Caring for Wildlife - The World Zoo and Aquarium Animal Welfare Strategy
Chapter 4: Exhibit Design

Our commitment is to have exhibits that provide opportunities to meet animals' physical and behavioural needs

RECOMMENDATIONS

To realise our commitment to high animal welfare standards, the *World Zoo and Aquarium Animal Welfare Strategy* calls on member organisations to:

1. Define environmental characteristics that support species-specific good animal welfare and include these as primary criteria of all exhibit design and upgrades; ensure species-appropriate features based on up-to-date, science-based advice.
2. Seek to ensure that the animals' physical and behavioural needs are met. Provide environmental challenges that encourage curiosity and engagement, as well as choice of access to natural elements, including seasonal changes. Also accommodate the changing needs of an animal or group of animals over time.
3. Ensure that exhibits allow opportunities for separation of animals as required for animal welfare management.
4. Ensure that staff members can safely and easily engage in maintenance, care and training to enable animals to lead rich and fulfilling lives without undue stress or injury.
5. Institute monitoring to assess the quality of exhibit design. Find creative solutions and share them with others.
6. Explain animal welfare on exhibits and provide visitors with information about personal actions they can take to improve the welfare of animals anywhere.
7. Consider the provision of features that allow the animals' continuous species appropriate multiple choices or control over their environment.

INTRODUCTION

The quality of life of any animal is determined by a series of variables, including genetics, previous experiences, the overall quality of the environment and the opportunity to exercise choice in seeking comfort, sustenance and social engagement. Although animals have no control over their genetic makeup and the overall quality of the environment, an individual in the wild or in a zoo or an aquarium can exercise a degree of control over its well-being by choosing to move from place to place in search of different behavioural opportunities, social choices and an ability to express personal preferences.

On any one day, an animal might find itself being more or less comfortable, more or less hungry, or under stress from a variety of external factors. An important aim of exhibit design is to provide animals with opportunities to keep mentally, emotionally and physically fit through dealing with such daily stressors and availing themselves of opportunities to have positive experiences.

Historically, zoos and aquariums have specialised in bringing animals into a human-regulated environment where care-giving was substituted for the animal's 'free-will' or wild state. While many of these animals seem content and outlive their wild counterparts, longevity is not necessarily an indicator of animal welfare. As zoos and aquariums better understand the species and animals for which they care, exhibit design must incorporate whole-of-life needs, expand space allocations, provide a variety of environmental enrichment features and increase opportunities for appropriate social interactions with other animals.

THE ROLE AND STYLE OF EXHIBIT DESIGN

In modern zoos and aquariums, exhibit design takes on two important roles. First, to create a flexible framework where animals have enough space and opportunities for challenge and choice within their own behavioural repertoire, and where staff members are always safe in the proximity of animals and have options to challenge and support the animals' predilections. Second, to design a 'stage set' that supports visitors' opportunities for intuitive environmental learning—where visitors' emotional and intellectual needs are satisfied by understanding how the setting and situation allow the animals to thrive, as well as what the visitors might do to support animal welfare.

There are two main approaches to the style of exhibit design, namely landscape immersion and abstract ecology. The landscape immersion style incorporates natural and sometimes cultural components of the animals' native land. Both the natural and cultural components transcend the exhibit barriers in each direction, placing visitors in a shared setting with the animals. Landscape immersion is a form of 'naturalistic' or 'soft' architecture. This style of exhibit design facilitates intuitive environment learning.

The abstract ecology style uses abstracted elements of the animals' native habitat. Examples include a climbing structure instead of a living forest for brachiating primates, or a geometric concrete formation to represent icebergs in an arctic species exhibit. This style of exhibit design is referred to as 'mechanistic' or 'hard' architecture. Abstract ecology

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Case study 4.1:
Gorilla habitat design innovations

The Gorilla Rainforest habitat at Dublin Zoo, opened in 2011, is unique in the way it matches respect of existing landscape and the behavioural history of western lowland gorillas (*Gorilla gorilla gorilla*), and successfully recreates the character of their home place. The habitat consists of a large natural swamp; a total of 6,000 m^2 of undulating topography gives the gorillas several diverse habitats resembling the grassland, forest and river matrix of their ancestral home. The habitat design was guided by behavioural studies of gorillas in the wild. Visitors explore this tropical biome along a continuous boardwalk. They traverse cascading streams and enjoy views of close and remote landscape and sky, and distant views across a lake to other animal habitats. Visitors come upon formal viewing areas, a play area, an overnight camp and educational opportunities. Discovering and observing the gorillas requires patience, but even if the gorillas choose to avoid detection, the walk itself is an enjoyable experience, with opportunities to observe a troop of red-capped mangabeys (*Cercocebus torquatus*) sharing the habitat with the gorillas, as well as local wildlife.

- Dublin Zoo, Ireland, Western lowland gorilla

can be more economical, thus saving money for enhancing other animal welfare features.

Neither one of these approaches to the styling of exhibits is inherently better for animals than the other. A beautifully designed canyon with a backdrop of trees may convince visitors that they are in the native environment, but it may not be beneficial to animals unless it offers a variety of conditions and activities appropriate to the resident species. Conversely, a jungle gym may be very exciting for gibbons even though it does not visually evoke a natural forest. Regardless of style, it is the species-specific environmental enrichment features, the amount of choice and stimuli, and the ability of the animal to engage in natural behaviours that matter.

EXHIBIT DESIGNS AND ANIMAL WELFARE
How can we design spaces that enhance the fitness, health and welfare of their inhabitants?

Appropriate species selection is one of the first principles of exhibit design. Species should be naturally comfortable in the zoo's or aquarium's climate or kept comfortable through artificial environments (*see Chapter 5*). Physical and landscape characteristics and limitations of space also play a role in determining which species are appropriate. Animals found together naturally in the wild can benefit from mixed-species exhibits and inter-species behaviours can be displayed that would otherwise not be performed in single species habitats. However, consideration needs to be given to the species and individuals involved, as some mixed-species exhibits can lead to overaggressive behaviour, injuries and death, if not managed correctly.

Exhibits should always be designed in a manner that not only considers safety of staff and visitors, but also provides a space where the animal feels safe. Successful exhibit design starts with a thorough understanding of each species' behavioural repertoire over its lifespan (birth, development, maturity, geriatrics and death), and the ways it makes use of its natural landscape. This is a collaborative effort and should involve biologists, animal welfare scientists, animal keepers and researchers who study wildlife in their natural habitats (*see case study 4.1*). Evidence-based design (EBD) can provide valuable information about what has worked in the past and post-occupancy evaluation (POE) techniques can be used to monitor the effectiveness of the exhibit design.
The scale and scope of an exhibit habitat should accommodate each species' range of needs and behaviours. For some species, three-dimensional space will be an absolute priority and essential to achieving positive welfare states, while

for others appropriate social structures will be a priority. Knowing specific species requirements is essential for effective animal welfare exhibit design.

For example, consider how animals use all three dimensions of their natural space, imagine the day-to-day details of their lives and look at their available choices for light and noise levels as well as temperature range. Provide access to natural light. Design for the provision of environmental enrichment and challenge to support animals' opportunities for self-motivated choice.

Case study 4.2:
Advance in animal management style propels advance in exhibit design

Apenheul Primate Park, opened in 1971, pioneered free-range exhibits for primates via experimenting with fences, electrified bridges and social learning of primates. In the first free-range area, which occupies approximately 1 ha of forested area, more than 100 black-capped squirrel monkeys (*Saimiri boliviensis*) roam in the trees and among visitors. The space given to the animals allows them to form rewarding social groups. The holding rooms provide flexibility for the group members to position themselves within the group: each of the eight holding rooms features at least three exits, with each exit leading through an intersection to multiple other rooms. The building has wall rather than floor heating, the target temperature being 25 °C for the wall and 20 °C for the air. An animal that needs to be kept in the isolation room due to injury or illness is always accompanied by a companion selected by the animal keepers based on their knowledge of the group.

- Apenheul Primate Park, The Netherlands, Black-capped squirrel monkeys

Animals should be able to form natural groups (*see case study 4.2*). Prepare for breeding events and to separate animals for welfare reasons. A complementary off-exhibit area or a second exhibit may be needed. Off-exhibit areas, although out of sight of visitors, should be built around specific animals' needs just as exhibits are. Both exhibit and off-exhibit areas should provide safe, easy and flexible options for staff members to engage in maintenance, care, training and observation. Rotating animals on exhibit and to off-exhibit areas may provide additional positive stimuli.

Ideally, staff members should be able to change environmental enrichments and engage in other daily tasks without interfering in the animals' natural behaviours, both to prevent disturbance and to avoid conditioning that leads them to become dependent on human intervention. Thus, design should enable use of flexible systems for placing environmental enrichment to allow for daily variety and challenge. It should also incorporate appropriate management and care devices, such as scales, squeezes and capture chutes, so that animals, regardless of their size and complexity, may more easily accept non-invasive medical procedures through positive reinforcement training.

Retreat areas should be incorporated into exhibits, so that animals, if they choose, can escape from public view. From an educational perspective, explaining the welfare features of exhibits helps visitors to better understand animals' needs. Studies show that animals' need for occasional privacy is recognised by educated visitors who then do not expect to see every animal at every visit. Such explanation can inspire connection and can motivate visitors to take an interest in the welfare of animals in zoos and aquariums as well as their conservation in the wild.

CONCLUSION

A well-designed zoo or aquarium space, along with attentive animal management, can do much to enhance the fitness, health and welfare of its inhabitants. Providing choice within an exhibit and ensuring areas for rest and retreat from visitors can make a notable difference to an animal's welfare. Equally, it can provide opportunities to observe animals as fully sentient individuals whilst they engage in a rich variety of choices and a complex repertoire of behaviours that reflect their own curiosity and individual use of their habitat.

Zoos and aquariums should strive for best practice, lead by example and encourage new ways of thinking about and designing for animal welfare. The solutions do not have to be expensive, but good outcomes require thoughtful, thorough and bold effort.