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INTERNATIONAL ZOO
EDUCATORS
ASSOCIATION
Social
Change for
Conservation
The World Zoo and Aquarium
Conservation Education Strategy

Credits

TITLE
Social Change for Conservation:
The World Zoo and Aquarium Conservation Education Strategy

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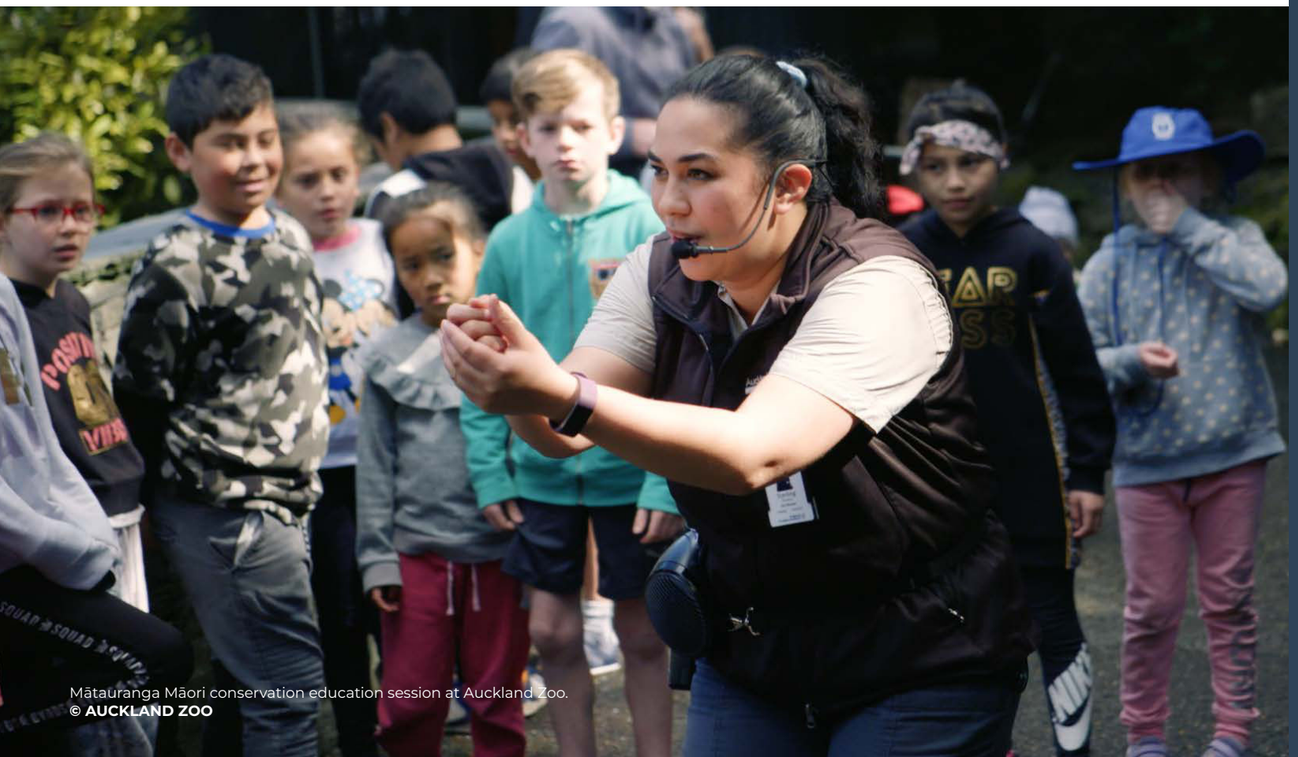

Mātauranga Māori conservation education session at Auckland Zoo.
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Foreword

Over the last 15 years, the World Association of Zoos and Aquariums (WAZA) has produced a number of influential strategies. In 2005, the Conservation Strategy was the first to position zoos and aquariums as centres of conservation excellence. It was followed in 2015 by the Animal Welfare Strategy, which addressed the critical role of animal welfare. The 2020 Environmental Sustainability Strategy brought into focus the importance of environmental sustainability in zoological operations. Therefore, it's fitting that the International Zoo Educators Association (IZE) should now produce the World Zoo and Aquarium Conservation Education Strategy. This strategy highlights the critical role of conservation education in the work of zoos and aquariums, and clearly demonstrates the interdependence of all four pillars of operation: Conservation, Welfare, Sustainability, and Conservation Education. We hope this strategy generates support among leaders for conservation education, inspires and guides educators, and ultimately benefits people and our natural world.

DEBRA ERICKSON, PRESIDENT
DR. JUDY MANN, PRESIDENT ELECT
International Zoo Educators Association

In collaboration with the International Zoo Educators Association (IZE), the World Association of Zoos and Aquariums (WAZA) is proud to share the World Zoo and Aquarium Conservation Education Strategy. The ways in which we help people understand, experience, and connect to nature remains crucial for the life our planet sustains. We work hard to inspire positive change in those who come to us, and others that we are not shy to reach out to. We have learned how to carry out conservation education missions, and we continue to ensure our approaches are enlightened and underpinned by science. As former chairman of the Education and Exhibit Design Committee of one of our regional partners, EAZA, and as someone who studied pedagogics as well, I am pleased to have another tool to offer to our community. We thank all the contributors who prepared this valuable document. We are sure that you will find this guide inspiring, and that you will use it to further enhance and drive quality conservation education in your organisation.

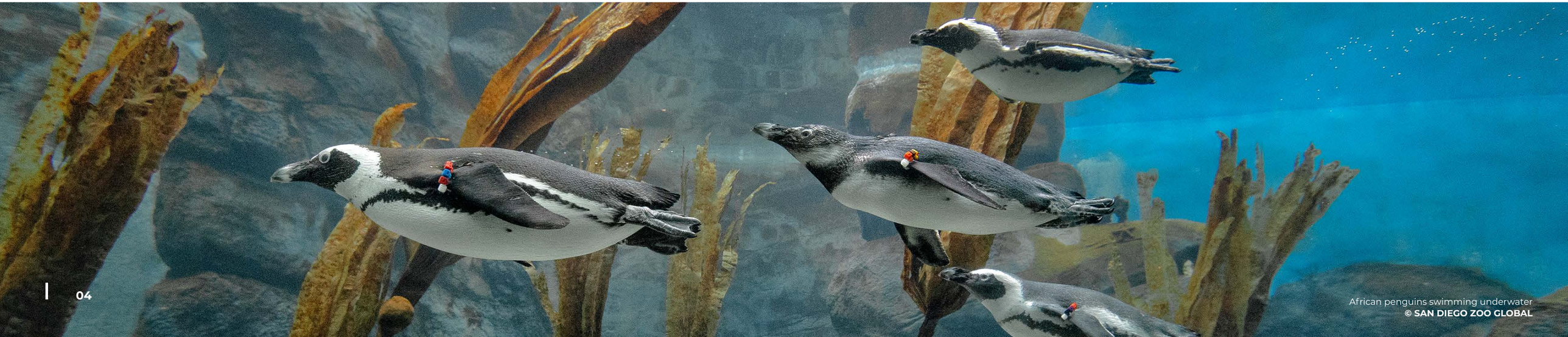
PROF. THEO PAGEL
WAZA PRESIDENT, 2018 - 2021
World Association of Zoos and Aquariums

As elected Chair of IUCN's Commission on Education and Communication (CEC), I am always thrilled to see a deep commitment to excellence in communicating conservation. The World Zoo and Aquarium Conservation Education Strategy truly manifests this understanding of the power of education and culture in transforming the way the public supports conservation. Zoos and Aquariums are gateways to the magic world of nature for many around the world, and offer an incredible opportunity to reach urban audiences and help shift their relationship with conservation. This strategy is powerful in that it recognises that the enjoyment and pleasure afforded by zoos and aquariums can be used to thoughtfully activate conservation action within the public at large. Imagine if the hundreds of millions of people who connect with zoos and aquariums each year also help conserve our planet—what a powerful outcome that would be! This strategy can help make this dream a reality.

SEAN SOUTHEY, CHAIR
Commission on Education and Communication
International Union for Conservation of Nature (IUCN)

In its 2015 Conservation Strategy, WAZA endorsed CPSG's One Plan approach, promoting the consideration of all populations of a species under all conditions of management from the start of the conservation initiative. I see *Social Change for Conservation: The World Zoo and Aquarium Conservation Education Strategy* as a marvellous interpretation and application, by IZE and WAZA, of the One Plan approach; an application arguably more meaningful than the original in its potential to increase humanity's awareness of the values of biodiversity and the steps they can take to conserve it. The devastating decline in our planet's biodiversity continues. The conservation community must face the fact that while we are doing valuable, impactful work, it is not enough, and not fast enough, to move the needle. We must scale up our efforts. Conservation education, as defined in this insightful and ambitious document, is at the heart of these efforts and no community is better placed to take the lead than accredited zoos and aquariums. *Social Change for Conservation* not only defines the challenges but the aspirations and guidance needed to overcome them and, thus, transform how we value the natural world. It comes not a moment too soon.

DR. ONNIE BYERS, CHAIR
IUCN, SSC, Conservation Planning Specialist Group



African penguins swimming underwater
© SAN DIEGO ZOO GLOBAL

Executive Summary

Zoos and aquariums play a critical role in building diverse and sustainable futures for people and nature.

Rapidly changing environments, a global pandemic, and devastating biodiversity loss due to human activities make this role increasingly important.

Urgent, effective, and collaborative action is therefore needed to change how people collectively think, feel, and act toward the natural world. This context presents a unique opportunity for zoos and aquariums to take a leadership position in contributing to this social change for conservation.

Through its set of recommendations, *Social Change for Conservation: The World Zoo and Aquarium Conservation Education Strategy* guides zoos and aquariums to achieve educational and social outcomes crucial to their organisational mission. It specifically calls on zoos and aquariums to:

Build a culture of conservation education in their organisations.

Appreciate the range of authentic and relevant purposes of conservation education—such as creating connections to nature, fostering empathy for wildlife, capacity building, and motivating pro-environmental behaviours.

Create strategic conservation education plans with measurable learning outcomes for diverse audiences.

Grow audience reach while being diverse, equitable, accessible, and inclusive.

Design and deliver clear messages, compelling content, and innovative programming.

Be optimistic and solution-focused to relevant conservation and environmental issues.

Prioritise embedding principles of animal welfare into conservation education.

Optimise conservation education training and professional development opportunities for staff, volunteers, and audiences.

Strengthen the evidence of the contributions, value, and impacts of conservation education by zoos and aquariums.

As the first unified global strategy on conservation education, *Social Change for Conservation* signifies an extraordinary step-change for many zoos and aquariums. It affirms IZE's (International Zoo Educators Association) and the WAZA's (World Association of Zoos and Aquariums) commitment to lead and support its members, colleagues, and the wider zoo and aquarium community to build expertise, leadership, and capacity in quality conservation education.

Conservation education at the Tisch Family Zoological Gardens in Jerusalem. © **SHAI BEN AMI**

Recommendations

CHAPTER ONE
Building a Culture of Conservation Education

- The conservation education role of the zoo or aquarium should be reflected in its written mission statement.
- The zoo or aquarium should have a written conservation education plan. This plan should outline the conservation education activities, how they apply to different types of audiences, and the strategic thinking behind the plan's design.
- The conservation education plan should make specific reference to how the zoo or aquarium has integrated its mission and vision, as well as applicable national, regional, and international policies and standards into its conservation education.
- The zoo or aquarium should have appropriate facilities to deliver its conservation education.
- Conservation education should be an integral part of exhibit design.

Hands on the soil - planting, growing and learning to start over at Belo Horizonte Zoo. © **HUMBERTO MELLO**

CHAPTER TWO
Embedding Multiple Purposes of Conservation Education into Zoos and Aquariums

Conservation education in zoos and aquariums should aim to:

- Build knowledge and understanding about species, the natural world, and zoo and aquarium contributions to conservation.
- Foster positive connections, emotions, attitudes, values, and empathy toward species, the natural world, and zoos and aquariums.
- Promote awe, wonder, enjoyment, creativity, and inspiration about species and the natural world.
- Motivate pro-environmental behaviours, actions, and advocacy toward species and the natural world.
- Develop scientific, technical, and personal skills connected to zoos, aquariums, and biodiversity conservation.

CHAPTER THREE
Promoting Conservation Education for All

- The zoo or aquarium should expand their reach and opportunities for people to learn about and get involved in conservation onsite, offsite, and online.
- The zoo or aquarium should be able to demonstrate a range of delivery approaches in their conservation education programmes to cater to different audiences' needs and diversities.

CHAPTER FOUR
Applying Appropriate Approaches and Methods in Conservation Education

- The conservation education plan should include a specific reference to applying a cross-curricular approach with measurable learning outcomes to all aspects of conservation education.
- The conservation education messages should be based on scientific facts and theories. Where cultural, religious, or alternative ideas are represented, they must be clearly indicated as such.
- The zoo or aquarium should present accurate and relevant information about the species, ecosystems, and issues exhibited.

Lecturer introduces how to use animal matured compost to plant flowers. © **TAIPEI ZOO**

CHAPTER FIVE
Integrating Animal Care and Welfare into Conservation Education

- The zoo or aquarium should comply with WAZA or regional guidelines on animal-visitor interactions.
- The zoo or aquarium should connect audiences to the principles of animal care and show how their organisation achieves high welfare standards for the species in their care.

CHAPTER SIX
Prioritising Conservation and Sustainability into Conservation Education

- Conservation education in zoos and aquariums should aspire to make conservation issues relevant to audiences' own lives and inspire people to take direct and indirect actions for species, ecosystems, and communities.
- The zoo or aquarium should educate their audiences about their conservation and sustainability work by demonstrating their organisation's direct and indirect contributions to conservation.

CHAPTER SEVEN
Optimising Training and Professional Development in Conservation Education

- The zoo or aquarium should have at least one member of staff with the necessary experience and qualifications responsible for leading and implementing their conservation education plan.
- The zoo or aquarium should support staff and volunteers involved in conservation education to be active in local, national, regional, and international conservation education networks and meetings.
- The zoo or aquarium should support staff and volunteers involved in conservation education with the appropriate continuous professional development and training to help meet their conservation education plan.

CHAPTER EIGHT
Strengthening the Evidence of the Conservation Education Value of Zoos and Aquariums

- The zoo or aquarium should collect and share a range of evidence to demonstrate how it is carrying out its conservation education plan.
- The zoo or aquarium should evaluate its conservation education programmes at multiple stages using appropriate methods.
- The zoo or aquarium should aspire to conduct evidence-based research to demonstrate the effects that conservation education in zoos and aquariums has on people's knowledge, attitude, and behaviours toward the natural world.
- The zoo or aquarium should aspire to build partnerships with external organisations and academic institutions to conduct social research and evaluation projects.

Committing to Quality Conservation Education

The commitments listed below frame the key outcomes of this strategy. These commitments and recommendations can be used by IZE, WAZA, other regional and national associations, and individual institutions to understand and support the conservation education role of zoos and aquariums.

CHAPTER 1

Building a Culture of Conservation Education

Our commitment is to build a culture of quality conservation education at the heart of all zoos and aquariums.

CHAPTER 2

Embedding Multiple Purposes of Conservation Education into Zoos and Aquariums

Our commitment is to create clear, authentic, and relevant purposes for conservation education in zoos and aquariums.

CHAPTER 3

Promoting Conservation Education For All

Our commitment is to understand the range of audiences and expand the reach of conservation education of zoos and aquariums.

Our commitment is to promote diverse, equitable, accessible and inclusive conservation education.

CHAPTER 4

Applying Appropriate Approaches and Methods in Conservation Education

Our commitment is to advance and innovate evidence-based approaches in conservation education in zoos and aquariums that raise awareness, connect people to nature, and motivate pro-environmental behaviours.

CHAPTER 5

Integrating Animal Care and Welfare into Conservation Education

Our commitment is to develop conservation education techniques that demonstrate respect for animals and the high standards of welfare they receive in human care.

Our commitment is to enhance the positive perception of zoos and aquariums through quality conservation education.

CHAPTER 6

Prioritising Conservation and Sustainability in Conservation Education

Our commitment is to facilitate, motivate, and mobilise zoo and aquarium audiences to act and advocate for biodiversity, environmental, and conservation-related issues.

CHAPTER 7

Optimising Training and Professional Development in Conservation Education

Our commitment is to offer and support a wide range of opportunities for professional development and training in conservation education.

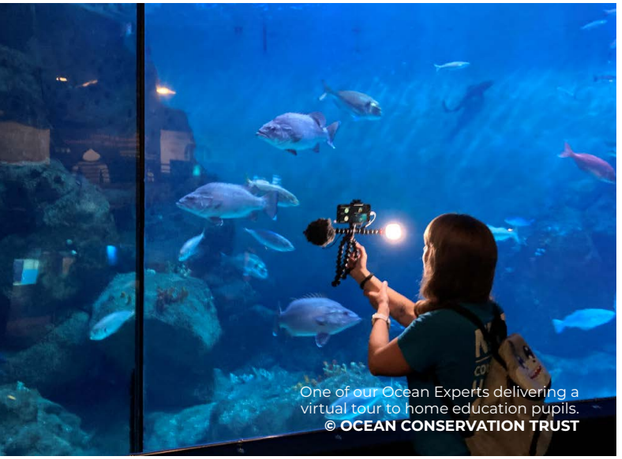
CHAPTER 8

Strengthening the Evidence of the Conservation Education Value of Zoos and Aquariums

Our commitment is to maximise the opportunities for and build evidence of the effects and impacts of conservation education through monitoring, evaluation, and social research in zoos and aquariums.

Terminology

It is essential to ensure a clear understanding of the key terms used within this strategy and explain the rationale behind these choices. Different words describe the programmes, activities, and events within zoos and aquariums depending on language, cultural, and organisational contexts.



One of our Ocean Experts delivering a virtual tour to home education pupils. **© OCEAN CONSERVATION TRUST**

ZOOS AND AQUARIUMS

This document aims to be relevant, applicable, and useful to all zoos and aquariums. The scope includes safari and wildlife parks, nature reserves, and other members of national and regional zoo and aquarium associations. The phrase "zoos and aquariums" is intentionally used throughout this document to reflect that this strategy is as relevant to aquariums as it is to zoos.

EDUCATION

The word "education" is used to mean education and learning in the broadest sense. It encompasses all learning opportunities (formal, informal, and non-formal), experiences and activities for all ages and diversities of audiences. Importantly, it is not confined solely to schools or education focused only on children.

CONSERVATION EDUCATION

The term "conservation education" is used to reflect that biodiversity conservation should be at the core of any educational activity delivered by a zoo or aquarium.

However, conservation education, in its broader sense, can include activities that make contributions to biodiversity conservation—such as education for sustainable development, biological, science or environmental education, ocean literacy, practical skills-based programmes, campaigns, and interpretation. The words "learning," "engagement," and "advocacy" are relevant, but as this strategy is globally inclusive, "conservation education" has been chosen as the primary descriptive term. It can be translated across a wide range of languages while maintaining its underlying meaning.

AUDIENCES

Throughout this strategy, the word "audiences" is used. This choice is a deliberate departure from the use of the word "visitors," as most zoos and aquariums now reach a multitude of individuals and groups in their conservation education efforts. Using the term audiences helps to depict a more accurate representation of the range and diversity of human and social connections with zoos and aquariums. Zoo and aquarium audiences include, but are not limited to: day visitors such as families and school children, participants of outreach programmes, community projects, *in situ* field programmes and summer camps, annual pass holders, and those that interact with the zoo's or aquarium's website and social media platforms.

SPECIES

Animals have traditionally been the primary focus for zoos and aquariums, as species in their care and through their conservation programmes. However, now many organisations incorporate plants into their conservation programme portfolios and into collection plans for their sites, and they acknowledge the crucial role that plants play in their conservation education efforts. To reflect the importance and inclusion of plants, where the word "species" is used, it explicitly represents both animals and plants.

NATURE

The terms "nature," and "the natural world" are used to reflect the broad range of taxa and environments within a zoo or aquarium's conservation responsibilities. Noticeably, the adjectives "good," "modern," "progressive" are often used interchangeably to describe a level of quality in zoos and aquariums operating at a certain standard. These adjectives are open to interpretation, and there is often confusion about their parameters. Although these terms are deliberately excluded in this document, there is a clear intention that if an organisation meets all the recommendations within this strategy, it can claim to be a good, modern, or progressive zoo or aquarium. However, this is only with specific reference to their conservation education.

Outline of Chapters

Each chapter in this strategy guides zoos and aquariums to achieve each recommendation. It gives an overview of the purpose of this strategy, and the scope of conservation education in zoos and aquariums (Introduction). It describes the need to build a culture of quality conservation education within individual organisations and the wider global zoo and aquarium community (Chapter 1). It recognises and describes the core purposes of conservation education (Chapter 2), to motivate and mobilise audiences into active conservation advocates.

The strategy acknowledges zoos and aquariums are in a unique position to reach large, diverse audiences, while highlighting the importance of being diverse, equitable, accessible, and inclusive organisations (Chapter 3). It emphasises how quality conservation education should be designed and delivered through innovative programming and compelling content (Chapter 4), and critical factors that exemplify excellence in conservation education. It outlines how animal welfare should be prioritised in conservation education—first, concerning how animals are involved in activities and interactions with audiences; and second, how to communicate how zoos and aquariums care for their animals and their contributions to biodiversity conservation (Chapter 5).

The strategy recognises the range and complexity of conservation, environmental, and sustainability topics that can be woven throughout conservation education. It advocates for optimistic and solution-based approaches to catalyse social change for conservation (Chapter 6). It briefly outlines the diverse development pathways and training opportunities that help to build capacity for success in staff, volunteers, and their audiences (Chapter 7). Finally, the strategy focuses on research approaches that can strengthen the evidence of the contributions, value, and impacts of conservation education by zoos and aquariums (Chapter 8).

The appendices include a bibliography on page 80 and glossary of terms on page 84. It has a recommendations checklist tool on page 88, which is a self-evaluation tool for zoos and aquariums to audit their organisation's conservation education against the strategy's recommendations.

In the development of this conservation education strategy, thanks are given to the IZE Board and WAZA Council for their guidance throughout the strategic development process. Wider thanks and praise go to the hundreds of contributing individuals and organisations. Over 350 individuals from 180 institutions and 44 countries/regions (see page 86) shared their ideas, enthusiasm, and expertise to shape this innovative and inclusive global approach for conservation education in zoos and aquariums of the future.

Ramat Gan Israel. **© RAMAT GAN SAFARI**

Introduction

This strategy aims to support zoos and aquariums to deliver quality conservation education as part of their roles in biodiversity conservation

THE NEED FOR A WORLD ZOO AND AQUARIUM CONSERVATION EDUCATION STRATEGY

Social Change for Conservation: The World Zoo and Aquarium Conservation Education Strategy was initiated by the International Zoo Educators Association (IZE) and developed in collaboration with the World Association of Zoos and Aquariums (WAZA). IZE is dedicated to expanding the educational impact of zoos and aquariums worldwide. Its members are guided by a mission to conserve biodiversity by encouraging pro-environmental behaviours in people who visit zoos and aquariums. WAZA is a worldwide alliance of regional associations, national federations, zoos, and aquariums dedicated to the care and conservation of animals and their habitats around the world. Despite conservation education being a long-standing core role for zoos and aquariums, it has, until now, lacked a formalised and unified global strategic approach. This strategy acknowledges the relationship between conservation education and the existing WAZA strategies on conservation, animal welfare, and sustainability. Together, these four strategies link to provide the foundation for how zoos and aquariums should operate, and recognises the connectivity between these critical core responsibilities of all zoos and aquariums.

In *Committing to Conservation: The World Zoo and Aquarium Conservation Strategy* (2015), the commitment to conservation education is evident:

> **Zoos and aquariums have a duty to lead, support, and collaborate with education programmes that target changes in community behaviour toward better outcomes for conservation.**

Caring for Wildlife: The World Zoo and Aquarium Animal Welfare Strategy (2015), includes a chapter on the welfare aspects of conservation education and visitor interactions. In this chapter it states that:

> **Our commitment is to protect and enhance the welfare of our animals in all of their interactions with visitors while we engage visitors in wildlife conservation.**

Protecting our Planet: World Association of Zoos and Aquariums Sustainability Strategy 2020-2030, links to each of the United Nations Sustainable Development Goals (SDGs). Many of this strategy's recommendations for zoos and aquariums involve conservation education as a tool to support individual and societal sustainable actions and change. SDG 4 is specifically about quality education with the aim to:

> **ensure inclusive and equitable quality education and promote lifelong learning opportunities for all**

Social Change for Conservation acknowledges that individual organisations, and national and regional zoo and aquarium associations have already given significant attention to the strategic direction of conservation education in their specific contexts. Several regional zoo and aquarium associations have an existing suite of education standards and guidelines. This strategy in no way aims to supersede these efforts. Instead, it draws from their current work to further raise the profile of conservation education globally. It aims to provide a unified framework all zoos and aquariums can align with to help deliver quality, consistency, and accountability for conservation education throughout their organisations.

The foundational framework used for this strategy has already been implemented in over 400 zoos and aquariums in nearly 50 countries. Launched in 2016, the European Association of Zoos and Aquaria (EAZA) Conservation Education Standards has 20 standards that have been embraced by EAZA Members as a useful tool to audit, celebrate, and further develop conservation education within their organisations. Within this strategy, the 20 EAZA Conservation Education Standards have been modified to complement and include other existing regional frameworks, and to align with the global context of this strategy. The result is a set of 22 global recommendations of good practice for conservation education in zoos and aquariums.

The Sustainable Development Goals

17 Goals for People, for Planet

The Sustainable Development Goals (SDG) are a universal call to action to end poverty, protect the planet, and improve the lives and prospects of everyone, everywhere. The SDGs aim to secure a sustainable, peaceful, prosperous and equitable life on earth for everyone now and into the future.
The 17 Goals were adopted by all UN Member States in 2015, as part of the 2030 Agenda for Sustainable Development, which set out a 15-year plan to achieve the Goals. The commitment of zoos and aquariums to the SDGs has the potential to significantly contribute to the global achievement of these goals. The SDGs provide aspirations for improving the world, and sustainability should be integral to how progressive zoos and aquariums lead, think, and act.

Read *Protecting our Planet*: the WAZA Sustainability Strategy for more details.

A GLOBAL CALL TO ACTION

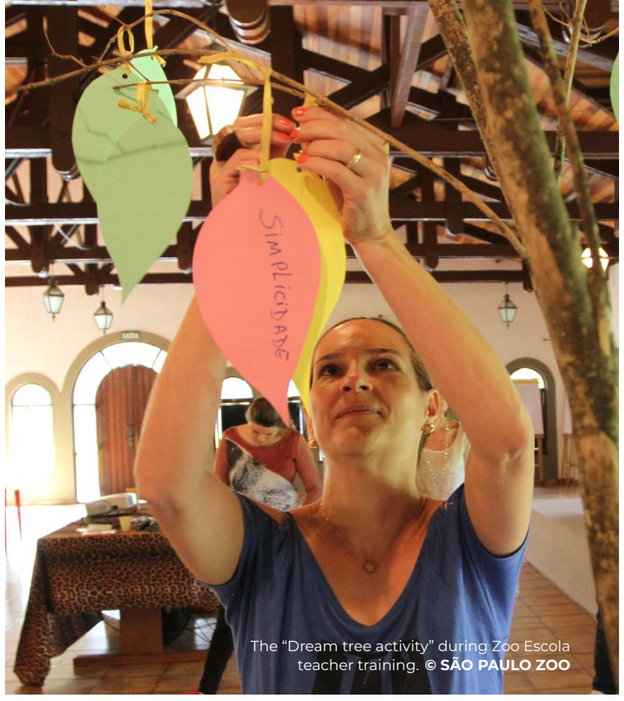
There is growing evidence demonstrating the link between rapidly changing environments and human activity. It includes the 2018 Living Planet Index (LPI) report, the 2019 Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) report, and several recent Intergovernmental Panel on Climate Change (IPCC) reports. Collectively, they call for prioritising timely, ambitious, and coordinated action to address unprecedented and enduring changes to species, climate, ecosystems, and communities.

There is clear evidence that biodiversity is deteriorating at an alarming rate worldwide. Often described as the sixth mass extinction, there are fears that three-quarters of all species could disappear in the next few centuries. Evidence shows that the planet has now entered the Anthropocene epoch as human activity is now the primary cause of changes to the Earth's climate and ecosystems. As a result of an evident climate and biodiversity crisis, the International Union for Conservation of Nature's (IUCN) Species Survival Commission in 2019 called for:

> **urgent and effective action to address the unprecedented, unsustainable, and growing impacts on wild species from human activities.**
>
> with specific reference to zoos and aquariums
>
> **to scale up their commitment to species conservation.**

SOCIAL DIMENSIONS OF BIODIVERSITY CONSERVATION

A recent paradigm shift in the understanding of the human and social dimensions of biodiversity conservation highlights the important part that people and their actions play in the conservation landscape. This is further reinforced by the "One Health" approach that recognises the health of people is closely connected to the health of animals and their shared environment. Like many conservation organisations, zoos and aquariums are furthering their understanding that conservation of species has human and social behavioural challenges and therefore should be tackled with behaviourally informed solutions. Consequently, zoos and aquariums are exploring and expanding the definition, function, scope, and audiences of their conservation education efforts. Evolving conservation education to encourage and catalyse individual behavioural and broader social changes should be a clear future focus for zoos and aquariums.



The "Dream tree activity" during Zoo Escola teacher training. **© SÃO PAULO ZOO**

This strategy is motivated by the growing disconnect between people and the natural world. This disconnection from nature, together with the increase in urgent and alarming environmental issues, can make people feel hopeless and disempowered. Zoos and aquariums provide unique platforms to reconnect people with nature, build empathy for wildlife, and mobilise social change for people to become powerful advocates for species, ecosystems, and communities.

As well as being spaces where people can experience the richness of the world's biodiversity, zoos and aquariums are social levellers. They attract and provide opportunities for all cultures, faiths, demographics, and generations. Globally, hundreds of millions of people visit and connect with zoos and aquariums annually. These large and diverse audiences provide a huge potential reach for messages and to catalyse pro-environmental behaviours that positively impact the natural world. With a broad scope and diverse audiences, zoos and aquariums need to further invest in conservation education resources, capacity, and expertise to ensure that the right messages reach the right audiences to leverage social changes and conservation outcomes.


Houston Zoo, Zoo Mobile program. **© HOUSTON ZOO**

CONSERVATION EDUCATION FOR SOCIAL CHANGE

Conservation education can be thought of as a multifaceted and blended discipline. It is underpinned by aspects of many cognitive, social, emotional, behavioural, and educational theories. It embraces elements of environmental education, science education, interpretation, education for sustainable development, and community engagement. It draws on several approaches to behaviour and social change, such as environmental and conservation psychology and social marketing. It is informed by the already established environmental, science, and ocean literacy frameworks. It is cross-curricular, interdisciplinary, and often takes place in real-world contexts. It can be delivered by individual zoos or aquariums, or through multi-organisational collaborative partnerships with other zoos, aquariums, nonprofits, schools, and community groups. Essentially, there is no one way to design, deliver, and evaluate conservation education. However, this strategy will help frame and expand on some of conservation education's core components. The document is not designed to be an in-depth operational or practical guide. It intentionally excludes the finer details of the theory, research, practice, and policies connected to conservation education.

It is important to note that there are multiple ways to achieve this strategy's recommendations. The cultural, geographical, economic, and political contextual diversity within the global community will influence the scale and focus of conservation education at each organisation. For example, individual countries have different legislative and cultural expectations for conservation education in their zoos and aquariums.

Social Change for Conservation is a tool that helps to reflect, audit, and improve the conservation education provided by all zoos and aquariums. It aims to guide zoos and aquariums to engage in critical thinking about their conservation education initiatives to drive better outcomes for conservation. This global strategy raises the profile and standards of conservation education in zoos and aquariums. It helps frame conservation education as an organisation-wide endeavour to leverage support and involvement from all levels of staff and volunteers.

CHAPTER ONE

Building a Culture of Conservation Education

Our commitment is to build a culture of quality conservation education at the heart of all zoos and aquariums.

Two Kindergarten kids play with magnifying glasses while on excursion at Healesville Sanctuary. **© CORMAC HANRAHAN**

Recommendations

- The conservation education role of the zoo or aquarium should be reflected in its written mission statement.
- The zoo or aquarium should have a written conservation education plan. This plan should outline the conservation education activities, how they apply to different types of audiences, and the strategic thinking behind the plan's design.
- The conservation education plan should make specific reference to how the zoo or aquarium has integrated its mission and vision, as well as applicable national, regional, and international policies and standards into its conservation education.
- The zoo or aquarium should have appropriate facilities to deliver its conservation education.
- Conservation education should be an integral part of exhibit design.

Introduction

Strengthening the culture of quality conservation education is critical for zoos and aquariums. A strong culture within and between zoos and aquariums promotes quality, consistency, and accountability. Catalysing a culture for quality conservation education requires the whole organisation to embrace a collective responsibility to deliver effective evidence-based messages and provide a solutions-based approach to critical conservation issues.

Organisational Approach

Conservation education is widely recognised as a core role of a zoo or aquarium, regardless of the organisation's business model. As such, conservation education should be reflected in the organisation's mission statement. This gives a clear signal to staff, volunteers, external audiences, and stakeholders of the zoo or aquarium's commitment to conservation education at the highest level.

The responsibility for conservation education should be embedded at all levels across the organisation. From directors to animal care specialists/zoo keepers and aquarists, from retail staff to conservationists and researchers, connecting to audiences through conservation education should be part of the culture, mindset, and responsibility of all staff and volunteers. Different roles and departments can fulfill this responsibility in diverse ways. Gone are the days when conservation education was solely confined to formal sessions delivered by educators in an education department. Zoos and aquariums will benefit from this holistic approach, as key conservation education messages can be consistently delivered and amplified across the organisation.

CASE STUDY

Love, Care, Protect, Together – A value-driven approach to visitor engagement and advocacy

Conservation is about people and how they view and value nature. Wild Planet Trust, UK developed an Interpretive Strategy that works alongside the knowledge base, perceptions, and values of guests to develop meaningful engagement and involvement. The approach centres around four core statements and messages that guests can tangibly relate to, identified by repeated straplines, keywords, and logos that appear on all signage. The messages take a logical four-step approach - engage the guest (love); allay their concerns (care); show them what Wild Planet Trust are doing (protect); help them to join (together) - with all of the interpretive content relating to one or more of these themes. Guests can understand the ethos of Wild Planet Trust as a conservation charity and can see that the conservation issues discussed are relevant to, and impacted by, their day to day actions at home.

Consistent use of simple straplines, icons, and keywords underpin our approach to interpretation and help to convey meaningful messages that visitors can relate to and engage with. The content of our signs and interpretive panels always relates to one of the core statements shown above.
© WILD PLANET TRUST

Tied to the culture of quality conservation education, zoos and aquariums should "walk the talk." This means they must commit to the same actions and behaviours they ask of their audiences. For example, conservation education initiatives often ask audiences to make pro-environmental choices in consumer behaviours, such as in their decisions on purchasing plastics, palm oil, wood, or seafood. Zoos and aquariums should pay equal attention to their own procurement and use of these resources as outlined in WAZA's *Protecting our Planet* strategy. Zoos and aquariums will only be credible and trusted voices if they can demonstrate their commitment to the issues they advocate to their audiences—with action.

Conservation Education Plans

To help build a culture of quality conservation education requires the creation and implementation of a written strategic conservation education plan. This plan should:

- Use the recommendation in this strategy as the basis for the conservation education plan.
- Outline the philosophy and commitment of the organisation to design, deliver, and evaluate quality conservation education.
- Describe the different activities and how they apply to diverse audiences.
- Highlight the theories and strategic thinking behind the plan's design.
- Refer to the importance and relevance of indigenous science, knowledge, and cultures.
- Demonstrate the need and benefit of partnerships between zoos and aquariums, other conservation organisations, and communities.
- Link and align to broader conservation efforts and the organisation's mission, vision, and strategic plans.
- Draw on and include applicable state, national, regional, and international policies and standards—such as national school curriculums, the Ocean Literacy Framework, and UN Sustainable Development Goals.

CASE STUDY

Conservation Education Plan, a hands-on, minds-on and hearts-on based strategy

Inspiring audiences at the Zoo. **© LISBON ZOO**

Lisbon Zoo's (Portugal) conservation education mission is to inspire and encourage different types of audiences, inside and outside the Zoo, to change behaviours in favour of protecting biodiversity through cognitive, emotional and behavioural goals. Building a Conservation Education Plan (CEP) is the result of strategic planning and reflects the philosophy of the institution. Lisbon ZOO CEP dates from 2008 and is updated annually according to the Portuguese National Curriculum, Sustainable Development Goals, EAZA Conservation Education Standards. It includes a quality conservation education framework reflected on more than 50 different programmes and activities, exhibition contents, key learning outcomes, and evaluation methods, but is also open to creating innovative learning scenarios.

A strategic planning process will help decide the scope and purposes of conservation education, outline priorities, map out intended outcomes, and allocate resources. It can help develop quality frameworks and build theoretical models of change for programmes and audiences. It can drive evaluation and social research agendas and ignite innovative practices. The plan should provide a clear roadmap across the organisation to ensure a culture of governance, quality, consistency, and accountability for all conservation education.

Zoos and aquariums should have at least one member of staff with the necessary experience and qualifications to lead their conservation education efforts. They should work with colleagues across the organisations to develop their conservation education plan. Their responsibility is to create and ensure the correct implementation of the conservation education plan throughout the organisation.

All operational aspects that include elements of conservation education, such as exhibit design, interpretative planning, and institutional collection planning should involve staff who have the appropriate conservation education qualifications and experience. Integrating conservation education throughout these operational aspects can ensure consistent messaging and more effective implementation of the conservation education plan throughout the organisation.

CASE STUDY

The Ocean Literacy Framework

Ocean literacy is defined as an understanding of the ocean's influence on people and people's influence on the ocean. An ocean-literate person:

- **can communicate about the ocean in a meaningful way; and**
- **is able to make informed and responsible decisions regarding the ocean and its resources.**

The Ocean Literacy Principles were developed in 2002 using the collective intelligence of over 100 teachers, scientists and education policymakers. Each principle has a "flow" of related concepts that become gradually more complex. The principles offer an excellent framework for formal and informal learning programmes and enable clear learning outcomes to be developed and evaluated.

Ocean literacy is now a global movement with networks in Asia, Europe, North and South America, Canada, and Australia. There is a clear role for zoos and aquariums in providing access to authentic and compelling ocean experiences and learning programmes that can strengthen the learner's connection with the ocean.

The essential principles of Ocean Literacy

1. **The Earth has one big ocean with many features**

2. **The ocean and life in the ocean shape the features of the Earth**

3. **The ocean is a major influence on weather and climate**

4. **The ocean makes the Earth habitable**

5. **The ocean supports a great diversity of life and ecosystems**

6. **The ocean and humans are inextricably interconnected**

7. **The ocean is largely unexplored**

'Ocean Literacy for All – A toolkit'
© UNESCO-IOC

Quality in Conservation Education

Zoos and aquariums should embrace the notion of quality in how they create, deliver, and evaluate their conservation education. This can involve developing a quality framework as part of a conservation education plan. This kind of framework will underpin each activity to ensure quality for all conservation education efforts throughout the organisation.

Facilities and Infrastructure

Zoos and aquariums should invest in appropriate facilities and infrastructure to deliver quality conservation education. Every zoo or aquarium has a wide variety of spaces and places that are suitable for self-led conservation education experiences. Other onsite facilities include outdoor nature play spaces, indoor classrooms, laboratories, and flexible teaching spaces. Examples of offsite conservation education facilities include field studies sites, nature trails, community spaces, temporary outdoor learning spaces, and schools. Online facilities include digital learning portals, marketing materials, websites, and social media platforms. Facilities and infrastructure for conservation education vary depending on the individual site, budget, and operating structures. Importantly, all facilities need to be in good working order, comply with relevant health and safety legislation, and be fit for the purpose of the conservation education they host.

Challanges

There are global differences in how much institutional attention, resources, and profile conservation education is given. Shifting organisational cultures that position conservation education at the heart of a zoo or aquarium could be perceived as a challenge. It requires organisational leaders to acknowledge conservation education as one of, if not the, most important roles to champion within their zoo or aquarium. More specifically, leaders need to support the notion that zoos and aquariums should drive social change and behavioural solutions to conservation issues through their conservation education efforts.

Conservation education is still emerging as a recognised profession, requiring a high level of skills and expertise. There is a widely reported lack of consistency in the level of recognition and remuneration for skilled conservation education workers. It remains an unpredictable career path, as many individuals leave the field challenged by lack of work-life balance or inequitable opportunities for professional growth and the ability to move into senior leadership positions.

The responsibilities of staff and volunteers involved in conservation education have shifted away from being solely educational to include a focus on behavioural, psychological, and social changes for nature. Thus, those working in conservation education require new skills and training in areas such as conservation psychology, social marketing, and social research.

Children learning about shoebill. © UWEC

CHAPTER TWO

Embedding Multiple Purposes of Conservation Education into Zoos and Aquariums

Our commitment is to create clear, authentic, and relevant purposes for conservation education in zoos and aquariums.

Zoo Intern Program teens build interpretive and leadership skills as they engage guests in hands-on activities. **© LINCOLN PARK ZOO**

Recommendations

Conservation education in zoos and aquariums should aim to:

- Build knowledge and understanding about species, the natural world, and zoo and aquarium contributions to conservation.
- Foster positive connections, emotions, attitudes, values, and empathy toward species, the natural world, and zoos and aquariums.
- Promote awe, wonder, enjoyment, creativity, and inspiration about species and the natural world.
- Motivate pro-environmental behaviours, actions, and advocacy toward species and the natural world.
- Develop scientific, technical, and personal skills connected to zoos, aquariums, and biodiversity conservation.

Introduction

The "What" and "How" of conservation education are the various activities, events, and programmes. These are explored further in Chapter 4. Here, the purposes or the "Why" of conservation education in zoos and aquariums are described. Each zoo and aquarium is unique, with its own geographical, social, economic, and cultural context. Regardless of the size, budget, and business operating model, the core purposes of its conservation education should be consistent, to enable outcomes that drive social changes that benefit people and nature.

Theory of Change

Conservation education is a multifaceted discipline with a range of core purposes. These purposes centre around changes to how people think, feel, and act toward species and the natural world. Less well understood by zoos and aquariums is what they are trying to change, who their target audiences are, and how they will know that these changes have happened. Zoos and aquariums should invest in developing message frameworks that connect stories and messages to conservation education aims and outcomes. These should describe and link how the effects and impacts of the conservation education that is delivered contributes to social and conservation outcomes.

Zoos and aquariums should map out, critically think about, and explore the various pathways of change catalysed through their conservation education. Using a "theory of change" model can be a helpful outcome-based methodology. Long-term goals, links, and assumptions can be outlined, and outcome pathways mapped out. Theories of change are useful tools to explain how and why the desired changes are expected and intended. A theory of change is created with clear goals in mind, and usually before a delivery method has been decided. Logic models are another tool to help to map out the components of a specific programme. These models help to show the relationship between resources, inputs, activities, outputs, outcomes, and impacts. Creating logic models can help zoos and aquariums visualise their conservation education activities. They can describe what they hope to achieve and what they need to do to deliver successful programmes. They show the components of conservation education and help to ensure that activities lead to the intended outcomes and impacts.

Logic model for the Bronx Zoo's Youth Employee Advisory Council. **LOGIC MODEL CREDIT:** Su-Jen Roberts

CASE STUDY

Examples of using logic models in conservation education programs

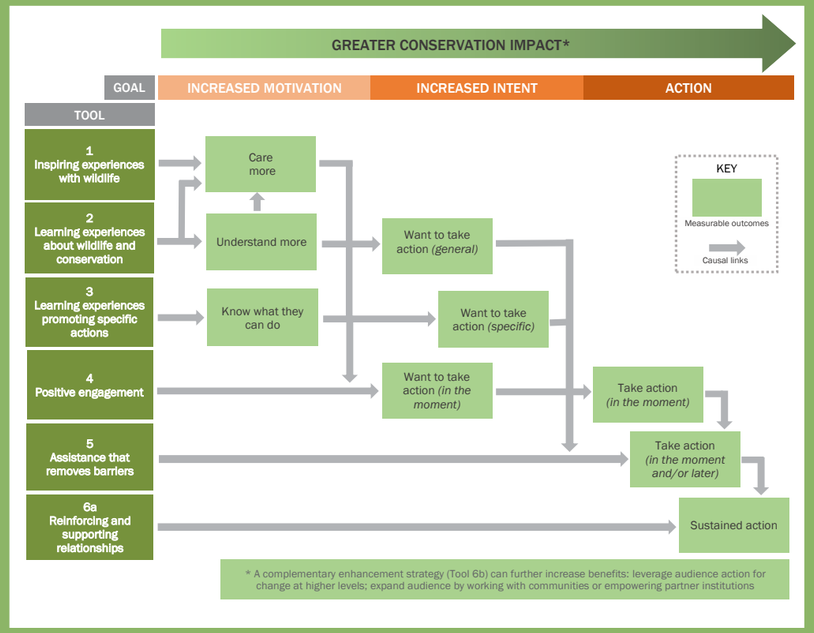
This logic model is for the Bronx Zoo's (USA) Youth Employee Advisory Council (YEAC), a three-year pilot program launched in 2017. The Bronx Zoo's YEAC is a small group of front-line staff members who are invested in making their workplace better for themselves and visitors. The program makes real change to business operations and workplace culture, while providing career development and mentorship to youth employees.

Program leads convened stakeholders from across WCS (Wildlife Conservation Society) departments to co-develop target outcomes and work backward to develop the detailed activities, outputs, and timeline. Stakeholders return to the logic model annually to remind themselves of the goals of the program and report on progress against activities, outputs, and outcomes.

CASE STUDY

Example of using a theory of change in conservation education

San Diego Zoo Global's (USA) CARE Conservation Engagement Roadmap is a Theory of Change that outlines how different types of experiences can be used in combination to promote conservation-related caring, understanding, intent to take action, and action.



The CARE Conservation Engagement Roadmap, San Diego Zoo Global.

Purposes

Conservation education covers many topics and themes. There is a host of possible intellectual, social, emotional, and physical well-being aims and outcomes for activities, programmes, and events delivered in zoos and aquariums. Therefore, a range of cognitive, social, emotional, inspirational, behavioural, and skills-based purposes should be considered and included. This approach promotes a more diverse suite of outcomes and moves away from the traditions of solely providing a lot of information and facts to audiences. The following five purposes are not hierarchical but are interlinked, and they provide a useful way to conceptualise the multiple core purposes for conservation education in zoos and aquariums.

Diagram of the range of purpose in conservation education (informed by the Arts Council England "Inspiring Learning for All" framework for generic learning outcomes).

(COGNITIVE PURPOSE)
Build knowledge and understanding about species, the natural world, and zoo and aquarium contributions to conservation.

(AFFECTIVE PURPOSE)
Foster positive connections, emotions, attitudes, values, and empathy toward species, the natural world, and zoos and aquariums.

(INSPIRATION PURPOSE)
Promote awe, wonder, enjoyment, creativity, and inspiration about species and the natural world.

(BEHAVIOURAL PURPOSE)
Motivate pro-environmental behaviours, actions, and advocacy to support species and the natural world.

(SKILLS PURPOSE)
Develop scientific, technical, and personal skills connected to zoos, aquariums, and biodiversity conservation.

Cognitive Purpose

Building knowledge and understanding remains a fundamental purpose of conservation education in zoos and aquariums. This purpose helps audiences to know and understand more about topics ranging from individual animals, species, and ecosystems to *ex situ* population management and biodiversity conservation. In addition, zoos and aquariums should build audiences' knowledge and understanding of a range of complex conservation, sustainability, and environmental issues.

Building an understanding of nature in its broadest sense is an essential tool to help audiences know more, and think differently and critically about zoos, aquariums, and critical global issues. Many audiences do not know about the full range of "work zoos and aquariums do" for species care, animal welfare, and contributions to biodiversity conservation. Conservation education should continue to build audiences' knowledge, understanding, attitudes, and positive perceptions of zoos and aquariums as authentic conservation organisations.

Affective Purpose

Zoos and aquariums should aim to design experiences that encourage audiences to spend more time outside. Experiences in nature help develop emotional and physical well-being. They connect people emotionally to the natural world, and to other people, and encourage personal reflections. Conservation education can help audiences feel connectedness, interdependence, and a part of the global "socio-ecological system." They can feel intrinsically part of nature, as just one species living on this planet, not separate from the natural world. Zoos and aquariums should aim to foster respect and empathy for wildlife, and promote the intrinsic values of nature, pride, guardianship, love, and compassion toward nature. Audiences should feel a sense of responsibility as global "environmental citizens"; to look after, care about, and care for species and the natural world. Resilience and optimism should be nurtured to keep audiences hopeful and positive, despite a rapidly changing global environment. Through these affective learning pathways, zoos and aquariums can enhance people's biophilia—namely their love, respect, and care for nature.

CASE STUDY

Combining practical work with situation-based discussion: building the foundation of empathy in preschool

Helping with cleaning the European bison *(Bison bonasus)* enclosure, while talking about what they eat.....and what comes out! **© BORÅS DJURPARK**

Borås Zoo, Sweden combines practical husbandry work with discussions about different animals where children identify and discuss the animal's emotions. The scenarios and images were developed by Animal Welfare Sweden, together with an Ethologist and Psychologist to help children develop their empathy.

The children also learn about the animals they are working with, basic biology and the threats they face in the wild. Outcomes of this programme include teaching children about empathy and respect, the need for conservation and what they can do themselves at home or in their classroom to preserve biodiversity.
For example, raising funds by recycling cans and donating to conservation programmes.

CASE STUDY

Purposeful conservation education for “young explorers” to equip with vision/skills to connect with nature

Young Explorers Club (YEC) is a weekly conservation education programme at Ocean Park Hong Kong for children aged 1.5 to 6 years old. It aims to develop an early love of nature through meaningful activities. This programme taps on the synergy from “Nature Play” and “Experiential Learning” to achieve development goals such as social-emotional, fine and gross motor skills, and cognition.

Leveraging Ocean Park’s unique environment and balanced indoor-outdoor learning activities, each class centers on a different animal. Subsequent art, sensory, and storytelling activities follow to consolidate relevant animal and conservation knowledge. Seeds of conservation value are sown at these early ages. Positive results seen include an increased awareness of nature exploration and deeper understanding of animals and conservation knowledge. Along with a first glance of what Ocean Park (as a zoo and aquarium) can offer to the community, YEC sets the initial steps to nurture lifelong learners, nature advocates, and animal enthusiasts for life.

An educator observing the sea animals with the young children and sharing relevant knowledge with them at the Grand Aquarium exhibit.
© OCEAN PARK HONG KONG

Inspiration Purpose

Many audiences initially choose to visit a zoo or aquarium for social reasons—to spend time with family and friends. These social experiences help audiences to both enjoy and be inspired by their visit and often determine return visits to the zoo or aquarium. Audiences should be able to experience moments of awe and wonder about species and the natural world through conservation education within the spaces and places of zoos and aquariums. Organisations should design conservation education to encourage nature play, creativity, fun, exploration, innovation, and curiosity. These inspirational elements are an essential part of the social connections people have to zoos and aquariums. This inspirational purpose is critical to how people learn, feel connected, and take on pro-environmental behaviours that support social change for conservation.

To help connect people with nature, zoos and aquariums should align and partner with the IUCN’s Commission for Communication and Education and their #NatureforAll global movement that inspires a love of nature. It is founded on the knowledge that the more people experience, connect with, and share their love of nature, the more support and action there will be for its conservation. Personal experiences and connections with nature provide powerful benefits for individual and societal health, well-being, and resilience.

Behavioural Purpose

The conservation of nature is inextricably linked to peoples’ behaviours and actions. Human and societal actions are both the drivers and solutions for all environmental and conservation issues. Therefore, as the behavioural purpose of their conservation education, zoos and aquariums should strive to motivate audiences’ behaviours, actions, and advocacy to support species and become champions of the natural world.

Human behaviour is influenced by multiple factors, including values, attitudes, beliefs, and social norms. It is affected by socioeconomic circumstances, social practices, cultural, and other contextual factors. Human behaviours are challenging to predict and understand, often hard to influence. It is difficult to assign attribution or causal pathways linked to specific interventions. Zoos and aquariums should strive to further audiences’ understanding of how their own behaviours and actions affect species, ecosystems, and themselves. They should encourage and support audiences to adopt a range of individual and collective pro-environmental behaviours. At the same time, they should model the same behaviours and actions within their organisation and through staff and volunteers. Zoos and aquariums should facilitate groups such as schools, youth groups, communities, and neighbourhoods to stand together to drive larger-scale collective advocacy and social actions. An “ecological thinking” approach is a useful frame to think about how all collective human efforts are interwoven and interlinked to individual actions. Zoos and aquariums should motivate and mobilise individual and collective actions that help effect social changes for conservation that benefit people and nature.

Audiences often want to live more sustainably and contribute to biodiversity conservation but may experience barriers to this becoming a reality. Zoos and aquariums, where appropriate, should facilitate discussions, and provide a variety of support and tools to overcome these barriers. Supporting audiences helps individuals and communities gain confidence, feel empowered, and realise their desires to become powerful advocates for species conservation and healthy communities.

Students working in a pollinator garden on their campus. **© HOUSTON ZOO**

CASE STUDY

Relationship-based school partnership model creates communities that are empowered to save wildlife.

Houston Zoo’s (USA) Saving Wildlife School Partnerships program is a customisable experience that emphasizes long-term relationships, includes multiple points of contact, and focuses on age-appropriate actions students can take individually and as a group to reduce threats to wildlife. All partnerships include educator training, school visits by Zoo staff, field trips to the Zoo, and visits to regional nature preserves. Through facilitating positive experiences in nature, fostering empathy for wildlife, and connecting individual actions with specific animals, the Houston Zoo has seen students internalise the wildlife-saving message. Partner schools have collectively created over 7,000 square feet of pollinator habitats, recycled more than 8,000 pounds of paper, and raised over $26,000 to support Houston Zoo’s global conservation partners. These successes and evaluation data show partnerships create experiences that intrinsically motivate students and teachers and have the potential to bring school communities together for the benefit of wildlife and wild places.

Skills Purpose

Developing scientific, technical, and personal skills connected to zoos, aquariums, and biodiversity conservation is an essential purpose of conservation education. Authentic participation, trying new things, and experiential learning processes are crucial components for audience skill development. Zoos and aquariums should support all audiences to improve their "21st-century skills" to cope with modern, urban lives and environmental uncertainty. These skills include critical thinking, using initiative, problem solving, inquiry, decision making, collaboration, communication, leadership, and literacy in digital media and technology. Developing a range of scientific, technical, and personal skills and competencies can help zoos, aquariums, and their audiences prepare to tackle future issues facing the planet.

Challenges

One of the main challenges for zoos and aquariums is how to catalyse significant large-scale changes in how people think, feel, and act toward the natural world. To meet this challenge, zoos and aquariums should invest in building their staff capacity so that they are equipped with the right level of knowledge, skills, and expertise to plan, deliver, and embed mechanisms for social change in their conservation education. Moving away from the traditions of education, focused purely on the transfer of information, zoos and aquariums should audit, reflect, and reconstruct their conservation education with multiple purposes in mind. This includes clear descriptions of intended outcomes and learning pathways of change for each of the different goals within their conservation education plan.

A further challenge can be the initial apparent mismatch between the mission of a zoo or aquarium, and the interest and goals of target audiences. This challenge often happens when reaching out to under-served audiences in the community who may be less willing to participate or don't readily see the relevancy of connecting with a zoo or aquarium. Zoos and aquariums should invest in building relationships, developing trust, and working collaboratively with these audiences to find intersections key to authentic conservation education programme development.

A challenge—and opportunity—for zoos and aquariums is to transform conservation education to embrace multiple purposes that drive social change for conservation. Through this transformation, conservation education can motivate audiences to become active conservation advocates, who understand the world around them and who feel connected to and appreciate the value of nature. Future zoo and aquarium audiences should be people who care that the future of the world's biodiversity and ecosystems is under threat, and who care about the health and well-being of all living things. They will care for the future of all species, take steps both to adopt more pro-environmental behaviours in their daily lives, and join with others to drive decisive collective actions. Future audiences should see zoos and aquariums as social enterprises with trusted voices. They know zoos and aquariums enable social, emotional transformational experiences and opportunities that bring people together to build sustainable futures for species, ecosystems, and communities.

Closer to the whales - An adapted educational moment for all types of audiences. **© MARINELAND ANTIBES**

CASE STUDY

Mātauranga Māori conservation education programme: a Māori world view

Mātauranga Māori conservation education session at Auckland Zoo. **© AUCKLAND ZOO**

Mā te whakaaro nui e hanga te whare; mā te mātauranga e whakaū
Big ideas create the house; knowledge maintains it

In the Māori world/Te Ao Māori there is only one set of primal ancestors (Ranginui and Papatūānuku) from whom all things ultimately trace descent. Therefore all things are related. Be they people, animals, plants, rocks, water. Everything is connected and dependent on each other for their health and well-being. Mātauranga Māori is about a Māori way of being and engaging in the world.

Auckland Zoo, New Zealand, delivers Mātauranga Māori conservation education programmes that uses Aotearoa New Zealand flora and fauna to illustrate, explain relationships, and provide greater understanding and appreciation of Māori culture and its many principles and practices. These include kaitiakitanga (guardianship), whakapapa (genealogy), rongoā (medicine), and tūrangawaewae (belonging).

CHAPTER THREE

Promoting Conservation Education for All

Our commitment is to understand the range of audiences and expand the reach of conservation education of zoos and aquariums.

Our commitment is to promote diverse, equitable, accessible, and inclusive conservation education.

My City, My Forest participants, learned to reuse plastic bottles to create amazing pencil cases. © **BRIGHT SENANU**

Recommendations

- The zoo or aquarium should expand their reach and opportunities for people to learn about, and get involved in conservation onsite, offsite, and online.
- The zoo or aquarium should be able to demonstrate a range of delivery approaches in their conservation education programmes to cater to different audiences' needs and diversities.

Introduction

Zoos and aquariums should be diverse, equitable, accessible, and inclusive organisations that connect to all sectors of society. After all, biodiversity conservation is a whole planet challenge, and socially based solutions need to involve everyone. Therefore, building an understanding that conservation is integral and relevant to everyone's lives is critical. An essential part of conservation education is to understand and support the needs of different audiences—and, specifically, how diverse audiences can participate in a variety of conservation education activities connected to zoos and aquariums onsite, offsite, and online.

Zoos and aquariums should reflect on the diversity of their audiences, their workforce, and the accessibility of the places and spaces where they deliver conservation education. They should include a social justice approach to their conservation education to further their "social license" to operate, widen participation, and improve social change for conservation opportunities for personal and community good.

Furthering the Reach of Zoos and Aquariums

In addition to zoo or aquarium sites, conservation education can take place online, out in the local community, in partnership with other organisations, within *in situ* projects, and collaboratively on a local and global scale. By providing such opportunities, zoos and aquariums can connect to a broader range of audiences more equitably and profoundly.

Current and potential audiences to zoos and aquariums have many choices of how to spend their time. Real and perceived barriers prevent many people from visiting a zoo or aquarium or participating in conservation education activities offsite or online. Barriers can be economic, cultural, intellectual, or a sense that zoos and aquariums are "just not for them." These barriers limit audiences' opportunities to access and experience conservation education. Zoos and aquariums should work to overcome these barriers by diversifying their programmes, and the spaces and places where they connect with new and current audiences.

Conservation education in community spaces, in local natural areas, and in conservation reserves brings the mission of zoos and aquariums to their audiences. These outreach experiences help reduce some of the potential barriers. They bring conservation education to environments where audiences can make local, meaningful connections with nature, as they experience personalised, authentic, and relevant learning opportunities. Working with partners such as community and faith groups, as well as other environmental nonprofit organisations, further helps zoos and aquariums reach new audiences.

CASE STUDY

Providing conservation education opportunities for all families

"Families Connecting with Nature in the Wild Space" delivered by Dublin Zoo, Ireland was funded by WAZA Nature Connect Grants. A five-month immersive, themed nature programme was designed by educators in collaboration with local conservation organisations and experts. The focus of the programme was to offer accessible conservation education to urban families. Its purpose was to build confidence, skills, and resources to connect meaningfully with nature in Dublin Zoo's Wild Space and their local green spaces, thus providing these skillsets for life. In 2018, 13 families participated, and this quadrupled in 2019, with over 60 families taking part. Positive responses noted from participants were biodiversity knowledge gain, increased confidence to explore nature, improved family bonds, and greater empathy towards native wildlife.

Families building connections with each other and nature at the Wild Space, Dublin Zoo. © **DUBLIN ZOO**

Conservation education delivered through online experiences has become an increasingly popular method to connect with existing, new, remote, or underserved audiences. Zoos and aquariums should make further use of digital learning platforms in addition to their websites, "live camera feeds," and social media platforms, as effective tools for delivering impactful conservation education. Supporting conservation education via online materials and content enables audiences to diversify how they connect to and receive messages from zoos and aquariums. These online materials can extend connections to the zoo or aquarium before or after a visit, be part of a community outreach programme, or be a stand-alone online conservation education experience.

Arbor day celebration at the Joburg Zoo. © **JOHANNESBURG ZOO**

CASE STUDY

"Masibambisane – clubbing together" for environmental education

Gauteng province has a large number of communities who cannot afford entrance to Johannesburg Zoo, South Africa. A corporate social responsibility programme called Masibambisane focuses on closing this gap. It helps to make the Zoo more accessible to these underserved communities. The programme connects to educational institutions, offering them free transport and entry to the Zoo. This programme enables opportunities for communities to take a stand for the natural environment and conservation of wildlife through environmental education and awareness.

The Zoo partners with several environmental non-profit organisations to participate as well expose children to a variety of educational activities. They also discuss several conservation programmes within the Zoo as well as in nature reserves, conservation areas, and wild open spaces.

Ramat Gan Israel. © **RAMAT GAN SAFARI**

CASE STUDY

Fostering youth leadership for coral reef conservation

The Roatan Marine Park in Honduras education programme promotes coral reef conservation using the reef as the outdoor classroom to raise awareness on coastal marine resources through several strategies. A "4Rs" Recycled Art Contest was launched that invited participants to create sculptures or 3-D murals made out of marine debris. After environmental and art training, students of grade 9 had a month timeframe to carry out their school campaign, collect materials, and create their unique artwork. As a result of the programme, students showed willingness to invite others to reduce their plastic footprint and care more about the cornerstone of Bay Islands economy, the coral reefs. Their highest motivation was the underwater scooter reef exploration with their peers, an experience that not all the islanders could afford.

Award Ceremony 2019 "4Rs Contest" Place 1 Winning Students from CEB Rubén Barahona. **© MIRNA PUERTO**

Underwater Scooter Group Ride Winners Place 1. **© BOSS/ OCEAN CONNECTIONS**

CASE STUDY

Conservation education outreach activities positively influence views towards nature in Ghana.

Empathy towards nature seems to be forgotten in Ghanaian culture nowadays. Visiting the Zoo is not an option for everyone; therefore, offering conservation education activities in the communities captures the attention of citizens who otherwise might not have the opportunity. The West African Primate Conservation Action (WAPCA) carried out a community sensitisation project, My City, My Forest, to connect urban families to nature and promote conservation behaviours. The activities implemented were diverse to include different conservation approaches: a visit to the Zoo and WAPCA's Endangered Primate Breeding Centre, cleaning-up a beach, tree planting, and the reuse of plastic materials. Within a year, participants from four communities of Accra, Ghana's capital, changed their views and attitudes towards nature and animals. Post project, these communities received seed funding, enabling them to continue to develop and implement sustainable actions in their neighbourhoods while sensitising more people to the importance of biodiversity conservation for the planet's wellbeing.

My City, My Forest participants, learned to reuse plastic bottles to create amazing pencil cases. **© BRIGHT SENANU**

Diverse, Equitable, Accessible, and Inclusive

Diversities in humanity can make designing, delivering, and evaluating audience-appropriate conservation education difficult. Zoos and aquariums bring together diverse, multilingual, and multicultural groups of people in their visitors, communities, staff, and volunteers. They should invest time, resources, and expertise to enable their organisations to understand and meet the needs of different current and potential audiences. This allows the development of accessible spaces and genuinely inclusive and authentic experiences for a wide range of people. Zoos and aquariums should commit to offering a broad range of equitable opportunities to learn about, connect to, advocate for, and act for species and the natural world.

Zoos and aquariums should strive to model equity through staff and volunteers who represent the diversities within the wider world. Gender, race, cultural, physical, and neurodiversity are just a few of the many aspects of human society that zoos and aquariums should encourage and support to be part of their workforces, as well as within their audiences.

Team of the Tierpark School with objects used for educational purposes during the guided tours. **© TIERPARK BERLIN**

CASE STUDY

Meeting needs of audiences with special needs (sign language, dementia, visible impaired or blind, and disabled).

Tierpark Berlin, Germany, offers activities that are specially tailored to the needs of people with different disabilities. All activities are developed in cooperation with recognised aid organisations and are carried out in small groups by trained zoo employees. The needs of each participant are taken into account. These include a guided multi-sensory walk for people with dementia. This gives opportunities for self-expression and to exchange ideas, to connect with familiar things, and to enjoy social contacts.

Another example is a tour of selected zoo species for visually impaired and blind visitors. They are given information about the animals, and also use touch and smell. On this special tour, the participants have the opportunity to touch and feed selected animal species. Another valued programme is a tour of the Zoo in sign language. The interest of the group is spontaneously addressed and all kinds of information about animal husbandry, training, and enrichment are discussed.

Challenges

A current challenge is how to make zoos and aquariums genuinely diverse, accessible, equitable, and inclusive organisations, for visitors, communities, staff, and volunteers. Zoos and aquariums should strive to understand their own unconscious biases and organisational barriers toward staff, volunteers, and their audiences. There is a need to understand the obstacles that prevent audiences from accessing opportunities or feeling included. This understanding can enable more authentic relationships and engagement opportunities to grow between zoos and all sectors of society.

A common challenge for audiences is understanding the relevancy of biodiversity, ecosystems, and conservation in their lives. They can find these issues complex and challenging to connect with during a visit to a zoo or aquarium. Saving endangered species is not a prime concern for the majority of zoo and aquarium audiences and the wider society. For many people, conservation of biodiversity is superseded by more immediate issues such as poverty, conflict, lack of education, medical care, or unemployment. Naturally, people focus more on urgent issues affecting their close family and friends than on often relatively distant (in terms of space and time) conservation and environmental matters.

Further to this challenge, zoos and aquariums have goals for conservation education that include motivating social change about how people collectively think, feel, and act toward the natural world. In contrast, audiences' priorities may focus on more immediately personal, social, and enjoyment outcomes. Zoos and aquariums should invest in finding intersecting ways to personalise and localise species conservation. Contextualising and linking conservation and environmental issues to audiences' lives help make these experiences part of audiences' priorities. Understanding and valuing audiences' ideas and experiences, what they know and care about, zoos and aquariums can shape their conservation education to be more relevant to audiences' lives.

A widespread challenge that emerged during the writing of this strategy was how to keep delivering quality conservation to a wide range of audiences when the majority of the world's zoos and aquariums had to close due to a global pandemic. This removal of onsite contexts saw zoos and aquariums seize the opportunity to quickly pivot and embrace online platforms to innovate and expand their portfolios of online conservation education opportunities. This kept audiences connected to the zoos' or aquariums' species, staff, and mission. It also was vital to promoting good emotional health and well-being for communities and continuing their connections to nature and each other.

The Chester Zoo Youth Board. **© CHESTER ZOO**

CASE STUDY

Integrating the voices of audiences into planning and development

When working with new audiences, it is beneficial to engage them in designing and informing the development of new conservation education programmes. When Chester Zoo, UK identified they wanted to work more with young people, they set up a Youth Board to help shape development. The Chester Zoo Youth Board consists of 13 young people from a variety of backgrounds, but all aged 18 – 25 years old. They make recommendations directly to the Zoo's Board of Trustees and executive teams, so have a real voice in the organisation. As well as looking at conservation education programmes, they look across the organisation at all issues that could impact, either positively or negatively, how the Zoo engages young people.
They also receive ongoing training and individual mentoring to help them develop their leadership skills and help ensure they are effective in their Board Member roles.

CASE STUDY

Are snakes malign or sacred?: A dilemma amongst the community

From a cultural perspective, snakes are worshipped and respected in India, but in the wild, if a snake is spotted, fear sets in and the initial instinct is to get rid of them. The Madras Crocodile Bank Trust (MCBT) in India brings out snakes to initiate awareness and what to do when people come across a snake in the wild. Most of their fears are built upon the myths that have been passed on generation after generation. Conducting this snake awareness programme sheds light on these misunderstood creatures and helps people to be aware of the dos and don'ts when they see them in the wild. This experiential learning creates empathy towards snakes, making way for people and snakes to coexist rather than people having the instinct to eliminate them from the environment.

Reptile Encounter with our yellow anaconda *(Eunectes notaeus)*. **© MCBT**

Houston Zoo - Zoo Crew World Lemur Day Festival planned by teens for Zoo guests 2019. **© HOUSTON ZOO**

CHAPTER FOUR

Applying Approaches and Methods in Conservation Education

Our commitment is to advance and innovate evidence-based approaches in conservation education in zoos and aquariums that raise awareness, connect people to nature, and motivate pro-environmental behaviours.

A Golden Age Volunteer was sharing conservation messages about LOHAS benefits at the Adventures in Australia exhibit to the park visitors during her narration service. © **OCEAN PARK HONG KONG**

Recommendations

- The conservation education plan should include a specific reference to applying a cross-curricular approach with measurable learning outcomes to all aspects of conservation education.
- The conservation education messages should be based on scientific facts and theories. Where cultural, religious, or alternative ideas are represented, they must be clearly indicated as such.
- The zoo or aquarium should present accurate and relevant information about the species, ecosystems, and issues exhibited.

Introduction

The extent to which zoos and aquariums achieve their conservation education outcomes depends largely on the approaches and methods they select for their programming and content. Chapter 2 discusses "the Why": the purposes. Chapter 3 discusses "the Who": the audiences; and "the Where": the places and spaces. This chapter explores "the What and How": the pedagogical, behavioural, and communication approaches that can achieve conservation education outcomes. The strategic elements outlined frame how to design, deliver, and evaluate the approaches and methods that drive social change for conservation. These include the relationship between practice, research, and innovation, theoretical considerations, guiding principles for delivering impactful conservation education, quality assurance, language, tonality, and optimism. The finer details of the operational aspects of approaches and methods are outside the scope of this strategy.

Key Messages

Zoos and aquariums should develop a set of key messages that outline the priority facts, stories, and actions they want to communicate through their conservation education. Clear and compelling message frameworks help prioritise issues and topics that should be integrated into all conservation education efforts. This will provide clarity and consistency throughout the organisation about what narratives should frame conversations with its audiences.

Measurable Learning Outcomes

Zoos and aquariums should create measurable learning outcomes for all aspects of conservation education. Taking an outcome-based approach to conservation education means that all activities have clear and explicit purposes and goals. Learning outcomes are statements of what an individual or group is expected to be able to do, know about, and value as a result of a specific conservation education activity, event, or programme. Learning outcomes should be measurable, interlinked, and aligned to the organisational message framework, mission, and priorities.

Unique Stories about Species, Staff, and Projects

Zoos and aquariums should maximise the conservation education potential of their unique sites, species, staff, and stories. All conservation education activities should aspire to connect to the zoo's or aquarium's species, their staff's knowledge, expertise, and stories, and their *in situ* and *ex situ* conservation, science, and research projects. These connections help to bring conservation education to life for audiences through real species, real people, and real places and projects.

Reptile rovers at Auckland Zoo. © **AUCKLAND ZOO**

CASE STUDY

Age-appropriate methods and activities in nonformal learning environments

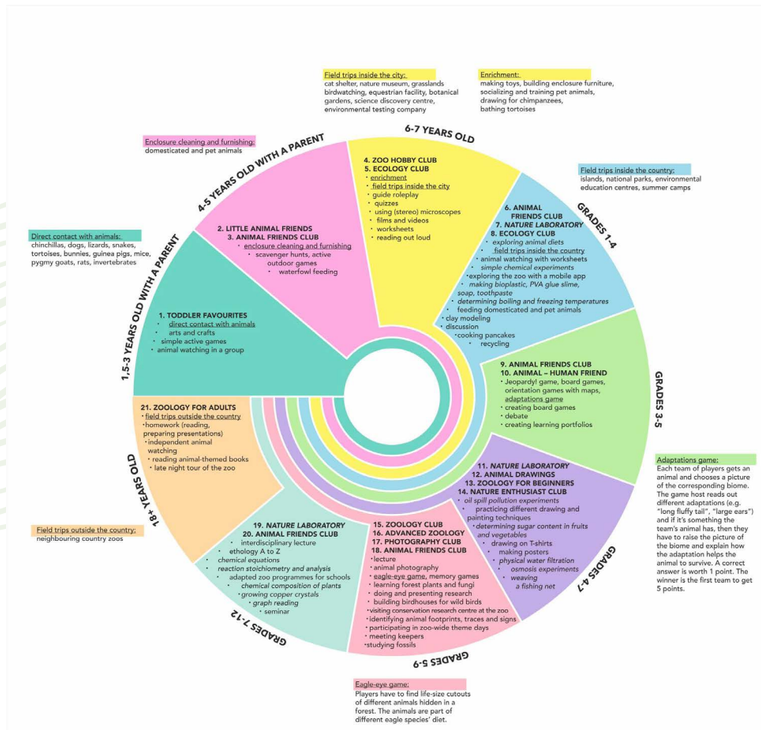


Figure 4.3 | Diagram of activities matched to age groups. © **TALLINN ZOO**

Tallinn Zoo, Estonia has had hobby clubs since the 1950s. A hobby club is an example of nonformal learning: a regular meeting of the same group of participants, united by a common interest and led by a specialist. To nurture people's love of nature and support a comprehensive understanding of the world, the Zoo takes into account participants' existing level of skill and knowledge and builds on it. The meetings of over 20 hobby clubs take place weekly throughout the year and are attended by people aged 1-60+. The range of topics covers general biology, zoology and chemistry, animal behaviour, animal-themed art, etc. The best methods tried over the years are presented in the diagram, with activities matched to the appropriate age groups. The older the participants are, the more our approaches vary, as we can use both the methods from the previous age groups and new ones.

Participatory Experiences

People's curiosity, ability, and eagerness to learn are stimulated during authentic participatory experiences. Free-choice learning opportunities, where audiences discover and learn on their own, should be available throughout conservation education experiences onsite, offsite, and online. First-hand and hands-on experiences should be created to enhance active and multigenerational participation in conservation education. Through these connecting experiences, zoos and aquariums should strive to inspire audiences' sense of awe, wonder, and guardianship for species and the natural world.

Conservation education should be carefully constructed and audience-appropriate, mindful of the frames and traits of diversities in personal, social, and cultural backgrounds. These differences influence how audiences react, experience, and perceive species and the natural world. Conservation education should be aware of the range of ways people learn, and the diversity of audience needs. They should be intellectually and culturally inclusive and structured to be locally appropriate, connecting audiences to situate their learning in real-world contexts and through relevant issues.

CASE STUDY

Bioinspiration educational programmes at the zoo: lifelong science and environmental learning

Bioinspiration is an interdisciplinary methodology applying biological principles to human challenges with sustainable development. In bioinspiration educational programmes for adults, Safari Ramat Gan, Israel uses the outdoor, hands-head-heart on learning, to engage diverse audiences with science, environment, and nature conservation. During the course, participants learn about organisms that have inspired engineers and designers, observe the animals, and have direct contact with them when possible. For example: while hand feeding giraffes, participants learned about a circulatory system and heard about an astronaut suit inspired by the giraffes' tight skin.

Research conducted in the Faculty of Education in Science and Technology at the Technion showed that focusing on this complex idea at the zoo helped adults learn new knowledge in science, technology, and sustainability; improve transfer of thinking skills; and address implementations in their own lives. Participants self-reported change in environmental and social dispositions. Bioinspiration education bridges science, technology, society, and conservation education for adults and turns the zoo into a "Thinking skills lab for creative ideas."

Observing the movements of a corn snake *Pantherophis guttatus* while learning about a snake-like robot, a bioinspired design by prof Alon Wolf and co., Technion
© DR GILLAD GOLDSTEIN, SAFARI RAMAT GAN

CASE STUDY

We go together: otter conservation and Kinmen City God culture

Otter conservation and Kinmen City God culture are two topics that appear to be drastically different; now they go together. Taipei Zoo, Taiwan has been working with Kinmen (an island close to Taiwan) on conservation projects and educational activities that integrate folk culture and ecological conservation.

Kinmen's Eurasian otter conservation has gradually become one of the key topics at Kinmen's Folk Culture Festival. Taipei Zoo found an easy way for people to recognise and value otters through locals worshipping Kinmen City God that not only blesses people but loves endangered species. Through religious events, every level of ages people flock together to celebrate and worship. With images of otters appearing everywhere at this time, they come to understand the rarity of Kinmen's otters and the imminent survival threats they face.

Children wear otter drawing paper ring hats.
© TAIPEI ZOO

Transformational Conservation Education

Transformational learning is a process of profound understanding that goes beyond simple knowledge acquisition. Within a zoo and aquarium context, elements of transformational learning can support new ways for audiences to consciously make meaning of their lives in relation to sustainable futures for species, ecosystems, and humanity.

Elements from transformational learning can be embedded within conservation education to foster deep, valuable, and meaningful experiences. Experiential and reflective learning opportunities support audiences to participate, debate, discuss, and build critical-thinking skills, to make more profound pro-environmental choices. As biodiversity conservation is complex and multidimensional, zoos and aquariums should use approaches and methods that explore biodiversity, the environment, and social change for conservation through different perspectives. These include the natural, socia,l and indigenous sciences, technology, the arts, languages, and the humanities. Creating equitable, meaningful, and multiple opportunities exposes audiences to rich content communicated in a variety of formats.

Language and Tonality

The language, tonality, and framing of messages and content are as important as the desired conservation, social, or educational outcomes. Certain words and experiences inspire, motivate, and mobilise people more than others. Zoos and aquariums should focus on creating compelling narratives that go beyond didactic "define and describe" traditions of education. Staff and volunteers should be supported to evolve into powerful conservation storytellers. They should connect with audiences using accessible language, active dialogue, and creative content that translates and connects key concepts and actions to their audiences.

Optimism

Although negative framing of conservation messages may grab initial attention, without hope, this negativity can quickly lead audiences to feel overwhelmed, helpless, and disengaged. Through conservation education, zoos and aquariums should aim to instill hope, optimism, and determination in their audiences. That does not mean excluding stories about the realities of a rapidly changing planet. It does mean achieving the right balance between revealing urgent threats to biodiversity and constructive narratives that show how individuals and groups can make a difference. An essential part of this optimistic approach is to be explicit about the success stories, and positive contributions zoos and aquariums make for species, ecosystems, and communities.

Quality

Striving for quality and consistency is critical for conservation education in zoos and aquariums. To achieve this, systematic and rigorous planning processes are required to ensure that all conservation education has clear aims and measurable learning outcomes. This includes creating content using accurate and relevant information based on scientific facts and theories, and using effective strategies to implement conservation education interventions. Importantly, conservation education requires appropriate monitoring, research, and evaluation tools, and techniques to establish the quality, value, and ultimately assess the effects and impacts of conservation education.

Theoretical Considerations

Zoos and aquariums should be familiar with and understand the mechanisms and implications of theoretical frameworks connected to different aspects of their conservation education. Theories use systems, concepts, definitions, and ideas that can explain and predict what might happen, given certain variables and contexts. Relevant to framing conservation education in zoos and aquariums are various pedagogical theories about how people learn, play, and construct meaning through activities and interactions, and via different learning contexts.

Interdisciplinary and transdisciplinary frameworks such as the social-ecological system theories are useful to explore how individuals interconnect with other people, animals, and the environment. Several social and behavioural theories are relevant for understanding and driving social change for conservation. They use different perspectives to frame and understand fundamental components of how and why people think, feel, and behave in specific ways, motivating factors and influences, and how applying these theoretical models can affect attitudes, actions, and decision making.

Zoos and aquariums should draw on a range of theoretical considerations to inform and underpin the design, delivery, and evaluation of their programming and content to achieve intended outcomes and impacts.

Children using Virtual Reality (VR) to experience wild environments of animals at RZSS Edinburgh Zoo. **© RZSS**

CASE STUDY

Using technology to transport visitors around the world

The Royal Zoological Society of Scotland (RZSS) has integrated Virtual Reality (VR) and other learning technologies into its conservation education. Using VR has enabled sessions to be delivered in subjects not typically associated with the zoo, such as music, creative writing, and computer coding.

The highlight of this work is the immersive classroom at Edinburgh Zoo, which uses 270º projections, lights, scents, wind, and full interactivity to create a completely enveloping experience. This classroom enables audiences to experience places and scenarios that they wouldn't otherwise get to see on a visit to the zoo. This includes animal spaces that are generally not visible to the public, global conservation projects and different environments the zoo's animals come from in the wild. Experiencing these things gives our learners a more memorable experience, a better understanding of the work of RZSS, and stronger feelings of empathy toward our conservation projects.

Practice, Theory, Research, and Innovation Model

An agile and positive feedback relationship between research, practice (the activities and programmes), theories, and innovation can help ensure quality conservation education. This holistic model is a strategic way of thinking about the different focal areas of conservation education. It helps to visualise how this practice-research-theory triad interacts, collectively contributing to outcomes, effects, and impacts of conservation education. Placing innovation as the central construct supports new ways of thinking to build theories, novel research, and innovative learning practices that catalyse behavioural and social change for conservation.

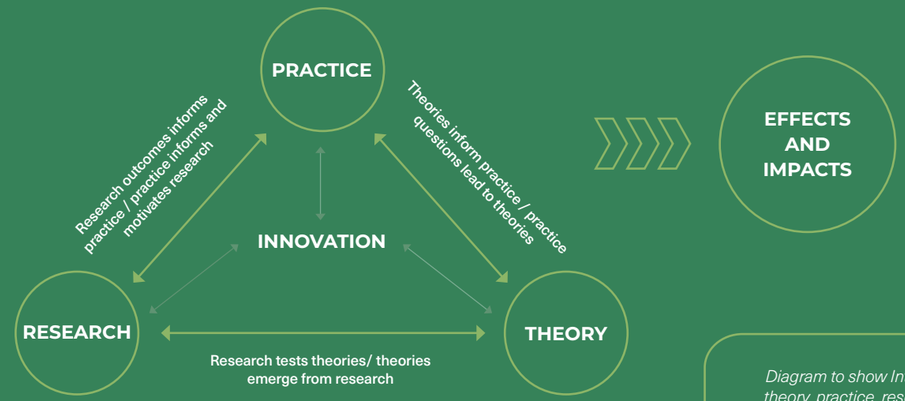


Diagram to show Interrelationship between theory, practice, research, and innovation in conservation education. (Thomas, S 2020— informed by Hoy, W. K. and Miskel, C. G. 2013)

Challenges

The human and social dimensions of conservation are continually changing. Human populations are rapidly growing and becoming more urbanised, new environmental issues arise, and technological developments continue to emerge. Zoos and aquariums should strive to collectively scan the horizon for potential future issues and challenges connected to people and species conservation. This future focus helps zoos and aquariums modify and align their conservation education programming and content with dealing with emerging scenarios.

Other challenges include how to communicate serious conservation and environmental messages without destroying audiences' hope. Another challenge is how to achieve conservation education outcomes while providing enjoyable, social experiences for audiences. To address these, zoos and aquariums should think creatively, act nimbly, and be brave and innovative with their approaches and methods.

The use of technology is another challenge and an exciting opportunity to explore. Through technology, audiences can experience nature in new ways, making it more accessible to visualise and explain complex conservation and environmental issues. Recent technological advances provide the ability to initiate global connections between people who share a vision of hope, resilience, and action for species and the natural world. As a future focus, zoos and aquariums should investigate how to initiate these digital transformations. They should support audiences in using everyday technology as part of conservation education experiences.

Zoos and aquariums should innovate and experiment with emerging technologies to further contribute to the range of intended social changes and conservation outcomes.

Challenges in deciding on the approaches and methods for conservation education arise from global differences in audiences and varying internal and external governance structures. There are differences globally in the level of support, and in some countries, there is active opposition to science-based conservation. These contexts can make communicating environmental and conservation issues problematic. Zoos and aquariums should work with their audiences to mitigate these challenges, endeavouring to communicate and collaborate within the parameters of their specific cultural and social contexts.

CHAPTER FIVE

Integrating Animal Care and Welfare into Conservation Education

Our commitment is to develop conservation education techniques that demonstrate respect for animals and the high standards of welfare they receive in human care.

Our commitment is to further positive audience perceptions of zoos and aquariums through quality conservation education.

Foster wonder to kindle respect and desire to protect the natural world and its biodiversity.
© **RÉSERVE AFRICAINE DE SIGEAN**

Educator Claudia Richards and Health Safety Advisor Lynne Laurie working with TRAFFIC to end illegal wildlife trade. © **WELLINGTON ZOO**

Recommendations

- The zoo or aquarium should comply with WAZA or regional guidelines on animal-visitor interactions.
- The zoo or aquarium should connect audiences to the principles of animal care, and show how their organisation achieves high welfare standards for the species in their care.

Introduction

Zoos and aquariums have exponentially evolved since the early days of menagerie-style collections. Now, zoos and aquariums position themselves as conservation organisations that demonstrate excellence in species care, animal welfare, conservation science, conservation education, research, and sustainability.

Despite continued efforts by zoos and aquariums, there are fundamental gaps in audience understanding of what zoos and aquariums do. Conservation education should fill these knowledge gaps, and support audiences to become powerful advocates for zoos and aquariums. Conservation education can help audiences to understand systems, frameworks, legislative compliance, and operating processes concerning animal health, care, and welfare. Additionally, it can explain the principles of zoo and aquarium-based species conservation, and how *in situ* and *ex situ* conservation have common goals through initiatives such as IUCN's One Plan approach.

Two aspects of animal care and welfare connected to conservation education are discussed in this chapter. The first covers the different ways animals are involved in conservation education programmes, activities, and interactions with audiences. The second covers how to communicate the ways zoos and aquariums care for animals and contribute to species conservation.

Animals and Interactive Conservation Education Experiences

The ways that animals are included in close contact experiences with visitors and communities vary widely throughout the world. It goes beyond the scope of this strategy to recommend a standardised approach for these interactions. However, in all instances, zoos and aquariums should carefully examine how their audiences interact with species in their care. They should be able to demonstrate that, regardless of the conservation education delivered, animal welfare is always a prime concern, and that the animals are thriving. Conservation welfare is a term used in WAZA's *Caring for Wildlife* strategy that supports positive animal-welfare states while at the same time achieving conservation objectives. Here a new term of "education welfare" is offered as a frame that supports positive animal welfare states while achieving conservation education outcomes. To ensure that education welfare is achieved, conservation education needs to embed appropriate animal welfare assessment frameworks into their activities. The 2020 WAZA guidelines for animal-visitor interactions complement existing regional animal-visitor policies and gives more details and recommendations for good practice for these experiences.

Photograph of the Happy Animals cubes opposite the capuchin monkey habitat.
© **WELLINGTON ZOO**

CASE STUDY

Happy animals: engaging visitors with the Five Domains of Animal Welfare

Wellington Zoo, New Zealand applies the Five Domains of Animal Welfare to ensure their animals are healthy and happy. This model assesses the physical well-being of animals and also their emotional and mental state, taking into consideration the animal's behavioural and physiological needs.

Wellington Zoo wants visitors to understand that animal welfare is the Zoo's top priority and that they leave the Zoo feeling confident that the animals are receiving the greatest of care. Three-dimensional cubes were designed and installed based on the Five Domains and highlight the animal care work across the Zoo. These colourful cubes encourage our visitors to interact with them. The animal welfare visitor experience has been expanded with short videos in locations of specific animal habitats to further inform visitors about how the Zoo helps animals in their care to thrive.


Guests participate in "Feed the Chickens" program at Lincoln Park Zoo in Chicago
© **AMANDA BERLINSKI**

CASE STUDY

Choice, control, and the option to stay home sustains welfare in an ambassador animal program

Lincoln Park Zoo, USA prioritises animal welfare in all conservation education programs involving animals. To do this, animals remain in their primary habitat during programs and are given a choice to participate. In 2019, the zoo phased out all programs that did not meet these criteria, while piloting new programs that did. One new programme was "Feed the Chickens." During this program, up to 15 guests are allowed into an area outside the chicken yard and invited to feed chickens using specialised feeders that can be placed through ports in the yard's fencing. Scientists with the zoo's Animal Welfare Science Program evaluated the welfare of the chickens and found that offering the programme was not associated with changes in behavioural indicators of welfare. This supports the idea that programmes that prioritise animal choice and occur in an animal's habitat are less likely to compromise welfare.

Conservation Education about Animal Management, Health, Care, and Welfare

It should be a priority for conservation education to build audiences' knowledge, understanding, and positive attitudes toward the range of work zoos and aquariums do, both for the animals in their care and species conservation in the wild. Zoos and aquariums should connect audiences to the science and research involved in animal health, husbandry, behaviour, and training. This can be achieved through embedding engaging stories of animal care—such as how they house, feed, transport, enrich, train, and provide health care for animals in their care.

Audiences may need support to understand the scope of and differences between welfare, ethics, and rights concerning animals in zoos and aquariums. Presenting proactive and evidence-based information, and creating appropriate and transparent platforms for discussions, can help foster audiences' understanding and positive attitudes about these elements of zoos and aquariums that are sometimes viewed as controversial.

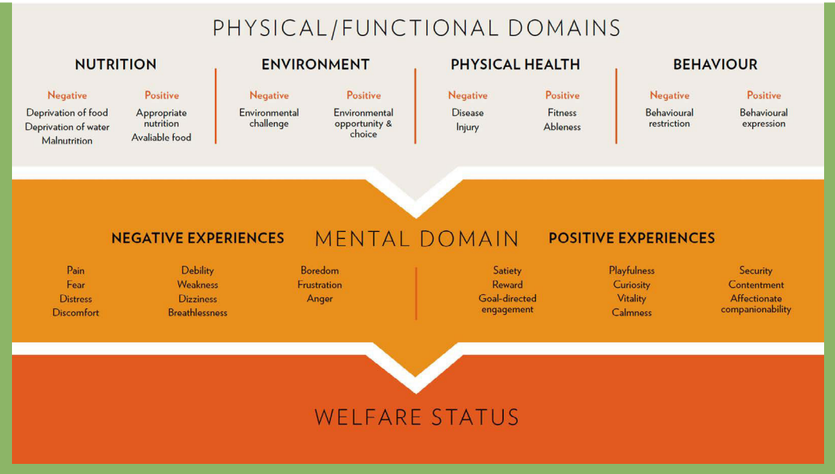
By explaining animal needs along with welfare and management processes, zoos and aquariums can facilitate audience respect, empathy, and positive connections to animals and the natural world. The five domains of animal welfare, as outlined in WAZA's *Caring for Wildlife* strategy are a science-based framework for assessing animal welfare, which recognises that animals can experience feelings, ranging from negative to positive. The first four domains of nutrition, environment, health, and behaviour use a set of criteria to assess, inform, and contribute to demonstrating that positive experiences are occurring in the fifth domain of mental state/wellbeing. Zoos and aquariums should use this framework in their conservation education as it shows the ways welfare is assessed to ensure animal's needs are met, and that they thrive in human care.

Ramat Gan Israel © **RAMAT GAN SAFARI**

Conservation Education and Species Action Planning

Planning which species to include in an institutional "collection plan" is essential. Conservation education plays an indispensable role, as many species are tagged with an education reason for being within a zoo or aquarium. However, zoos and aquariums should move beyond the monotypic use of the term "education" within their collection plans. A more useful approach is to create several subcategories reflective of the many purposes for conservation education. Categories include, but are not limited to, species that support audience knowledge and understanding, build empathy, promote practical and personal skill development, support conservation storytelling, and encourage pro-environmental behaviours and sustainability. Using a range of conservation education categories in a collection plan helps strengthen and further explain the variety of conservation educational roles species can play in a zoo and aquarium context. Importantly, staff with conservation education expertise should be actively involved in the planning process, working with species specialists to develop the educational components of the collection plan collaboratively.

A crucial part of demonstrating the work that zoos and aquariums do are the links between *ex situ* and *in situ* efforts for animal welfare and species conservation. The work of the Conservation Planning Specialist Group (CPSG) and the IUCN's One Plan approach strives to build an integrated approach to conservation planning. It delivers comprehensive conservation plans for different species and helps bridge the gap between *in situ* and *ex situ* population management. Through conservation education, zoos and aquariums should demonstrate and celebrate the relationship between those who work with species within zoos and aquariums and those who work directly with wild populations. Messaging should describe how zoos and aquariums take part in cooperative international and regional *ex situ* population management programmes to form viable populations that can benefit *in situ* conservation efforts.



© WAZA'S CARING FOR WILDLIFE STRATEGY

CASE STUDY

Diagram of Five Domains of Animal Welfare

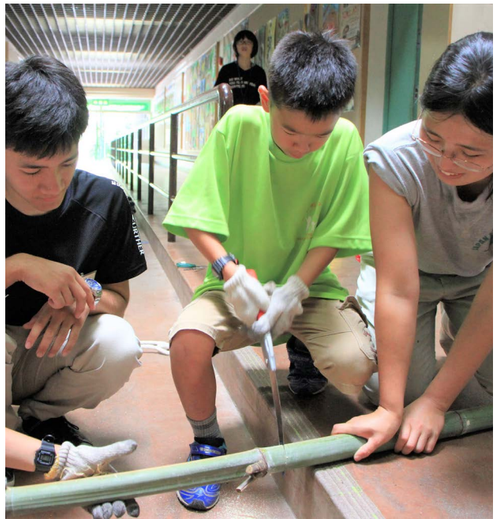
The five domains model for understanding animal welfare, divided into physical/functional and mental components, provides examples of how internal and external conditions give rise to negative (aversive) and positive (pleasant) subjective experiences, the integrated effects of which give rise to an animal's welfare status.

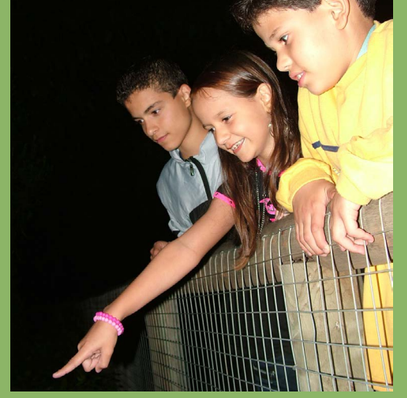
Feeders made by participants are given to the ring-tailed lemurs
© JAPAN MONKEY CENTRE

CASE STUDY

Learn, think, discuss, and work for animals: Enrichment Experience Activity

As part of the Japan Monkey Centre's animal welfare improvement efforts, environmental enrichment is used in their conservation education activities. In these activities, participants observe target animals, learn about the animal's ecology in the wild, and discuss how they can enrich their captive environment. If the ideas are safe and allowed by the keepers, participants work together to implement them. There have already many ideas realised by the participants. For example, making insect feeder for lemurs, setting the feeder for gibbons at the higher place, and making bamboo wind-bell for a gorilla. Throughout these activities, participants learn proactively to develop a sense of empathy and responsibility for the animals. They gain a better understanding of the roles of a zoo and its commitment to good animal welfare.





Discovering the habits of nocturnal animals.
© BELO HORIZONTE ZOO

Brazilian porcupine
© BELO HORIZONTE ZOO

CASE STUDY

Educational activity that visitors learn about the Zoo Animal Welfare Program

The "Owl Expedition" is an educational activity at the Belo Horizonte Zoo, Brazil which takes groups of visitors to meet the nocturnal animals, such as felines (tiger, lions, and jaguars), wolves, tapirs, anteaters, and Brazilian porcupine. During these nightime visits, it is possible to learn about the care offered to animals at the Zoo through the Animal Welfare Program developed by the institution. The target audience is families and students. During the activity, they see animals interacting with the environmental enrichment items prepared for the animals that night. This activity takes place mostly during the full moon weeks. It is conducted by biologists or veterinarians, zookeepers, and educators. Since its implementation, 300 people each year have participated in this activity, and the evaluations show a very high degree of satisfaction and learning about animal care and welfare. Everyone considered the information passed on as a great learning experience and recommended the activity to friends.

Challenges

Zoos and aquariums work continually to advance animal care and welfare, conservation, and educational, scientific, and sustainability outcomes. Despite these contributions, there is still an apparent disconnect between what zoos and aquariums do, versus what their audiences think they do. Some individuals who feel negatively about zoos and aquariums may shift to more positive attitudes if given sufficient evidence about the role of zoos and aquariums in species care, animal welfare, conservation, sustainability, and conservation education. However, providing evidence may not necessarily change the views of others.

The public perception of zoos and aquariums is a key challenge and an opportunity for conservation education. As a future focus, zoos and aquariums need to understand more about how audiences think and feel about animals in human care, and about zoos and aquariums more generally. A better comprehension of audience perceptions and the basis for those perceptions can provide zoos and aquariums with informed opportunities to address misconceptions.

Zoos and aquariums can recast themselves as powerful, productive, and leading organisations for biodiversity conservation. To do this, they need to talk more proactively about their enormous contributions to advancing animal welfare, and *in situ* and *ex situ* conservation. Zoos and aquariums should be brave and lead conversations to shift public perceptions of species in human care with practical, transparent, and consistent messages—including discussions with a wide range of current and potential audiences. They should develop approaches to continue influencing public attitudes by communicating boldly, diversely and effectively about characteristics of a "good" zoo or aquarium. They should demonstrate how collectively the global community of zoos and aquariums is a major force for social change in conservation, to build sustainable futures for species, ecosystems, and society.

CHAPTER SIX

Prioritising Conservation and Sustainability into Conservation Education

Our commitment is to facilitate, motivate, and mobilise zoo and aquarium audiences to act and advocate for biodiversity, environmental, and conservation-related issues.

Zoo Crew Teens sharing wildlife-saving messages with Zoo guests © **HOUSTON ZOO**

Listed below are some of the environmental and conservation issues relevant to zoos and aquariums. These include, but are not limited to:

BIODIVERSITY LOSS
such as mass extinction, population collapse, illegal and legal wildlife trade, hunting and poaching, bushmeat trade, illegal pet trade, loss of pollinators, invasive species, and traditional medicines.

CLIMATE EMERGENCY
such as the ways changing climate impacts people, wildlife, and wild places; the science of global heating; and climate emergency deniers.

USE AND OVERUSE OF NATURAL RESOURCES
such as overfishing and mass meat production.

MARINE AND FRESHWATER CONSERVATION
such as the importance of marine protected areas, and ocean acidification. Ocean and freshwater health is vital for both species and human health.

POLLUTION
such as plastics, littering, balloons, microplastics, and water pollution.

DEFORESTATION
such as loss of habitats, both local and international; agriculture and monoculture such as palm oil impacts on species and habitats.

HUMAN HEALTH AND RIGHTS
such as family planning and voluntary population control, zoonotic diseases (zoonoses), human rights and colonialist conservation.

HUMAN INTERACTIONS WITH WILDLIFE AND THE ENVIRONMENT
such as human-wildlife conflict, responsible ecotourism, exploitation of wild animals by people (e.g. primates as photo props), and domestic and wildlife conflict (e.g. domestic cats' and dogs' impact on wildlife).

SUSTAINABLE SOLUTIONS
such as alternative energy sources, reducing meat consumption, sustainable fishing, composting, reduce, reuse, recycle, changing transport habits, ecosystem services.

Recommendations

- Conservation education in zoos and aquariums should aspire to make conservation issues relevant to audiences' own lives and inspire people to take direct and indirect actions to make a positive difference for species, ecosystems, and communities.
- The zoo or aquarium should educate their audiences about their own conservation and sustainability work by demonstrating how their organisation makes direct and indirect contributions to conservation.

Introduction

Conservation and environmental issues are a blend of science, policy, economics, and human components. As such, they are as much about people and their actions as they are about species and ecosystems. Conservation education should prioritise opportunities to catalyse social movements that drive behavioural solutions to urgent and complex conservation and environmental issues. Motivating and mobilising social change in audiences to adopt pro-environmental behaviours, empowering them to become conservation advocates and supporting them to remain optimistic in a rapidly changing environment are critical for conservation education.

Through conservation education efforts, zoo and aquarium audiences should know and understand more about some of the complex issues currently facing species, the environment and society. They should care about and feel connected to these issues, and be motivated and primed to adopt pro-environmental behaviours, as well as be part of widespread conservation advocacy and collective action. They should be aware of the UN Sustainable Development Goals and how they can be involved in building sustainable futures for species, ecosystems, and communities. They should also be aware of the social and cultural aspects to conservation and environmental issues, and that conserving culture diversity connects to conserving biodiversity.

IZE workshop participants from Africa visiting and being guided at Makanaga wetland.
© UWEC

Conservation and Environmental Issues

Many issues that affect species, ecosystems, or communities are complex and abstract. Making connections and contextualising conservation helps audiences to understand how each issue could be relevant to them. Illustrating stories behind the issues, such as the stakeholders and specific projects, helps audiences to find connections, make meaning, and place issues and solutions within their own world contexts. There are many conservation or environmental issues that a zoo or aquarium could focus on through their conservation education. What zoos and aquariums decide to focus on depends on location, culture, audiences, and the relevancy of each issue to their organisational contexts.

CASE STUDY

Strengthening *ex situ* and *in situ* link through conservation education

Uganda Wildlife Conservation Education Centre (UWEC) is implementing Biodiversity Conservation and Awareness Programme at Makanaga Wetland system. This wetland, which was under threat from human encroachment, is part of the expansive wetland system adjacent to Lake Victoria, Uganda. It is home to the threatened shoebill stork *(Balaeniceps rex)*. Other focal species include; grey crowned crane *(Balearica regulorum)*, saddle-billed stork *(Ephippiorhynchus senegalensis)*, spotted necked otter *(Hydrictis maculicollis)*, civet cat *(Civettictis civetta)* and sitatunga *(Tragelaphus spekii)*.

Since the inception of the Biodiversity Conservation and Awareness Programme in 2013, degradation of the wetland has reduced, its integrity is restored and wildlife exists harmoniously with the community. The programme has created community awareness, developed management plans, and trained tour guides. It has enabled ecotourism enterprises, school wildlife clubs, and re-greening projects to be conducted. Local treasures have been documented, educational materials distributed, and some species were rehabilitated at UWEC and released back into the wetland.

CASE STUDY

Bubbles not Balloons: a simple action to help tackle a complex issue for wildlife

When Balloons Fly is a collaborative campaign aiming to activate communities to help eliminate the impact of balloon waste on wildlife. Research has found balloons to be the single deadliest form of marine debris for seabirds. Zoos Victoria, Australia aims to create a social movement within families, as well as with businesses, schools and local councils. Since 2017, more than 230,000 visitors have made a public promise to use bubbles instead of balloons outdoors, and more than 300 local businesses have committed to not using balloons outdoors. The campaign plays a critical role in starting a discussion about the bigger problem of plastics in a way that is accessible and fun. The campaign is a platform that can be used to bring communities along on the Zoos Victoria sustainability journey. Zoos Victoria is a zero-waste organisation and has removed all possible single-use plastics from the organisation.

Visitors to Melbourne Zoo are invited to write a public promise to use bubbles not balloons at their outdoor events. **© ZOOS VICTORIA**

Conservation Education and Sustainability

A future priority for zoos and aquariums is to align conservation education to complement global biodiversity targets, such as the United Nations Sustainable Development Goals, and the relevant recommendations within WAZA's *Protecting our Planet* strategy. There is a fundamental need to raise awareness of education for sustainable development, motivate everyone to strive for a more sustainable way of life, and link pro-environmental behaviours to conservation outcomes. Conservation education should include themes of sustainability, from a local to broader global context. This includes addressing issues related to consumer behaviour choices on seafood, palm oil, transport, plastics, and other daily resource use. This should be balanced with information on how audiences can form powerful collective social movements for sustainable futures. These approaches help audiences to integrate elements of sustainability into their lives through better daily choices and collective social sustainable activism.

Zoos and aquariums need to "walk the talk." If they encourage audiences to adopt more sustainable lifestyles and make better decisions to support sustainability, zoos and aquariums must lead by addressing their own sustainability issues—and being as sustainable as possible. Through multiple approaches, zoos and aquariums should strive to demonstrate how sustainability is the key to species survival and societal futures.

CASE STUDY

Conservation water guardians: Educational programme on water conservation in rural and urban communities in Guadalajara, México

"Conservation Water Guardians Meeting" is an inclusive educational programme that has run for 14 years, with more than 1000 students participating. Children who walk 10 km to obtain the water resources, others who have water in their towns but it is polluted, and children who open the faucet and get clean water easily in their homes come together for one week each year. Primary school children from 40 rural communities, urban areas, and visually impaired population in the state of Jalisco, live at the Guadalajara Zoo, México during the programme. They meet water conservation scientists and debate the serious problems, analyse, discuss, and propose viable solutions for their community's water conservation. It focuses on fundamental content that links the daily activities of the human being, essential ecosystem services, as well as the biological processes of the species. This programme links conservation education, research methodologies, and interactions with staff and communities, to reinforce the priority conservation goals of Guadalajara Zoo and México.

© Mirka Camacho / Coordinator of the Water Conservation Guardians Meeting programee & Arturo Chavez Vera, Education Department, Zoológico Guadalajara.

Visit to the Zoo's Water Treatment Plant **© SÃO PAULO ZOO**

CASE STUDY

Planting the future: a path for a discussion on sustainability in zoos

Based on its Environmental Management System (EMS), certified by NBR ISO 14.001, the São Paulo Zoo (Brazil) develops two types of guided visits. The first one is for technical or higher education students, and it addresses several concepts and practices related to environmental management. The visit "Planting the Future," for elementary and high school students, portrays the Zoo as a "model city," which tries to minimise its environmental impact. Throughout this visit, the participants assemble a model that simulates urban growth, learn about the Zoo's Sewage and Water Treatment Plants and the cleaning procedures adopted in the enclosures of some animals. Thus, they are encouraged to reflect on more suitable alternatives to deal with common problems in modern cities and with their actions. Such activities demonstrate that the EMS, in addition to reducing the Zoo's ecological footprint, also has great potential for a discussion on sustainability.

Activity on riparian forest during the "Planting the Future" **© SÃO PAULO ZOO**

CASE STUDY

Engaging teachers and students in conservation research through an online citizen science platform that directly informs *in situ* programs

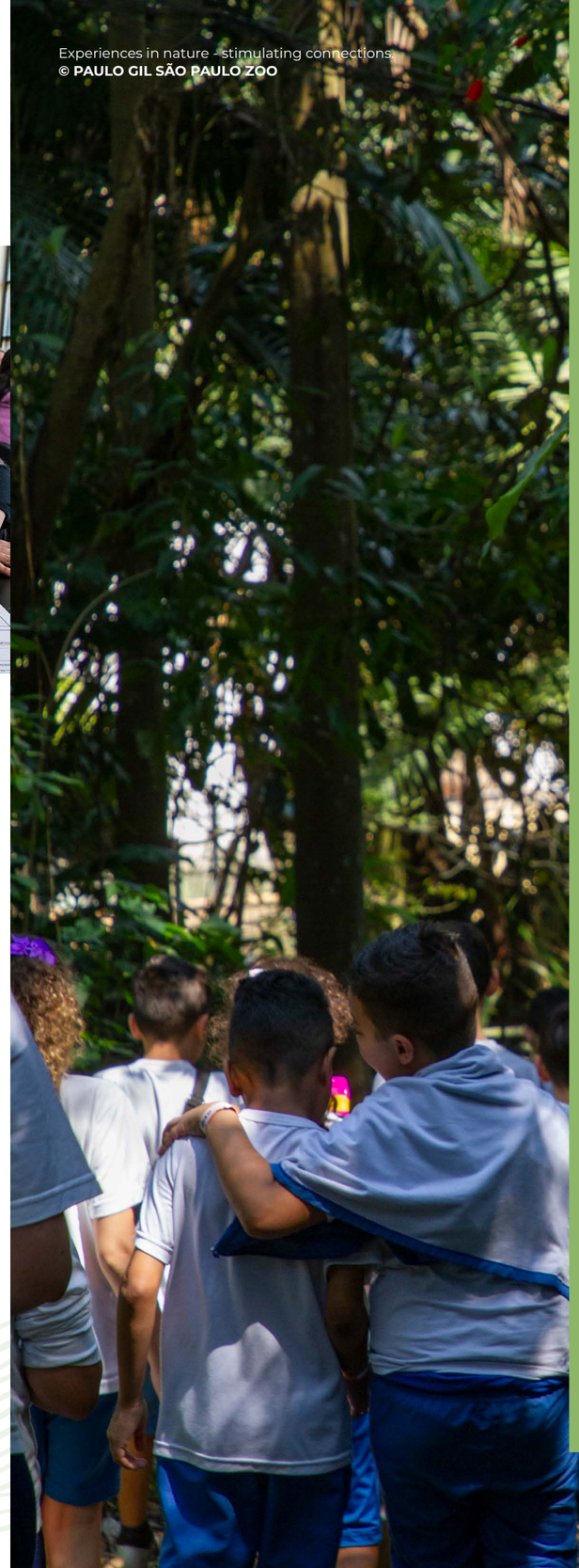
Experts in Population Sustainability and Community Engagement at San Diego Zoo Global (SDZG), USA enlisted the help of teachers and students from across North America to identify and count animals captured by a system of more than 100 motion-activated trail cameras in Northern Kenya, Africa. These important data help SDZG researchers understand how a variety of species (both wild and livestock) use different habitats across various times of the year, and further inform on-the-ground management strategies. Teachers were invited to this online citizen science Wildwatch Kenya School Challenge through the alumni pool of SDZG's Teacher Workshops in Conservation Science. These workshops are a three-day, two-night professional development experience that helps educators bring conservation science onto their home campuses.

Local high school students aid the work of San Diego Zoo Global conservation researchers by classifying camera trap images captured in Northern Kenya as part of the Wildwatch Kenya School Challenge.
© SAN DIEGO ZOO GLOBAL

Challenges

Integrating content about conservation and broader environmental issues into conservation education in zoos and aquariums can sometimes be problematic. Most issues are complex, making it difficult for those delivering conservation education to involve their audiences in an attractive, appropriate, and non-alarmist way. Issues should be broken down into clear messages, combined with a solution and optimistic frames that provide audiences with tangible actions that can make a difference—such as through a citizen science approach.

Many conservation and environmental issues are relevant to zoos and aquariums. It can be hard to decide which issues should be a priority, how many issues to focus on, and what communication techniques to employ with the target audiences. Additionally, some zoos and aquariums, like other scientific and conservation organisations, are hesitant to shift to activism-based approaches to drive social change for conservation. Zoos and aquariums of the future should not shy away from taking a strong advocacy stance for complex conservation topics such as the ongoing climate emergency, global heating, and the environmental and social justice connections to species conservation and healthy communities.



Experiences in nature - stimulating connections.
© PAULO GIL SÃO PAULO ZOO

CASE STUDY

Empowering youth volunteers as climate change interpreters

Utilising high school volunteers as climate interpreters benefits not only the students themselves, but provides an additional voice and perspective for communities about a key conservation issue facing both animals and people alike. High school students at The Marine Mammal Center, a marine mammal hospital and education facility in Sausalito, California, USA were introduced to climate change science and trained in scientifically tested communication strategies. Using this knowledge and skills, they engaged guests at interpretive stations about the impacts of climate change on marine mammals and climate mitigation solutions. Youth volunteers who had the opportunity to practice their public speaking skills and specialise in climate science and communication experienced significant gains in understanding of climate science and self-reported environmental behaviours. For visitors, these new interpretive stations provided hands-on activities that brought the science and stories of climate change to the forefront of their visit and resulted in the adoption of new climate-friendly behaviours.

Izzy, a Youth Crew Climate Interpreter, engages a family about climate change at The Marine Mammal Center.
© ADAM RATNER

CHAPTER SEVEN

Optimising Training and Professional Development in Conservation Education

Our commitment is to offer and support a wide range of opportunities for training and professional development in conservation education.

Exploring other languages to address conservation – a theatrical presentation at the Zoo.
© PAULO GIL SÃO PAULO ZOO

Volunteer training programmes CPR Parque Zoológico Nacional La Aurora
© PARQUE ZOOLÓGICO NACIONAL LA AURORA

Recommendations

- The zoo or aquarium should have at least one member of staff with the necessary experience and qualifications responsible for leading and implementing their conservation education plan.
- The zoo or aquarium should support staff and volunteers involved in conservation education to be actively involved in local, national, regional, and international conservation education networks and meetings.
- The zoo or aquarium should support staff and volunteers involved in conservation education with the appropriate continuous professional development and training to meet the aims of their conservation education plan.

Introduction

Building capacity in those involved in conservation education is a fundamental responsibility for zoos and aquariums. There should be a commitment from the highest level to invest in appropriate professional development for all staff and volunteers, to support the topics and recommendations within this strategy. Individuals from throughout the organisation could all benefit from development opportunities that build knowledge, develop skills, and grow confidence in designing, delivering, and evaluating conservation education.

Along with staff and volunteers, zoos and aquariums should support opportunities to build their audiences' capacity to become active conservation advocates. This support ranges from building conservation science capacity in those who wish to pursue a career working with animals, plants, and in species conservation, to providing training opportunities for individuals and communities who just want to "do their part" for their local wildlife, communities, and the natural world.

CASE STUDY

Volunteer Corps as a means for a conservation education training for adults

As educators who have a concern for conservation, we know that most programmes are usually targeted at kids. We also know that it usually takes a kid about 10 years to gain the empowerment to take action. Can we spare 10 years for conservation efforts?

The volunteer programme at La Aurora Zoo, Guatemala targets young adults and beyond (16 years to seniors). It includes 21 hours of training in areas such as natural history, the importance of zoos, conservation, and interpretation skills. The volunteer programme is part of the education department, and their goal is to connect the visitors with animals. Around 200 volunteers are trained per year. 40% remain in the programme for longer than six months and some for many years. Throughout the years, *in situ* field experiences and training have been added to the programme. This includes beach clean-ups, learning about conservation research programmes, and participating in wildlife conservation initiatives. This programme provides the tools and knowledge to secure the empowerment that adults need to take action.

Building Capacity for Conservation Success

A recent paradigm shift in the scope of conservation education now acknowledges people and their actions both as the drivers and agents of change for all conservation and environmental issues. Consequently, zoos and aquariums should shift accordingly to equip their staff and volunteers with the necessary knowledge, skills, and confidence to explain and connect their audiences to these complex issues. This includes learning how to build empathy for wildlife, design programmes to drive ecological and social change, and to measure the effects of their conservation education efforts. To do this, zoos and aquariums should encourage and support their staff and volunteers to participate in a range of activities, courses, and professional events that have clear developmental outcomes to meet the needs of both the participants and their organisations.

Lisbon Zoo's Conservation Education Team. **© LISBON ZOO**

CASE STUDY

Building active conservation advocates teams

The strength of conservation education in Lisbon Zoo, Portugal depends on the quality and capacity of the teams, and this begins with training. The training ensures that scientific knowledge, commitment, pedagogical strategies, and communication are in accordance with the Zoo's vision and mission. Lisbon Zoo applies the Training-Application-Evaluation methodology both in initial and continuous training. The themes are divided into zoological, scientific, pedagogical contents, communication strategies and skills, interrogative speech, storytelling, theatrical expression, vocal and body expressiveness, interactions with different audiences, and language adaptations. Evaluation parameters (a scale from 0 to 5) are used across all themes. The parameters are always discussed and participated with all team members to promote continuous improvement. In 2019, the team averaged 4.6 across all parameters. The best was the interactions with audiences (4.8) and the most needed improvement was the speech structure (4.1). This gives Lisbon Zoo measurable advances, skilled teams, and strong, active conservation advocates.

Diverse Development Pathways

This strategy provides clear recommendations for quality conservation education. How a zoo or aquarium prepares its staff and volunteers to meet these recommendations will vary due to the organisational, country, and cultural context. Importantly, there is no one way to build sufficient capacity to meet all the strategy recommendations. Instead, a broad spectrum of options is offered here from formally taught programmes to more informal continuous learning or "on-the-job" development opportunities.

Numerous formally delivered courses, provided through tertiary education institutions, connect to elements of conservation education. These focus on a range of topics that include, but not limited to, pedagogical skills, human and social dimensions of biodiversity conservation, motivating behaviour change, conservation psychology, ocean literacy, education for sustainable development, community engagement, social research, and evaluation. Also, national and regional zoo and aquarium associations offer a range of structured conservation education courses. For example, IZE delivers in-country training to professionals with the greatest need for development on a range of conservation education topics.

More informal opportunities include visiting or "job shadowing" at other zoos, aquariums, and conservation education organisations. IZE has a Job Experience Programme (JEP) that gives opportunities to learn directly from colleagues around the world. For both host and participant, the aim is to strengthen the global network of zoo and aquarium educators, and to share new ideas and inspire innovation.

Conferences and other professional events provide excellent opportunities for blended approaches to training and development. Through talks, presentations, and workshops, delegates learn, share ideas, and network with other conservation education professionals. For those unable to attend in person, many zoo and aquarium conferences have "live streaming" options through their social media channels to widen the reach of and participation in these events. For example, IZE virtual conferences and webinars offer a range of online professional development opportunities.

Online forums provide excellent contexts to further develop conservation education professionals further. These digital platforms support colleagues from around the world to experience peer-to-peer learning. They enable those involved in conservation education to share best practices, ask questions and participate in discussions. Examples of active social media pages and groups include IZE's Facebook page, EAZA Conservation Education Facebook Group, and AZA members' education forums.
Online training portals such as San Diego Zoo Global Academy and National Geographic offer a range of self-paced courses that support individuals who want to grow their capacity in conservation education.

Challenges

Commonly cited challenges to continuing professional development are insufficient financial resources and lack of time to undertake appropriate training and activities. Fortunately, through online opportunities and funded courses, there is an ever-increasing range of equitable options available to zoo and aquarium professionals.

Training and professional development are essential to the long-term improvement of conservation education in zoos and aquariums worldwide. Successful social change for conservation requires large numbers of people to act as agents for change. It will take many skilled conservation education professionals to support and catalyse ecological and social change. This will not happen without clear recognition and commitments from zoos and aquariums to train and develop their staff and volunteers to these required competencies. As such, they should prioritise the time and commit the necessary resources to support staff and volunteers who will be involved in local, national, and regional networks, meetings, and training opportunities.

Systematic changes to how training and professional development is delivered and supported can improve both the theoretical and practical aspects of providing conservation education. This will result in measurable advances—in individuals who will better perform their jobs, in organisations that will better fulfill their missions, and on the broader zoo and aquarium community, who will be in a stronger leadership position for action and solution-focused approaches.

CASE STUDY

Digital zoo-based professional development workshops create online learning opportunities for teachers to connect with zoos

The Wildlife Conservation Society (WCS), USA works with over 1,700 teachers annually by offering professional development workshops. These teacher courses are designed to enhance teacher content knowledge and prepare teachers to bring this content into their classrooms for their students. In digital programmes, teachers experience both synchronous and asynchronous learning. When teaching live, the WCS instructors live-stream from exhibit spaces and bring in the expertise of animal and research staff. Teachers get to remotely visit WCS's facilities and meet animals up close, all from the safety of their home. Teachers then self-pace their learning through asynchronous, standards-aligned activities that leverage the Zoo's digital resources, such as footage from the field or live webcams. Teachers overwhelmingly enjoy these courses, with over 90% rating them as excellent or superior in quality and over 95% indicating that they intend to incorporate what they learned into their curriculum in their schools.

New York Aquarium staff live-stream from the Sea Cliffs exhibit to remote teachers in a professional development workshop.
© SHINARA SUNDERLAL, WCS EDUCATION

CASE STUDY

Building conservation education capacity in Northern Vietnam

Ha Giang teacher facilitating nature exploration with students.
© KISHA BLANTON DENVER ZOO

Tonkin snub-nosed monkeys *(Rhinopithecus avunculus)* are one of the world's most endangered primates, with no more than 250 individuals remaining. The largest surviving population lives in the remote mountains of Vietnam's Ha Giang Province. Employing a community-based approach, Denver Zoo, USA works with local stakeholders in Ha Giang to develop strategies to protect this rare primate. By focusing on engaging and building capacity in local partners, programme sustainability is enhanced. Conservation education empowerment strategies include teacher professional development programmes that build capacity in local teachers to develop and deliver outcomes-based environmental education. Teachers are coached and mentored to deliver learner-centred programmes that provide students with critical thinking skills needed to gain deeper understandings of nature and wildlife. Local teacher involvement is critical for long term sustainability of the programme and to Tonkin snub-nosed monkey survival.

CHAPTER EIGHT

Strengthening the Evidence of the Conservation Education Value of Zoos and Aquariums

Our commitment is to maximise opportunities for and build evidence of the effects and impacts of conservation education through monitoring, evaluation, and social research in zoos and aquariums.

Children learn how to mow the napier grass. © TAIPEI ZOO

Recommendations

- The zoo or aquarium should collect and share a range of evidence to demonstrate how it is carrying out its conservation education plan.
- The zoo or aquarium should evaluate its conservation education programmes at multiple stages, using appropriate methods.
- The zoo or aquarium should aspire to conduct a range of evidence-based research to demonstrate the effects that conservation education in zoos and aquariums has on people's knowledge, attitude, and behaviours toward the natural world.
- The zoo or aquarium should aspire to engage in partnerships with external organisations and academic institutions to conduct social research and evaluation projects.

Introduction

Zoos and aquariums should be able to demonstrate quality and efficacy in their conservation education, using appropriate methods to collect, analyse, and share a range of evidence. They should aspire, through evidence-based research, to demonstrate the effects of their conservation education on the audience's knowledge, attitude, and behaviours toward species and the natural world. Doing this requires systematic and strategic approaches to planning, implementation, and evaluation. It involves using theoretical frameworks, rigorous design, and robust sampling techniques to gather appropriate quantitative and qualitative data. It requires careful analysis and synthesis of the data to produce results that are meaningfully used to demonstrate collective effects, achievements, benefits, and changes due to conservation education in zoos and aquariums.

Zoos and aquariums should strive to embed research (monitoring, evaluation, and social research) into conservation education's strategic plans and operations. This systematic approach will help demonstrate the range of effects and impacts their conservation education has on its audiences and the wider world. Additionally, the results can be to influence and improve the quality and efficacy of conservation education.

CASE STUDY

Onsite conservation education outreach programme helps to connect Vietnamese communities to the natural world.

Valuing Nature in Childhood Programme is the first conservation education programme for kindergartens in Vietnam. It takes place in Cuc Phuong National Park, Ninh Binh run by Save Vietnam's Wildlife. The programme connects pre-schoolers, parents, and teachers with the local forest and rescued, unreleasable wildlife, to foster their love and appreciation of nature. As of 2019, 236 one-day nature interpretation trips had been delivered, engaging 5897 children and 1078 adults, many of whom face economic, access, and cultural barriers in enabling zoo visits. The evaluation was conducted through pre and post questionnaires and revealed positive changes to participants' awareness, knowledge, and attitudes towards nature conservation. To illustrate, 80% of children correctly identified pangolins after the programme, compared with only 18% before the trip. Additionally, 95% of children showed positive attitudes and behavioural intentions towards nature and wildlife. The programme also strategically involved local communities, charities, governmental, and private sectors to support and expand this programme in Vietnam.

Save Vietnam's Wildlife educator introduces local pre-schoolers, parents and teachers to Hoi An, an unreleased Binturong *(Arctictis binturong)* at the education centre during the trip. **© PHUONG THI THUY VU/ SAVE VIETNAM'S WILDLIFE**

Planning

Planning is an integral part of effective monitoring, evaluation, and social research practice. When developing plans for a conservation education programme or activity, clear and measurable aims and outcomes should be mapped out in change pathways. These help to describe anticipated changes and to identify tools that can help measure intended and unintended outcomes. Integrating the delivery and evaluation phases means that monitoring can take place regularly. Data can be gathered against agreed indicators; and evaluation can be used to measure the effects and suggest improvements. Focused social research can be planned to address research questions that are integrated into the plan.

As part of the strategic planning approach, zoos and aquariums should aim to create a future-focused social research agenda. This will highlight key conservation education topics with associated research questions. It helps zoos and aquariums, as well as external research partners, have a clear sense of the future scope, priorities, audiences, and intersections for monitoring, research, and evaluation.

Having this roadmap of research themes and questions helps to visualise the collective contributions of organisations that strengthen the evidence of the value and impact of conservation education in zoos and aquariums.

CASE STUDY

Building a Social Science Research Agenda – Association of Zoos and Aquariums (AZA)

The AZA 2020 Social Science Research Agenda consists of five key research questions, accompanying sub-questions, and an action plan with implementation strategies. The agenda builds off of the work of the 2010 Framework for Social Science Research in Zoos and Aquariums while acknowledging the changing social climate and emerging issues to address. The agenda was created through an iterative process, engaging a cross-section of practitioners, academics, and researchers over several months. It serves as a compass to guide AZA members in their pursuit of defining (and demonstrating) impact, understanding their role in society, successfully meeting conservation goals, and ultimately delivering on mission. While the agenda was designed for AZA members, the questions are globally applicable, and zoos and aquariums in other regions would also benefit from these research studies and their findings.

KEY RESEARCH QUESTIONS

1. How can zoos and aquariums help build a more equitable society through critical reflection on their internal operations, culture, and communications? How can zoo and aquarium diversity, equity, access, and inclusion (DEAI) efforts support this?
2. What is the role of zoos and aquariums in communities, including in the context of striving for environmental and social justice?
3. What is the role of zoos and aquariums in contributing to social change toward conservation?
4. What is the role of zoos and aquariums in contributing to the development of a person's intellectual, social-emotional, and physical well-being?
5. How can zoos and aquariums maximise their systemic impact on conservation?

Measuring Change

Much of conservation education aims to catalyse social changes in audiences to support biodiversity conservation outcomes. These include, but are not limited, to changes in knowledge and understanding, attitudes and values, actions and behaviours, and practical, scientific, and personal skills. Given that zoos and aquariums are complex learning spaces, there should be a pragmatic yet rigorous approach to conducting research that measures changes within these real-world contexts. People learn about species and the natural world through an intricate constellation of experiences. Each person has a unique "conservation constellation" of how they think, feel, and act toward the natural world. It is made up of learning experiences—formal education and training; learning through family, friends, and peers; learning through the media; through everyday learning; and informal learning environments, such as zoos and aquariums. Learning about species and the natural world is lifelong and changes over time, as people build new points of reference within their conservation constellation.

In response to this complex network, zoos and aquariums can move away from solely attempting to identify clear, causal links between controlled or planned conservation education interventions. It is challenging to establish clear lines of attribution in this real-world context, due to the multitude of experiences that motivate and influence audiences in how they think, feel, and act toward species and the natural world. Including social research that focuses on exploring the contributions and effects— rather than focusing solely on attributional impacts—helps zoos and aquariums to take a more open, neutral, and exploratory stance in their research and evaluation.

CASE STUDY

Penguin Promises at SAAMBR: "We don't want your money honey, we want your love."

A visitor to uShaka Sea World, Durban South Africa completing a Penguin Promise postcard. **© SAAMBR**

SAAMBR encourages visitors to make environmentally responsible decisions after their visit. They designed a behaviour change campaign to encourage visitors to undertake environmentally responsible behaviours at home. Visitors to uShaka Sea World, Durban, South Africa were encouraged to "Make a Promise to the Penguins." A visitor's promise is their commitment to make a change in their daily lives to become more environmentally responsible. Visitors hand-wrote their promise on a postcard and posted it onsite. Research provided evidence of the efficacy of the campaign. Visitors who completed a postcard were contacted a year or more after their visit. The results (N=316) showed that 49.4% of respondents could give an example of something positive they had done for the environment, that they attributed to the campaign. The research revealed what encouraged visitors to make and keep their promises. These important principles should be considered in the design of future environmental behaviour change campaigns in zoos and aquariums.

Demonstrating the Conservation Education Value of Zoos and Aquariums

Through different kinds of research (monitoring, evaluation, and social research), zoos and aquariums can understand more about their audiences. They can also understand more about the range of effects their conservation education has on what people think about, feel about and act toward the natural world. Strengthening the evidence of the value of conservation education is essential for zoos and aquariums. Evidence can help to demonstrate how, individually, zoos and aquariums fulfill their mission and vision, and help to further innovate and guide future conservation education activities and associated research.
It also helps leverage funding and support, and it further demonstrates the collective impact of conservation education by zoos and aquariums around the world.

Approaches and Methods

Numerous approaches and methods can be used to monitor, evaluate, and research conservation education. It is beyond the scope of this strategy to explore all of these approaches in detail. Fundamentally, zoos and aquariums should strive to understand the range of approaches and methods available. This will help in decision making to select, develop, and implement the right tools to test, explore, and measure the quality and efficacy of their conservation education.

Designing monitoring, evaluation, and social research projects involves making decisions and supporting them with clear and rigorous justifications. There are different ways to collect qualitative and/or quantitative data using single or mixed-method approaches, including surveys, questionnaires, key informant interviews, drawings, and observations. Deciding what sampling technique to use and how to collect data to answer research questions is an important step, as is determining the target audience. Is the research testing a hypothesis, or taking a more grounded exploratory approach? Is it trying to measure immediate, short-term or longer-term effects? Monitoring can take place throughout a conservation education programme. Evaluation can happen at multiple stages of a conservation education activity, depending on the type of evaluation that is being used. These include formative, summative, process, outcome, and impact evaluation. These evaluation approaches can provide different data to answer various questions about a range of conservation education. Focused research data collection is dependent on both the questions and theory underpinning the selected approach. Once data are collected, decisions need to be made on how the data will be analysed, and the results synthesised into a product report or publication. Finally, the use and usability, meaning how the organisation uses and responds to the results from the research or evaluation, are as important as the research process itself. Zoos and aquariums should be open to improving, modifying, or changing their conservation education practices as a result of the conclusions that are drawn from their monitoring, research, and evaluation.

Rediscovering nature - trail through the Atlantic Forest. **© PAULO GIL SÃO PAULO ZOO**

Australian Little Penguins *(Eudyptula minor)* with bubbles at Melbourne Zoo.
© GEMMA ORTLIPP, ZOOS VICTORIA

CASE STUDY

Social research: maximising and measuring conservation behaviour change programs

To ensure their behaviour change programs are effective, Zoos Victoria, Australia, embeds social research into the development and implementation phases. Working with university partners increases capacity to conduct this research. For the Safe Cat, Safe Wildlife program, which encourages cat owners to keep their cats fully contained, Zoos Victoria collaborated with a university student to survey cat owners to understand their motivations and beliefs around cat containment. This helped shape the campaign narrative and create content that engaged cat owners in the call to action. Evaluating these programs is crucial to understanding their impact. A Before-After-Control-Intervention evaluation was used for the When Balloons Fly (WBF) program, aimed at reducing balloon waste pollution. By surveying zoo visitors (intervention group) and the broader community (control group) before and after WBF launched they were able to measure the positive impact WBF had on the attitudes and behaviours of people exposed to the message.

The Safe Cat, Safe Wildlife program helps cat owners keep their pet cats contained, keeping them and our native wildlife safe. **© ZOOS VICTORIA**

Ethics

Regardless of the type of research undertaken, it is essential to consider all ethical implications before data collection can start. As part of their conservation education plan, organisations should have a governance framework in place. This should include a set of ethical principles and systematic review processes for all research projects that involve people. The risks of harm should be minimised through careful project planning, informing people of their rights, and giving them clear information about their role and data in the research beforehand. Additionally, zoos and aquariums should gain informed consent where necessary, uphold confidentiality, avoid deception, debrief afterwards, and take a "do no harm" stance in all their social research and evaluation practices.

Challenges

Several challenges exist for social research and evaluation in zoos and aquariums. One of the main challenges facing zoos and aquariums is the often fundamental lack of knowledge, skills, and confidence in how to design and implement systematic processes for monitoring, social research, and evaluation. To demonstrate the range of effects and value of conservation education requires significant changes in how social research and evaluation is funded, conducted, and supported within zoos and aquariums. To do this, high-level commitments are needed to invest in building capacity to support evaluation and research practices throughout the entire organisation. Zoos and aquariums should strive to truly demonstrate their individual and collective contributions to how people think, feel, and act toward species and the natural world. To do this, the importance and necessity of quality systemic research practices should be a future priority. This can be achieved through improved collaboration and coordination, including the sharing of knowledge, resources, reports, research tools, and reporting on where approaches did not work out as expected, along with successes. More commitments for inter-organisational training, collaborative multi-institutional projects, and longitudinal studies should help zoos and aquariums globally to improve their collective abilities in monitoring, evaluation, and social research. In addition to collaborating with other zoos and aquariums, organisations should partner with relevant non-profit organisations, specialist researchers, and academic institutions.

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Acronyms and Websites

ALPZA
Asociación Latinoamericana de Parques Zoológicos y Acuarios

AZA
Association of Zoos and Aquariums

CBD
Convention of Biological Diversity

CPSG
Conservation Planning Specialist Group

EAZA
European Association of Zoos and Aquaria

IPBES
The Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services

IPCC
The Intergovernmental Panel on Climate Change

IUCN
International Union for Conservation of Nature

IUCN CEC
IUCN Commission for Communication and Education

IZE
International Zoo Educators Association

JEP
Job Exchange Programme

PAAZA
Pan-African Association of Zoos and Aquaria

SEAZA
Southeast Asian Zoos and Aquariums Association

UN SDG
United Nations Sustainable Development Goals

WAZA
World Association of Zoos and Aquariums

WZACES
World Zoo and Aquarium Conservation Education Strategy

ZAA
Zoo and Aquarium Association Australasia

Glossary of Terms

The context of this strategy determines the definitions provided here. These definitions aim to provide clarity and confidence about the meanings within this document.

21st Century Skills
The skills, abilities, and learning dispositions that have been identified as being required for success in 21st-century society. The skills have been grouped into three main areas:
1. Learning and innovation skills: critical thinking and problem solving, communications and collaboration, creativity and innovation.
2. Digital literacy skills: information literacy, media literacy, Information and communication technologies (ICT) literacy.
3. Career and life skills: flexibility and adaptability, initiative and self-direction, social and cross-cultural interaction, productivity and accountability.

Accessible
The ability to welcome and give reasonable access to everyone along the continuum of human ability and experience.

Advocacy
A combination of individual and social actions designed to gain awareness, political commitment, policy support, social acceptance, and systems support for a particular goal or programme.

Animal welfare
Animal welfare refers to a state that is specific for every individual animal; it is how the animal experiences its own world and life through its association with pleasant experiences specific for that species such as vitality, affection, safety, and excitement or unpleasant experiences such as pain, hunger, fear, boredom, loneliness, or frustration. (WAZA definition 2020)

Anthropocene
Relating to the current age, viewed as the period during which human activity has had the greatest influence on climate and the environment.

Aquarium
Permanently sited facility primarily open to and administered for the visiting public, with living wildlife and other species.

Audiences
Individuals or groups that connect to a zoo or aquarium onsite, offsite or online.

Biodiversity
The variability among living organisms from all sources, including inter alia, terrestrial, marine and other aquatic ecosystems, and the ecological complexes of which they are part; this includes diversity within species, between species, and of ecosystems (CBD definition).

Biophilia
An innate and genetically determined affinity of human beings with the natural world.

Behaviour
(in relation to humans) The range of physical or mental, learned or instinctual, conscious or unconscious, habitual or planned behaviours exhibited by humans.

Behaviour change
A broad range of coordinated interventions, activities, and approaches that focus on the individual, community, and environmental to motivate and influence specified behaviour patterns.

Capacity building
A process by which individuals and groups obtain, improve, and retain the skills, knowledge, tools, and experience needed to solve problems and implement change.

Climate crisis
Serious problems likely to be caused by changes in the world's weather; in particular the world getting warmer as a result of human activity increasing the level of carbon dioxide in the atmosphere.

Climate emergency
A situation in which urgent action is required to reduce or halt a rapidly changing climate and avoid potentially irreversible environmental damage.

Community
A body of individuals linked together by any mix of geography, policy, law, interests, knowledge, characteristics, kinship, history, social structure, economics, politics, or other types of bond.

Community engagement
A collaborative two-way process, involving respectful and responsive activities, interactions and listening to communities (individuals, groups and organisations) with the goal of generating mutual benefits, connections, and relationships.

Conservation advocacy
Individual and social actions designed to raise awareness, political commitment, policy support, social acceptance, and systems support for biodiversity conservation.

Conservation education
The process of influencing people's attitudes, emotions, knowledge, and behaviours about biodiversity conservation.

Conservation psychology
The scientific study of the reciprocal relationships between humans and the rest of nature, with a particular focus on how to encourage conservation of the natural world

Conservation
Securing populations of species in natural habitats for the long term (WAZA definition).

Conservation storytelling
The narrative shape given to a sequence of events to contextualize, highlight and convey meaning, transmit history and tradition, entertain, build empathy and community, and to motivate people to take conservation action.

Conservation welfare
Ensuring positive animal-welfare states at the same time as aiming to achieve conservation objectives, such as wildlife-research activities or release-to-the wild programmes. (see Chapter 6—WAZA's Caring for Wildlife.)

Cross-curricular approach
An interdisciplinary and dynamic blend of learning topics, academic disciplines, and skills/ competencies/ learning styles used within education and learning.

Diversity
A recognition and appreciation of the variety of characteristics that make individuals unique in an atmosphere that promotes and celebrates individual and collective achievement.

Critical thinking
Critical thinking is the ability to think clearly and rationally, understanding the logical connection between ideas.

Ecological thinking
An understanding that the world is fundamentally interconnected and interdependent. From an ecological perspective, humans are not separate from nature but are deeply embedded in the "web of life."

Ecosystem
A biological community of interacting organisms and their physical environment.

Environmental citizens
People who act and participate in society as agents of change in the private and public sphere, on a local, national, and global scale, through individual and collective actions, in the direction of solving contemporary environmental problems, preventing the creation of new environmental issues, achieving sustainability as well as developing a healthy relationship with nature.

Education for sustainable development
An approach to learning that empowers learners to make informed decisions and take responsible actions for environmental integrity, economic viability, and a just society, for present and future generations, while respecting cultural diversity.

Education for sustainability
A lifelong learning process that leads to an informed and involved citizenry having the creative problem-solving skills, scientific and social literacy, and commitment to engage in responsible individual and cooperative actions.

Education welfare
Where positive animal welfare states are ensured, at the same time achieving conservation education objectives.

Empathy
Empathy is a stimulated emotional state that relies on the ability to perceive, understand, and care about the experiences or perspectives of another person or animal.

Engagement
The degree of attention, curiosity, interest, optimism, and passion that individuals show, which extends to the level of motivation they have to learn and progress.

Equity
Equity takes into account that people have different access to resources because of a system of oppression and privilege. Equity seeks to balance that difference. In an equitable environment, an individual or a group would be given what was needed to provide them with equal advantage. This would not necessarily be equal to what others were receiving. It could be more or different. Equity is an ideal and a goal, not a process. Equitable means having equity.

Evaluation
A systematic and objective assessment using qualitative and quantitative data of the design, implementation, and results of an ongoing or completed project, program, or policy.

Evidence-based
An approach that emphasizes the practical application of the findings of the best available current research.

Exhibit design
The process of creating the spaces and experiences for the species, animal care staff, and visitors.

***Ex situ* conservation**
The conservation of species outside their natural habitats.

Field conservation
Directly contributing to the long-term survival of species in natural ecosystems and habitats.

Formative evaluation
Happens usually during the development of conservation education activities, in order to make early refinements and improvements, and influence design decisions.

Global heating
Indicates a stronger emphasis of the rapid warming of the whole Earth system: atmosphere, cryosphere, and oceans system.

Guardianship
Individuals and groups who actively connect, protect, and looking after something—such as the environment.

Impact evaluation
Focuses on evaluating long-term, sustained changes as a result of conservation education activities, both positive and negative, and intended and unintended.

Inclusion
The authentic and intentional embracing, leveraging, and celebrating the strengths of all individuals and groups, and the ongoing efforts to ensure that diverse individuals fully participate and are valued as respected members of an organisation or community.

***In situ* conservation**
Conservation of species within their natural habitats—that is "in the wild."

Interdisciplinary
Combining or involving knowledge and modes of thinking from two or more academic disciplines or fields of study, resulting in a synthesised approach.

Interpretative planning
An initial step in the planning and design process for informal learning-based institutions like zoos and aquariums, where interpretation is used to communicate messages, stories, information, and experiences. It is a decision-making process that blends management needs and resource considerations with visitor needs and desires to determine the most effective way to communicate a message to a targeted audience.

Logic models
A graphic that displays a programme's goals, objectives, and indicators of success. It is often presented as a matrix that displays the specific activities, expected outcomes, and measures of success. The aim of a logic model is to provide a shorthand display of the logic guiding the execution of a programme, and is a tool for explaining your theory of change.

Measurable learning outcome
A SMART (Specific, Measurable, Achievable, Relevant, Time-bound) statement of what an individual/group is expected to be able to do, know about and value as a result of a conservation education activity, event, or programme, and how well they should be expected to achieve those outcomes. It states both the substance of learning and how its attainment is to be demonstrated.

Monitoring
Continuous and systematic collection and analysis of data against specific indicators to check progress toward conservation education aims and outcomes.

Neurodiversity
A concept that recognises, respects, and embraces all neurological uniqueness, all rhythms of neurodevelopment, and all the forms by which humans can express themselves and contribute to their world.

Ocean Literacy
The understanding of individual and collective impact on the ocean and its impact on people's lives and wellbeing.

One Health
A collaborative, multisectoral, and transdisciplinary approach, working at the local, regional, national, and global levels with the goal of achieving optimal health outcomes recognizing the interconnection between people, animals, plants, and their shared environment. (CDC, One Health Commission)

One Plan approach
Integrated species conservation planning that considers all populations of the species (inside and outside the natural range), under all conditions of management, and engages all responsible parties and resources from the start of the conservation-planning initiative.

Outcome evaluation
Focuses on evaluating the changes (both short- and long-term results) in knowledge, attitudes, behaviours, and practices (or other described outcome) that result from conservation education activities.

Pedagogical approach
The method, and practice, of teaching, including teaching styles, teaching theory, feedback, and assessment.

Process evaluation
Focuses on evaluating the activities of a conservation education programme, its quality, who it is reaching, and how it is implemented. Compares what was supposed to happen with what is actually happening.

Quality framework
A conceptual framework for structuring quality processes by embedding principles of good practice in quality conservation education.

Sixth mass extinction
A proposed geological epoch dating from the commencement of significant human impact on Earth's geology and ecosystems, including, but not limited to, anthropogenic-caused climate emergency.

Social change
A shift in common attitudes and behaviours that characterise a society, community, or context, including changes in social processes, patterns, interactions, relationships, and cultures.

Social change for conservation
Shifts in attitudes, behaviours, systems, and culture that benefits species conservation and society.

Social justice
A concept that everyone deserves to enjoy the same economic, political, and social rights, regardless of race, socioeconomic status, gender, or other characteristics.

Social license
The ongoing approval or broad acceptance within the local community and other stakeholders of a project, a company, or an industry that operates in a given area or region as socially acceptable or legitimate.

Social research
A logical and systematic method of scientifically exploring, analysing, and conceptualizing social life.

Social-ecological system theory
A theoretical concept that humans are a part of, not separate from nature.

Summative evaluation
Focuses on evaluation conducted at the end of a conservation education programmes (or a phase of that programme) to determine the extent to which anticipated outcomes were produced. It is designed to provide information about the merit or worth of the programme.

Sustainability
The development that meets the needs of the present without compromising the ability of future generations to meet their own needs.

Sustainable Development Goals
A set of 17 goals adopted by all United Nations Member States in 2015 as a universal call to action to end poverty, protect the planet, and ensure that all people enjoy peace and prosperity by 2030.

Systems theory
An interdisciplinary field of science concerned with the nature of complex systems, be they physical or natural, or purely mathematical.

Theory of change
A way to describe and illustrate how and why a desired change is expected to happen in a particular context.

Transdisciplinary
A project that crosses many disciplinary boundaries to create a holistic approach.

Contributing Organisations

Argentina
Ecopark Bs.As Proyect
Fundación Temaikèn
Mundo Marino

Australia
Alexandra Park Zoo
Animal Welfare Unit, NSW Department of Primary Industries
Currumbin Wildlife Sanctuary
Flinders University
Lone Pine Koala Sanctuary
Perth Zoo
Taronga Conservation Society
Zoo and Aquarium Association
Zoos South Australia
Zoos Victoria

Brazil
Aquário de Ubatuba
Belo Horizonte Zoo from "Fundação de Parques Municipais e Zoobotânica"
Jardim Zoológico de Belo Horizonte- Minas Gerais - Brasil
Museu de História Natural Do Colégio Dante Alighieri
Museu de História Natural/Aquário Municipal de Campinas
Parque das Aves
São Paulo Aquarium
São Paulo Zoo
Sorocaba Zoo
Zoológico de Santo André - Sabina Escola Parque do Conhecimento
Zoológico do Rio de Janeiro
Zoológico Municipal Luiz Gonzaga de Amoedo Campos

Canada
Calgary Zoo

Chile
Buin Zoo
Zoológico Nacional de Chile

China
Ocean Park Hong Kong

Colombia
Corporación Autónoma Regional de Cundinamarca
Fundación Botánica y Zoológica de Barranquilla
Zoológico de Cali

Croatia
Zoological Garden of Zagreb

El Salvador
Parque Zoológico Nacional de El Salvador

Estonia
Tallinn Zoo

Finland
Helsinki Zoo

France
African Safari
Aquarium of Lyon
Marineland Antibes
Parc Zoologique et Forestier
Réserve Africaine de Sigean
Zoo de Jurques

Germany
Berlin Zoo
Cologne Zoo
Görlitz Zoo
Nuremberg Zoo
Opel Zoo
Tierpark Hagenbeck
Zoo Hoyerswerda

Ghana
West African Primate Conservation Action

Guatemala
Parque Zoologico Nacional La Aurora
Semillas del Océano, ONG

Honduras
Centro Nacional de Conservación y Rescate de Especies Rosy Walther
Roatan Marine Park

Hungary
Budapest Zoo and Botanical Garden
Sóstó Zoo

India
Madras Crocodile Bank Trust and Centre for Herpetology
National Zoological Park
Reliance Foundation

Ireland
Dublin Zoo
Tayto Park

Israel
Ramat Gan Safari
The Tisch Zoological Gardens in Jerusalem/ Israel Aquarium

Italy
Parco Natura Viva
Zoomarine Italia Spa

Japan
Aquaworld-Oarai
Atmosphere and Ocean Research Institute, The University of Tokyo
Chiba Zoological Park
Japan Monkey Centre
Sendai Yagiyama Zoological park
Tennoji Zoological Garden

Lao People's Democratic Republic
Free the Bears

Luxembourg
Parc Merveilleux Bettembourg

Mexico
Zoológico Guadalajara

The Netherlands
Aeres VMBO Almere
European Association of Zoos and Aquaria
Safaripark Beekse Bergen

New Zealand
Auckland Zoo
Hamilton Zoo
Wellington Zoo
Zealandia Ecosanctuary

Poland
Leśny Park Kultury i Wypoczynku Myslęcinek
Poznan Zoo
Warsaw Zoological Garden
Zoo Wroclaw

Portugal
Lisbon Zoo

Russian Federation
Moscow Zoo

Rwanda
Dian Fossey Gorilla Fund International

Singapore
Wildlife Reserves Singapore

Slovenia
Zoo Ljubljana

South Africa
East London Zoo
Johannesburg Zoo
South African Association for Marine Biological Research
Spain
Barcelona Zoo

Sweden
Borås Zoo
Kolmården Zoo
Nordens Ark
Skansen Foundation

Switzerland
Zoo Basel

Taiwan
Taipei Zoo

Thailand
The Zoological Park Organization

Uganda
Uganda Wildlife Education Centre

United Arab Emirates
Al Ain Zoo

United Kingdom of Great Britain and Northern Ireland
Arundel (Wildfowl and Wetland Trust)
Bede's Zoological Society
Belfast Zoological Gardens
Birdworld
British and Irish Association of Zoos and Aquariums
Calderglen Zoo
Canterbury Academy, IUCN ASG
Chester Zoo
Colchester Zoo
Crocodiles of the World
Environment Agency
Flamingo Land
Hanwell Zoo
International Centre for Birds of Prey
Isle of Wight Zoo
Marwell Wildlife
Myerscough College
National Marine Aquarium
Ocean Conservation Trust
Paradise Wildlife Park
Paignton Zoo
Reaseheath Zoo
RZSS Edinburgh Zoo
RZSS Highland Wildlife Park
Sea Life UK
Sparsholt College
The Deep
Twycross Zoo
West Midland Safari Park
Wildfowl and Wetlands Trust
Yorkshire Wildlife Park
Zoological Society of London
ZooStephen

United States of America
America's Teaching Zoo
Association of Zoos and Aquariums
Audubon Aquarium of the Americas/ Audubon Nature Institute
Audubon Zoo
Baton Rouge Zoo
Beacon College
Beez Kneez Creative
Brookfield Zoo
Cheyenne Mountain Zoo
Chattanooga Zoo
Cleveland Metroparks Zoo
Columbus Zoo
Dallas Zoo
Detroit Zoological Society
Denver Zoo
Fresno Chaffee Zoo
Friends of the National Zoo (Smithsonian's National Zoo)
Houston Zoo
Lincoln Park Zoo
Los Angeles Zoo
Minnesota Zoo
Naples Zoo
Nature Aware Magazine
North Carolina Zoo
Oakland Zoo
Palm Beach Zoo and Conservation Society
Phoenix Zoo
Reid Park Zoo
Riverbanks Zoo and Garden
Saint Louis Zoo
San Diego Zoo
San Diego Zoo Safari Park
Seneca Park Zoo Society
Species360
Terry O'Connor Consulting
Texas State Aquarium
The Marine Mammal Center
Turtle Back Zoo
Virginia Zoo
WAVE Foundation at Newport Aquarium, Kentucky
Wildlife Conservation Society

Vietnam
Save Vietnam's Wildlife

World Zoo and Aquarium Conservation Education Strategy (WZACES)

Recommendations Checklist

This checklist is a simple self-audit tool to help zoos and aquariums assess their conservation education against the set of WZACES recommendations.

STEP 1: AUDIT
Each question links to one of the recommendations. Answer Yes, No, Somewhat or leave blank if you don't know.

STEP 2: IDENTIFY GAPS
Any question you have answered with No or Somewhat or that you can't answer will identify gaps for follow-up. Assessing where your zoo or aquarium is right now will help you plan how to improve the conservation education at your zoo or aquarium for the future.

STEP 3: EVIDENCE
Imagine you had to provide evidence of your answers to this WZACES recommendations checklist to an accreditation team or colleagues from another zoo or aquarium. What evidence could you show them? A good practice is to collate a range of physical evidence that demonstrates how you fulfil each recommendation at your zoo or aquarium.

QUESTIONS	YES	NO	SOME WHAT
Chapter 1: Building a Culture of Conservation Education			
Is the conservation education role of your organisation reflected in its written mission statement?	○	○	○
Does your organisation have a written conservation education plan?	○	○	○
Does your conservation education plan outline: a) All your organisation's conservation education activities b) How they apply to different types of audiences c) The strategic thinking behind the plan's design?	○ ○ ○	○ ○ ○	○ ○ ○
Does your conservation education plan make specific reference to how the zoo or aquarium has integrated their mission and vision, as well as applicable national, regional, and international policies into its conservation education?	○	○	○
Does your organisation have appropriate facilities to deliver its conservation education programmes?	○	○	○
Is there evidence that conservation education is an integral part of: a) Institutional collection plans? b) Exhibit design? c) Interpretation planning?	○ ○ ○	○ ○ ○	○ ○ ○
Chapter 2: Embedding Multiple Purposes of Conservation Education into Zoos and Aquariums			
Can your organisation demonstrate that their conservation education outcomes aim to: a) Build knowledge and understanding about species, the natural world, and zoos' and aquariums' contributions to conservation? b) Foster positive connections, emotions, attitudes, values, and empathy toward species, the natural world and zoos and aquariums? c) Promote awe, wonder, enjoyment, creativity, and inspiration about species and the natural world? d) Motivate pro-environmental behaviours, actions, and advocacy to support species and the natural world? e) Develop scientific, technical, and personal skills connected to zoos, aquariums, and biodiversity conservation?	○ ○ ○ ○ ○	○ ○ ○ ○ ○	○ ○ ○ ○ ○

QUESTIONS	YES	NO	SOME WHAT
Chapter 3: Promoting Conservation Education for All			
Does your organisation provide opportunities to learn about conservation onsite, offsite, and online?	○	○	○
Can your organisation demonstrate a range of delivery approaches in their conservation education programmes to cater to different audiences' needs and diversities?	○	○	○
Chapter 4: Applying Appropriate Approaches and Methods in Conservation Education			
Is there evidence that your organisation applies measurable learning outcomes to all aspects of their conservation education?	○	○	○
Are all the organisation's conservation education messages based on scientific facts and theories?	○	○	○
Is the information about the species, ecosystems, and issues exhibited accurate and relevant?	○	○	○
Chapter 5: Integrating Animal Care and Welfare into Conservation Education			
Does your organisation comply with the WAZA or other regional guidelines on animal-visitor interactions?	○	○	○
Does your organisation educate its audiences about the principles of animal care by showing how their organisation achieves high welfare standards for the species in their care?	○	○	○
Chapter 6: Prioritising Conservation and Sustainability into Conservation Education			
Can your organisation demonstrate that it makes its conservation and sustainability issues relevant to audiences' own lives and experiences in order to inspire people to take action locally that can make a difference globally?	○	○	○
Does your organisation educate its audiences about their own conservation work by demonstrating how their organisation makes direct and indirect contributions to conservation?	○	○	○
Does your organisation educate its audiences about their own sustainability work by demonstrating how their organisation makes direct and indirect contributions to a sustainable future?	○	○	○
Chapter 7: Optimising Training and Professional Development in Conservation Education			
Does your organisation have at least one staff member with the necessary experience and qualifications who is responsible for leading and implementing your conservation education plan?	○	○	○
Can your organisation demonstrate its support to staff and volunteers involved in their conservation education to be actively involved in local, national, regional, and international conservation education networks and meetings?	○	○	○
Can your organisation demonstrate its support of staff and volunteers involved in their conservation education with continuous professional development and training, to be able to meet the aims of the conservation education plan?	○	○	○
Chapter 8: Strengthening the Evidence of the Conservation Education Value of Zoos and Aquariums			
Can the organisation provide a range of evidence to demonstrate how it is carrying out its conservation education plan?	○	○	○
Can the organisation demonstrate how it evaluates its conservation education programmes using appropriate methods?	○	○	○
Does the organisation conduct a range of evidence-based research to demonstrate the effects of conservation education in zoos and aquariums has on people's knowledge, attitude, and behaviours toward species and the natural world?	○	○	○
Does the organisation partner with external organisations and academic institutions to conduct social research and evaluation projects?	○	○	○


WAZA
World Association
of Zoos and Aquariums
iZE
INTERNATIONAL ZOO
EDUCATORS
ASSOCIATION