobson *et al.*, 2006; Cureg *et al.*, 2016) or at a conservation field site (Crudge *et al.*, 2016; Squires *et al.*, 2016). Conservation education includes both formal and informal approaches to learning (Falk & Dierking, 1992), structured and free-choice programmes (Tofield *et al.*, 2003), elements of

exhibit design (Coe, 1987) and collection planning (Moss & Esson, 2010), public-engagement and science-communication activities and events (Bickford *et al.*, 2012), biological, science and environmental education (Ballantyne & Packer, 1996; Falk & Storksdieck, 2010; Offord-Woolley *et al.*, 2016), education for sustainable development (Packer & Ballantyne, 2010) and practical skills-based programmes (Lopes & Salovey, 2004). To this end, we should celebrate this diversity of conservation education within the global zoo and aquarium community but remain focused on the universal goal of long-term sustainable populations of the world's biodiversity.

We are living in a time of crisis in terms of biodiversity loss. The *Living Planet Index* highlighted that there has been a 52% decline in global vertebrate populations in the last 40 years (WWF, 2014). Through social media, television and news stories there is a perpetual reporting of the critical situation around rapidly declining biodiversity that can cause a sense of hopelessness in visitors and staff alike (Swaisgood & Sheppard, 2010). As part of the conservation-education remit of the future, zoos and aquariums must endeavour to make sure their audience appreciates all the positive contributions that zoological institutions make to long-term biodiversity conservation success. In addition to the millions of visitors they engage with annually, zoos and aquariums are strongholds for coordinated breeding programmes, leaders in animal welfare, animal care and scientific research and, collectively, zoological institutions actively work on and donate vast funds (US\$350 million annually: Barongi *et al.*, 2015) to a wide range of conservation projects every year. However, the zoo and aquarium community does not engage with its audiences enough about the variety and complexity of work that it does, and conservation successes that are the direct result of the involvement of zoological institutions. Zoo and aquariums should not shy away from celebrating their own successes. Put simply, without the decades of commitment by zoological institutions, then many

species would be extinct and their habitats irreversibly destroyed (Tudge, 1992). Conservation education has a vital role to play in communicating these stories about breeding programmes and advances in animal care, welfare and wildlife health projects, ecologically and socially focused field programmes, wildlife rehabilitation, and the skills and practices developed in zoos and aquariums that are then transferred into field work. Zoos and aquariums also have a responsibility to talk openly and transparently about some of the difficult and complex topics; for example, managed euthanasia, population management of species, ethics, the agony of choice in conservation, and the complex social, economic and political forces at play in the context of modern conservation. In these times of crisis, zoos and aquariums need to be the trusted voice that inspires our visitors to appreciate the complexities involved in the long-term management of genetically viable global populations.

Conservation education is also no longer simply the remit of those who call themselves 'Educators'. There are elements of conservation education woven into every job role and remit within a zoological institution. For example, keepers are often responsible for giving talks about the animals in their care, which involve engaging with visitors daily. At all levels, from directors, veterinary and science staff, to field conservationists, keepers and volunteers, the future of conservation education is dependent on every individual, each being aware of and responsible for their part in the conservation-education story. Essentially conservation education should encompass a myriad of activities, using a wealth of different tools and approaches, delivered by a broad range of staff from all levels connected to a zoo or aquarium.

This volume on conservation education is timely, as it has been some years since the *International Zoo Yearbook* focused on this important area of conservation. It is also opportune because there have been significant changes in the ways people think, feel and act towards biodiversity and the

environment (Wilson, 1984; Kellert & Wilson, 1993; Kahn, 1999). These changes are posited to be based around the elevated use of modern technologies and there have been several claims that people are now more than ever disconnected from nature as a result of life in its modernity being inherently separated from the natural world (Miller, 2005; Louv, 2008). There is also an acknowledged tension between an exponential increase in the human population and the subsequent pressures on natural resources. No ecosystem is untouched by human activity and its negative effect on biodiversity, and habitats have never been more at crisis point than during this present decade. Because of these contemporary issues, the face of biodiversity conservation is changing, and it has to keep changing in order to address both the ecological and social dimensions of biodiversity loss (Adams, 2007; Sandbrook, 2015). As part of these changes, our perspective on conservation education is also evolving as we understand more about the interactions between people and the natural world.

In general, the thinking around education and how people learn in informal learning environments, such as zoos and aquariums, has advanced massively in the last few decades (Falk & Dierking, 2000; Anderson *et al.*, 2003; Johnson *et al.*, 2015). There have been several studies to explore the breadth and depth of learning in informal environments, such as zoos, aquariums, museums, galleries and science centres (Dierking *et al.*, 2002; Falk & Storksdieck, 2005; Falk *et al.*, 2007; Fraser & Sickler, 2009). This has led to the notion that zoos and aquariums are uniquely equipped to deliver conservation-education programmes that aim to raise awareness about biodiversity loss and other environmental issues, connect people to nature and encourage sustainable behaviours (WAZA, 2005; Packer & Ballantyne, 2010; Barongi *et al.*, 2015).

Modern accredited zoos and aquariums continue to play a key role in contributing to people's knowledge and understanding about biodiversity and the natural world

(Wagoner & Jensen, 2010; Dove & Byrne, 2014; Moss *et al.*, 2014). In addition, there has been a more recent acknowledgement that zoos and aquariums potentially can be a powerful component in fostering emotional connections (Kahn & Kellert, 2002; Clayton & Myers, 2009). Building on work around social and emotional intelligence, zoological institutions are able to showcase immersive, multisensory and complex exhibits and programmes (Goleman, 1996, 2007; Goleman *et al.*, 2012). These experiences promote social interaction between visitors, build emotional connections with animals and the natural world, and support effective engagement in order to influence behaviour change for conservation (Barongi *et al.*, 2015).

In 2010, the parties of the Convention on Biological Diversity (CBD) adopted the *Strategic Plan for Biodiversity 2011–2020* (CBD, 2010). There are 20 Aichi Biodiversity Targets. Under 'Strategic Goal A: Address the underlying causes of biodiversity loss by mainstreaming biodiversity across government and society', Target 1 states that 'By 2020, at the latest, people are aware of the values of biodiversity and the steps they can take to conserve and use it sustainably'. Zoos and aquariums have never been in a better position to contribute to meeting this target with well-crafted conservation-education programmes where people connect with, experience and consequently care about biodiversity (Clayton *et al.*, 2009; Jensen, 2014; Moss *et al.*, 2015). To support this notion further, I reconstructed the famous conservation statement made by Baba Dioum in 1968, to reflect the change in the thinking around the process that motivates people to take action for conservation.

*In the end we will conserve only what we
care for;
we will care for only what we connect to;
we will connect to only what we experience.*
Sarah Thomas (2010)

People draw their knowledge, attitudes, values and behaviour about the world

around them from piecing together various experiences, not only from their visits to zoos and aquariums but also from programmes they have seen on television, items they have read in magazines, people they have interacted with on social media and what they have experienced in everyday life. All these knowledge resources form a complex socially constructed constellation that collectively contributes to how individuals think, feel and act towards the natural world. Therefore, the experiences that people have during their visits to zoos and aquariums or as part of conservation-education programmes run by zoological institutions are only one component of the many interactions with nature individuals are exposed to over the course of a lifetime.

Despite the large steps forward that have been made in conservation education in recent decades, there is still more to explore as the field of conservation is perpetually evolving. Zoos, aquariums and other conservation organizations acknowledge the importance of people in conservation solutions, but there is still a gap in the knowledge and skills that will take us forward towards a more sophisticated approach in this social domain. It is widely acknowledged that the social sciences play a key role in conservation (Mascia, 2003; Adams, 2007; Manfredo, 2008; Newing, 2011), and yet there is much to learn around applying different social-sciences lenses to research and practice in conservation-education programmes for maximizing success. The zoos and aquariums of the future have a duty to explore the numerous different models and approaches that can be utilized to promote and measure connectedness with nature, and to foster sustainable behaviours. However, zoological institutions should ensure that they do not over claim, naively thinking that there is only one model or approach that fits all audiences and all conservation education (Moss & Esson, 2013). More needs to be understood about the motivations and behaviour of visitors in order to design, deliver and evaluate appropriate programmes (Mann-

Lang *et al.*, 2016; Mellish *et al.*, 2016; Moss, 2016). To assist with this endeavour, zoos and aquariums should aspire to create and maintain strong partnerships with academic institutions and other organizations focused on conservation education (Brewer, 2002). In this volume, an example is given of a zoo working together with external partners to design, deliver and evaluate a sophisticated programme (Crudge *et al.*, 2016). The use of novel approaches is another key component for the future of conservation education; for example, the use of an innovative evaluation approach that transcends the boundaries of culture, language and literacy (Esson & Moss, 2016), the use of bioinspiration to promote learning, not only about nature but also from nature, as a novel yet effective way of engaging zoo audiences (Topaz, 2016), and the use of technology to complement and enable learning in zoological institutions (Costa & Carrilho, 2016).

When thinking about the future perspectives of conservation education there are many dimensions involved. Despite the different guises this discipline can take, having clear aims and outcomes combined with an evaluation framework is vital if conservation-education programmes are to be designed, developed, delivered and evaluated effectively. To maximize their potential, zoos and aquariums should explore the use of new and novel teaching and learning approaches, tools and contexts. Zoological institutions should also understand the importance of, and invest in, social research, evaluation and visitor studies, along with the associated ethical considerations, in order to produce an evidence base for the effects and impacts of the conservation education provided by zoos and aquariums (Johnson *et al.*, 2015; Gillespie & Melber, 2016). By making a concerted effort to publish information about their conservation-education programmes, together with the results of the research processes and evaluation associated with each project, zoos and aquariums can disseminate the shared knowledge base about conservation-education programmes globally, and demonstrate

to a wide range of stakeholders the outcomes, value and impacts of these kinds of programmes. To enable these new ways of operating, zoos and aquariums should aspire to form partnerships with other zoos and aquariums and like-minded conservation organizations to ensure conservation education is undertaken collaboratively, maximizing the strengths of different partners in order to fulfil the potential for exciting and effective future for conservation education worldwide. Conservation education not only raises awareness about species, habitats and conservation issues but also connects people to nature and encourages sustainable behaviours in the millions of individuals who engage with zoological institutions annually. In my mind, conservation education is the most important role for zoos and aquariums of the future.

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