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Creating Conservation: The Role of Zoos
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Megan Selby

CREATING CONSERVATION: THE ROLE OF ZOOS IN THE FUTURE OF
BIODIVERSITY CONSERVATION

by

Megan Selby

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This thesis was prepared under the direction of the candidate's thesis advisor, Dr. William O'Brien, and has been approved by the members of her/his supervisory committee. It was submitted to the faculty of The Honors College and was accepted in partial fulfillment of the requirements for the degree of Bachelor of Arts in Liberal Arts and Sciences.

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ABSTRACT

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Once seen as entertainment organizations, many American zoos now strongly promote themselves as agencies of biodiversity conservation, a reorientation prompted in part by growing public concern about endangered species. Funding, research, conservation efforts, and captive breeding programs are the concrete tools that allow zoos to lay claim to their contributions, but it is their more subtle cues that leave a lasting impression with zoo visitors. The exhibits, layout, signage, and presentations reflect prevailing attitudes about nature, wildlife, exotic species, and shape ideas about how animals live their lives and what they are like in the wild. This project examines tensions between the public presentation of conservation goals and concrete contributions to conservation. Zoos are one of the few places where the public can see firsthand many animals in an up-close environment and the impact of zoos on the future of conservation may be dependent upon resolving such tensions.

To every person who knows what it is like to look into the eyes of an animal that has placed its trust in you, and who knows what that privilege bears in return.

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Introduction

Zoos were always one of the first places I wanted to go whenever I was in a new town. I have been attracted to them for as long as I can remember. I do not think I am alone in my appreciation, or there would not be as many zoos around today as there are scattered across the United States. It has never been the social outing that attracted me, or the entertainment, but the non-human animals housed in zoos that I wanted to see and learn about and be close to. This thesis is a natural outgrowth of an interest I have had for as long as I can remember. I have worked in wildlife rehabilitation, wildlife education, and animal care. The combination of my experiences as well as my interdisciplinary studies have influenced the outlook I now have on how zoos are situated within the discourse of biodiversity conservation.

Discourse refers to a framework of assumptions that shape what we know about a topic, assumptions that become normalized and achieve a taken-for-granted status. The desirability of biodiversity conservation has become normalized as a discourse that is now international, and serves broadly as the basis for legislation and treaties that promote conservation. Such policies are formed and practices are enacted towards the long-term protection of non-human animal populations and the environments they inhabit. In the context of zoos, biodiversity conservation discourse has shaped the design, layout, and structure of the zoos, as well as how they present such forms to the people who visit the parks.

Zoos continually speak about their desire to play a significant role in the future of conservation. Collectively, their active involvement in research, field studies, field conservation programs, and captive breeding programs are the concrete ways in which

they contribute to conservation efforts. The participation of each zoo depends on its own particular resources and motivations, but collectively they present a common theme of promoting the conservation both on and off-site of the non-human animals in their care.

In terms of conveying conservation messages to zoo patrons, however, it is the visual impression that zoos present through their exhibit designs that matter. In general, visitors are there primarily to see the animals. Zoos, then, must harness their power to create a useful and effective visual impression for the visitors so that conservation education becomes part of the experience. Zoos provide many people with the some of the closest encounters with non-human animals that they will ever have, and so the impression that each visitor gets about an animal might be formed by their experiences at the zoo.

In this thesis, I am concerned with how zoos' goals regarding biodiversity conservation depend on merging covert and overt messages about conceptions of nature, and the relationships between humans and non-human animals, and ultimately, conservation. Our current purposes for zoos can be broadly categorized as entertainment, education, research, and conservation. Funding, research, conservation efforts, and captive breeding programs are the concrete tools that allow zoos to lay claim to their contributions, but it is their more subtle cues that leave a lasting impression with zoo visitors. The exhibits, layout, signage, and presentations reflect prevailing attitudes about nature, wildlife, and exotic species and reinforce certain imbedded frames of thought about where humans stand in relation. I suggest that in this era of rapid biodiversity loss zoos must make extra efforts to ensure that conservation education not only moves to the

forefront of their missions, but is also adequately reflected in zoo exhibit design and other messages that influence visitor perception and action beyond zoo boundaries.

The first chapter provides a history of American zoos in terms of their shifts in design styles over time. Rather than recording the growth of zoos as an industry or changes in ownership, I am concerned with how zoos change their techniques in the context of changing discourses, and what these changes reflect regarding human conceptions of nature. From the initial nineteenth century formation of American zoos housing animals in stylized buildings, science has been used to justify their methods. Originally, animals were organized by taxonomy, but the Modern Era became focused on human innovations in science and technology. The subsequent Landscape Immersion and Naturalism paradigms were based on geographic and natural sciences. Conservation, the current discourse of zoos, is based on the credibility of scientific research.

The second chapter explores the social history of conservation and its influence on both the public and zoos to understand the discourse that zoos have adopted in their approach to establishing themselves as a credible site for promoting the survival of endangered species. The American Zoo and Aquarium Association, to which all accredited zoos belong, formed the Species Survival Plan to ensure zoos' role as the primary center for captive breeding and reintroduction of captive species into non-captive habitats. I examine the case of Golden Lion Tamarins as one of the first subjects of the Species Survival Plan, and then of the methods for selecting and maintaining a genetic bank of individuals in captivity for breeding. The rhetoric, the process involved in implementing the program, and the result present conflicted messages about how humans see their roles in relation to their ideas of nature.

The third chapter focuses on two zoos as case studies to display how exhibit design and presentation reflect ideologies and convey messages about the animals even when not explicitly stated or intended. The Palm Beach Zoo in West Palm Beach, Florida, and Disney's Animal Kingdom in Orlando, Florida were chosen because the former is representative of the history of many municipal zoos, and the latter because it is new, and has an incomparable base of financial resources, on-site acreage, and volume of visitors. Whereas the Palm Beach Zoo had pre-existed and subsequently adopted the conservation discourse, Animal Kingdom had been created after the conservation paradigm was in place. Both deliver conservation messages in various ways, which are explored in terms of success, implicit messages, and potential impact on conservation.

Finally, an idea that recurs throughout the thesis is explored in more depth at the end of the third chapter. A preference for exotic species, and the implications of this historical trend, is discussed. Conservation is a global concern, and the success of conservation practice relies upon both local and international commitment among the public. I am concerned with what impact the preference for exotics in zoos, a term that is only relevant when referenced to a localized idea of native, will have on local concern an awareness regarding native species. I am also concerned with the implications of this exotics preference for altering future visitor behavior and action regarding conservation.

Jennifer Price suggests that many of the relationships we construct between "nature" and ourselves say more about us than about nature (Price 1999). I believe that zoos are no exception, but I hope that their intentions will guide them to continually evaluate their actions in terms of the goals and their successes. There is something very real at stake: endangered species are threatened daily, and the habitats they require are

quickly disappearing. Zoos have accepted responsibility for the care and conservation of quite a few individuals and their species, making the relevance of zoos to the future of biodiversity conservation largely dependent on their effectiveness in engaging visitors in both attitude and action.

Chapter One: A History of Zoos in Social Context

The Early Years of American Zoos

Zoos were first formed in the United States in the 1860s, exemplified by both the Central Park Menagerie in New York and the Lincoln Park Zoo in Chicago, which had their modest beginnings in this decade (Flint 1996). In 1874 Philadelphia opened with almost a thousand specimens. The first zoos struggled to gain funding as public institutions relying on public support and tax dollars. Donations of many leftover animals from circuses, pet stores, or other small sources left many zoos with disorganized collections of possums, raccoons, livestock, and oddities (Flint 1996). Many specimens lived for only a few short years, and zoos constantly had to find dealers who could obtain more organisms. Their success with the public allowed them to continue to obtain animals from around the world, however, and each zoo expanded and more were founded (Baratay and Hardouin-Fugier 2002).

By the late nineteenth century there were nearly a dozen zoos, and plans for a national zoo were being advanced. William Hornaday, a popular taxidermist, was hired to help plan and design the National Zoo, in Washington D.C. (Baratay and Hardouin-Fugier 2002). Hornaday envisioned the National Zoo as a wildlife refuge, a home for the endangered bison and other American species to recover their numbers. American zoos of this era often drew inspiration from European zoos. Hornaday, for instance, and many other zoo planners and designers traveled to Europe and brought home design ideas influenced by European exhibits. The public was against paying for facilities that would be largely closed to visitor viewing, as Hornaday's "refuge" plan suggested, so his plans failed and the national zoo was converted into a mixture of exhibits laid out in a

haphazard way reflecting the random sampling of specimens originally obtained (Hancocks 2001). Hornaday left the zoo disappointed, but not defeated. He was hired to plan and found the Bronx Zoo, and became an original founder of the New York Zoological Society, which later became the Wildlife Conservation Society- the oldest zoo society committed to conservation (Wildlife Conservation Society 2006).

Municipalities separated zoological parks from botanical museums, natural history museums, etc. Zoos displayed animals as taxonomic collections to be observed and studied (Hancocks 2001), and sought to separate themselves in the public eye from disorganized menageries run as spectacles by having organized collections. Since their conception, the blending of entertainment and public education has been a struggle for American zoos. William Hornaday, Reid Blair, and Fairfield Osborn were some of the few early leaders who pushed for conservation and education as being essential components of zoos (Hancocks 2001). In reality, their ideas were rarely enacted to the full extent of their intentions. Although the leaders hoped to include conservation goals, such as Hornaday's vision of a refuge for animals of the Great Plains, the struggle to meet the general public's expectations has shaped the direction zoos have actually followed.

The upper middle class and upper class went to zoos and parks as a means to escape from city life for a few hours. At this point, nature was a pastime, a break for visitors who wished to be surrounded by picturesque scenery and observe novelties. Nature was also a destination. People did not recognize this version of nature in cities, but saw nature as Other (Sabloff 2001). Initially, many exhibits were indoors in heated buildings. Most zoos were in northern latitudes near metropolitan areas, and

professionals did not believe warm climate animals could adapt to the temperate or cool open air. The architecture of the buildings was designed to look like retreat houses, fairgrounds, or exotic buildings from other cultures. Landscaping was typically neat and looked like English-style gardens. Zoos were essentially part of municipal parks, with the animals in indoor buildings, disconnected from the garden-like image of nature outside the buildings (Baratay and Hardouin-Fugier 2002).

At the start of the twentieth century zoos were still recreational social destinations but began to include more visitors from the lower middle class. “Nature” as shown in the zoos was a taxonomic order of biological entities housed in neat sections (Baratay and Hardouin-Fugier 2002). Humans created an orderly, attractive nature; complete with borders of wrought iron fences and flowerbeds in which biota was segregated according to the Linnaean system (Hancocks 2001). Humans were in control of this version of nature entirely, molding it as a scientific representation in a recreational park setting. Although American zoos strove to be seen as legitimate models of taxonomy, and as a discipline of science, they typically did not emphasize research. European zoos routinely established links with universities and were sites for studies and experiments, while American zoos more often simply tried to give off the impression that they were credibly based on scientific knowledge (Hancocks 2001).

Zoos pushed far apart the gap between humans and their conceived non-human nature in the early 1900s, and yet zoos became the space in between at the same time. Zoos tell us how blind society was at this point to how these incarcerated animals really lived their lives if unconfined, or what other natures look like when a groundskeeper has not planned it (Sabloff 2001). According to the standards of the times, presentation for

aesthetic ends meant nature should look like Nature, but more beautiful without any of the decay, death, or unkemptness that occurs when life goes unmanaged. If the scenery looked informal, it was because the original vegetation had been uprooted and new trees had been planted to create an illusion of freely occurring growth (Hancocks 2001). The middle and upper class public wanted to get away from the city, to an unfamiliar, exotic setting, while still enjoying all the luxuries it afforded. Constructions of nature in zoos were indicative of just how removed much of society was from the nature it identified by its own accord. People wanted to be seen as separate from nature, and in zoos they wanted to see it confined, delegated into groupings, managed, and repackaged as an afternoon outing. The few men who suggested that zoos should be otherwise were few and far between, and largely ignored for decades.

Carl Hagenbeck was one of the most influential men in zoo design and architecture in the early 1900s, but even his innovative ideas fit within the framework of a prepackaged nature (Rechenbach 1980). He started out in the middle of the nineteenth century in the fishmonger business in Europe. After having to buy six seals brought to him by some fishermen, he grew into a major animal dealer, collector, and founder of Tienpark in Hamburg, Germany, which is still owned today by his family (Ritvo 1996). Hagenbeck was the first to display his animals in open outdoor panoramas, using moats instead of bars to separate people from animals. Grand in scale and often giving off the impression of a theater display, his animals were given ample space to roam, a considerable change from the small spaces designed by his contemporaries (Rothfels 2002). Hagenbeck romanticized nature to create an appealing presentation.

Hagenbeck's panoramas were layered in ascending tiers, separating animals by trenches and moats. He grouped animals together by geography rather than taxonomy and encouraged a naturalistic design. Hagenbeck carefully planned, organized, and presented an image of nature as completely as any other zoo (Rothfels 2002). The audience was still very much separated from this nature, and the animals were still grouped, segregated from one another, and stylistically displayed for entertainment. The difference was that on the other side of the moat, Hagenbeck's created nature made an attempt to mimic different geographic habitats instead of offering the same version of nature for every animal. Outdoor exhibits were a significant alteration from the buildings that housed animals indoors in most other zoos; the architecture of the buildings was replaced with the architecture of the set design (Hancocks 2001).

A few American zoos copied Hagenbeck's ideas, some even casting molds of actual geological formations (Hanson 2002). Many, however, simply copied from each other, creating a twice-removed constructed nature. Molds designed after molds looked like the artificial piles of plaster and cement that they were. The rockwork ended up not looking like any recognizable rock formation, but like an obvious trick for covering up human-made structures (Hancocks 2001). No illusion of wild habitat was engendered when the bars of the keeper door were visible to the onlookers as a break in a giant outcropping of unlikely rock formations. What was an innovation back then is now a shortcut still prevalent in many zoos- sad remainders of previous models of a badly produced nature.

The Modern Age

The next period in zoos, the Modern Age, is considered a low point in the subjection of the animals to poor qualities of living. The desire to show off human control over the environment had a new set of standards. No more were naturalistic panoramas embraced for the romantic vision of wilderness on display. A smooth, sleek, and functional aesthetic characterized the Modern Age (Baratay and Hardouin-Fugier 2002). Cars, buildings, and home goods were all designed to present ideals of cleanliness. Artificial lighting afforded new architectural designs, more free from dependency on sunlight. Science strove to emphasize empiricism, and exhibits were no exception. In the 1930's the Tecton Group became the leader in the Modern Age of zoo architecture (Jackson 1965). Clean, streamlined exhibits were meant to do away with the stuffy, heated atmospheres of earlier indoor versions that bred musky odors and bacteria. The idea was not to just give the impression of cleanliness, but to be innocuous beyond a doubt to the visitor's eye.

Tecton designed enclosures to be comfortable only near the front viewing areas, and offered few places for animals to hide (Baratay and Hardouin-Fugier 2002). Concrete was the principle medium, as well as plate glass, steel doors, tile, and bars. Animals that are adapted to inhabit an environment rich in complicated textures were confined to smooth surfaces that made hosing off any mess a simple procedure (Baratay and Haradouin-Fugier 2002). Keepers further minimized variety by offering no enrichment, and no variation in daily patterns and schedules. Even diets were scientifically managed through engineered nutrition biscuits that were yet one more lost opportunity for stimulating the animal (Hanson 2002). Here is the most significant early

example of how the desire to persuade the public that only the best in animal care standards are used can actually be detrimental to the animal's well being.

The Modern Age in zoos was characterized by bored, lethargic, erratic, and repressed animals (Hancocks 2001). Left with only their own fecal matter or daily food to interact with, many animals engaged in behaviors motivated by stress and frustration. Feather plucking, noise making, aggression, sexual frustration or excessive sexual activity are all behaviors that are the result of a bored, under-stimulated animal who is prevented from engaging in any healthy pastimes. The public learned little about the true ecology of animals who were kept in captivity in this manner. Very few behaviors that non-captive members of a species learn, or that are innate in captive or non-captive members, were reinforced, and the unhappy dispositions of the animals engendered feelings of apathy, fear, or negativity in the visitors (Malamud 1998).

Projecting ideals of cleanliness and scientific accomplishment were the goals of the many zoos during this era, rather than presenting the animals, which suffered greatly during this period when humans were more focused on themselves than on the animals on display. The animals may have had fewer diseases and infections thanks to advances in vaccines and antibiotics, but their quality of life was dismal. Until the public gained a renewed interest in the environment and inherent value of wildlife, the animals were subjected to the kind of hospital room sterility and innate boredom most humans despise. In the Modern Era, boundaries created by Americans between themselves and the nature they saw were cleaned up and controlled, until the 1960s, when society was forced to see the world from a new perspective.

Immersion and the Environment

The mid-twentieth century was a tumultuous time for Americans. The threat of the atom bomb caused people to look around them and evaluate the status of their surroundings. Rachel Carson and other scientists pushed the public to see more clearly that the environment was a legitimate field for concern, and with the rise of the social movement called environmentalism, people adopted a sense of responsibility for the lives of animals that were quickly perishing as a result of human actions (Gottlieb 2005). Americans began to interpret the well being of the environment from a viewpoint of how humans had impacted current conditions.

Space exploration in the 1960s brought home the first images of the Earth as a finite globe floating in space. The planet suddenly seemed much smaller. Limited resources became viewed as a legitimate concern and not just scare tactics by extremists. Environmentalists grasped the importance of “spaceship earth” and the general public started to pay attention. The photograph of the planet in space revealed very little that we did not already know, and yet technology gave an image to society that Americans jumped at, as if seeing the world for the very first time. A different perspective emerged from spaceship earth in which humans and a separated nature all of a sudden seemed constrained.

People in this transition period were living in increasingly urbanized settings, and perceived themselves as more divorced from nature than ever. Threat of extinction of many species and the loss of habitat on a massive scale caused many to sense that they might run out of time, or space, to experience interaction with a non-human nature. It is in this social context that movement towards zoos as a “nature experience” began.

Mimicking the dominant conceptions of nature became the goal, rather than celebrating human's control of it or displaying it as if it were in an art competition. Nature as non-human wilderness attracted people who wanted to feel they were immersed in the wild and part of that image.

Landscape Immersion, the design approach to achieving that goal, had been suggested or attempted before, but it was not until the 1970s that zoos collectively began to embrace its ideals. For the first time, innovators like William Conway were emphasizing the possibilities of educating people by presenting a more naturalistic exhibit, and the public was responding. Designing exhibits that resemble the wild habitat from which an animal comes gives the viewer a sense of what it would be like to see that animal *in situ*. Zoos relied primarily on visual knowledge to convey ideas to visitors that would help them associate the animal in front of them with its non-captive counterpart. If mimicry is a sincere form of flattery, then for the first time zoos are trying to offer an appreciation for nature in its own right, reflecting environmentalism's backlash against modernity. Seattle's Woodland Park Zoo was one of the first to overhaul its exhibits and rebuild in the new style (Hanson 2002).

Landscape Immersion's strength is in extending the exhibit to the visitor side. Surrounding the visitor on all sides makes the experience seem more total than the manicured gardens and lawns of early zoos. Not that the new landscaping was any less managed, but it was simply made to appear as if it occurred spontaneously, as wild as the animals it enclosed. Early techniques in horticulture did not hide the fact that the landscaping was constructed, whereas the new image was supposed to evoke a sense of being immersed in an unmanaged, wild nature. Playing soundtracks of recorded rain,

frogs, birdcalls, and monkey cries often accompany the new overgrowth of flora. The control of humans over their surroundings is just as strong as before, but because of the environmentalism, zoos tried to mask the domination. The implication was that humans still saw nature as Other, as non-human, but that they wanted to be a part of this nature which they desired and from which they saw themselves as alienated. Zoos worked to provide them with this interactive nature experience.

The new immersive landscapes were not made to be faithful representations of each animal's habitat, but simply to look like common public ideas of nature, showing off specific features of the animal, or mimicking local geographic landscapes that the visitors might recognize. Concealing architecture became more important, and keeper-friendly designs still took precedent over aesthetic design techniques. As zoos continued to copy from one another, there seemed to be a sort of overall picture employed universally: lots of green, lots of rock, and ponds and rivers and waterfalls. At this point, people still seemed to have an idea of nature that had little diversity, dynamics, or connection to themselves or to the animals.

The next stage in zoo design, Conservation, the subject of the next chapter, was a continuation of Landscape Immersion, and the result of a deepening environmentalism in the 1970s. Action was now demanded as a step beyond mere concern. Zoos have taken the design aesthetics of Landscape Immersion and matched them with the actions called for by environmentalists to create an experience that is meant to extend beyond the walls of the zoo. Now, when visitors go to zoos they learn about the role zoos play in conservation, both inside the park and around the world. Since zoos are one of the key

sources of information for the general public about animals, what they say is influential regarding public values and perceptions (Ogden et al. 2004).

Chapter Two: Conservation Moves Forward

Conservation in Context

The previous chapter recorded a history of American zoos in the context of shifts in social discourses on nature. The most recent shift has led into our current discourse, biodiversity conservation. This chapter will provide a brief historical account of conservation as a movement, in order to provide a context within which to understand zoos' perspective on conservation. Following the historical context of biodiversity conservation is a brief look at the Bronx Zoo, a model for realizing the rhetoric used by zoos, and then an account of the programs that zoos endorse as their contributions to conservation action. The Species Survival Plan, and the corresponding International Species Information System, is chosen to examine the process, the rhetoric, and the success of zoos in terms of their conservation goals.

During the early years of the environmental movement, zoos began to plan active conservation efforts, focusing on animals both in captivity and their wild counterparts. Zoos took steps to form programs with clear conservation goals and educational components that they could point to when the public put them under scrutiny. In the context of this new public consciousness, removing animals from the wild to be housed in captivity suddenly required justification. New exhibits removed as many overt signals as possible that the animals were captive under human control and design. Beyond the zoo gates, conservation as a movement was taking shape in worldwide politics. International conferences, new agreements, new laws, and public protests about the environment were increasingly being pushed to the front of agendas.

Environmental action experienced a watershed year in 1970. For instance, Richard Nixon signed the National Environmental Policy Act (NEPA), requiring for the first time that all federal agencies account for their environmental impacts before receiving funding. Nixon also established the Environmental Protection Agency (EPA) that year as a means of monitoring and regulating polluting activities. The year also marked the first Earth Day celebration, demonstrating the widespread public interest for environmental concerns. Soon after, the Endangered Species Act was passed in 1973, and represented a bundle of laws passed to protect specific species listed as threatened or endangered from any actions that might cause further decline in their numbers.

Yet environmental action was still dominated by an anthropocentric outlook. Even in legislation that is meant to protect and benefit wildlife, conservation has always made it clear that humans are first on the agenda. Where preservationism advocates setting aside land or ensuring protection entirely, for its own right, conservationism implies that humans should use resources, but in such a manner that enough are conserved for future consumption as well (Gottlieb 2005). Conservation is more about finding an efficient level of human consumption of a resource that does not threaten its supply, and views the biotic world primarily as a source of human-use value and secondarily in inherent value. Similarly, zoos rely on entertainment, a human-use value, as their primary means of attracting visitors and on conservation messages secondarily.

At the international level, the World Conservation Union (IUCN) has played a significant role in shaping biodiversity conservation such that human economic development is incorporated into conservation plans (IUCN 2006). IUCN, led by a zoo director, created a captive breeding program for the purpose of maintaining a captive

population of select endangered species (Baratay and Hardouin-Fugier 2002). In the 1960's IUCN created the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) that became active on July 1, 1975 (CITES 2006). Participating countries volunteer, but once included they are bound by law to commit to the resolutions. Laws and regulations on the trade of endangered species must be adhered to even by zoos, but there is a clause that allows for permits to be granted for scientific purposes of even Appendix I species, the most critically endangered species listed, to be traded (CITES 2006). Zoos have been able to obtain the permits with approval by the IUCN and CITES to capture endangered species for their captive breeding programs (Baratay and Hardouin-Fugier 2002).

Other institutions have continued this conservative-use trend in policy formation, creating a discourse on conservation that puts economics at its core. Particularly from the 1980s, an international emphasis on “sustainable development” has accomplished efforts by government agencies and large environmental organizations to address biodiversity loss globally and to regulate the trade of animals and plants. Zoos have adopted an anthropomorphic framework for incorporating conservation into a field that is expected to provide entertainment equal to its environmental concerns. Part of the problem I identify is that the conservation movement has allowed for zoos to keep human interests at their core, and to popularize animal interests secondarily as part of the attraction.

Zoo Contributions

Research in and by zoos has been increasing steadily in the last few decades. Zoos must have available funding to be able to partake in this aspect of conservation, but

nearly all make it a priority to contribute on some level (Hancocks 2001). How they contribute matters because if they truly are to be a key player in biodiversity conservation, their manner of contribution will affect the trajectory of the conservation process. There are primarily two types of research zoos in which are involved. There are research projects focused worldwide on the conservation efforts of a human community, habitat, and survival of the focal species. The zoo may have staff from its own facility involved in the research, or simply assist in funding a currently existing program (Ogden et al. 2004). The second type is research conducted on site. The focus here may be on animal behavior, training, psychology, husbandry, visitor trends, or any number of other related aspects. Increasingly zoos are becoming accepted as sites for scientific research (Maple 1995).

The Bronx Zoo is one of the most notable leaders in the zoo research field. They excel in conservation, education, and in cooperation with other organizations on a local, national, and international level (Hancocks 2001). Their history of these goals spans back further than most any other zoo as well. They have been committed to conservation since the beginning, thanks to the direction of William Hornaday. As indicated earlier, the New York Zoological Society, today known as the Wildlife Conservation Society, was established in 1895 as part of the Bronx Zoo, and one of its very first efforts was toward protecting the North American bison (Wildlife Conservation Society 2006). Today five zoos and aquariums in the New York area are part of the Wildlife Conservation Society, and all are contributors to the institution's conservation goals (Wildlife Conservation Society 2006). The Bronx Zoo has supported international conservation since the very beginning of the 1900s (Bronx Zoo 2006).

Today, the Wildlife Conservation Society is involved in conservation efforts on every continent and in countless regions (Wildlife Conservation Society 2006). They have lobbied for the foundation of protected parks worldwide, and have had the insight to connect many research projects with long-term monitoring and maintenance. They train and hire local research biologists, managers, and professionals. The Wildlife Conservation Society consistently funds graduate research to be carried out in-situ, creating important connections between established universities and zoos. They are the pioneers of programs that aim at outreach for local, national, and international programs in learning, training, and teaching. Efforts are often multi-lateral, working across borders and disciplines. Issues such as gender equity have drawn attention in tandem with Girl Scouts of America and the National Science Foundation (Wildlife Conservation Society 2006). In short, the Wildlife Conservation Society and the Bronx Zoo exemplify in many ways the goals of all modern American zoos.

The American Zoo and Aquarium Association, or AZA, is an organization that was created collectively by zoos to uphold a standard based on evaluation, inspection, and peer-review for animal care quality and husbandry (AZA 2006). AZA initiated the first major multi-institutional program, the Species Survival Plan (SSP) to enact many zoos' mission statement goals of being actively involved in conservation of wildlife species. Formed in 1981 to breed selected species in captivity in AZA accredited institutions throughout North America, "Each SSP manages the breeding of a species in order to maintain a healthy and self-sustaining population that is both genetically diverse and demographically stable" (AZA 2006). SSP species have to be approved by AZA, and over the years the list has grown to include 107 species today who are part of the

privileged plan. The SSP's goals include education, breeding, research, and the end goal of reintroduction of viable members back into the wild to boost endangered populations.

SSP species are generally well-known species considered to be charismatic megafauna, or flagship species, which are likely to be familiar to the general public and able to elicit emotion and support. Tigers, gorillas, ring-tailed lemurs, golden-lion tamarins, rhinoceros, panda bears, and notable species that are easy to recognize and remember are included in the SSP. The justification for favoring charismatic megafauna is that the high profile animals act as ambassadors on behalf of their less well-known relatives, and thereby generate support that extends to the more obscure species (Ray 2005). Whether or not this is true is still unclear (Ogden et al. 2004)

Zoos had historically received many of their acquisitions from animal dealers who collected specimens from their native habitats (Hancocks 2001). Great numbers of animals died in the process of capture, transportation, and adjustment to captivity. The public no longer viewed this practice as acceptable, and zoos recognized that such practices were contrary to their mission statements of conservation. In the last thirty years, wild capture has been minimized almost completely, although when zoos do obtain specimens through dealers, they do not always have thorough backgrounds of the sources of those individuals (Hanson 2002). Zoos now rely on captive breeding programs internally to provide each other with specimens for their collections so they have to remove less from the wild (AZA 2006).

Because of the broad scope of modern science in context, complexity, and utility, the public tends to know very little about individual avenues of scientific research (Wolfe 1957; Wynne 1991; Wooster 1998). But in general, science is viewed as a credible field

for establishing knowledge. “The credibility of a source depends strongly on its perceived interests in a particular context” (Ziman 1991, 101). Zoos have the advantage of already knowing that their visitors have an interest in the animals, so zoos that successfully present themselves as having the interest of animal well being in mind gain a persuasive edge with visitors (Sternthal, et al., 1978). Combined with the emotional appeal created by visual information provided in exhibits, zoos convince visitors that their conservation goals and actions are reliable.

Zoos consistently reinforce the idea that science is a legitimate reason for their actions. If the research they were a part of was based on scientific procedures, then the results must be considered conclusive evidence, and sufficient explanation for why zoos do certain things in a certain way within SSP research. Scientists in these efforts are presented as discovering truths, rather than constructing a reality as an object of investigation (Oudshoorn 1996), in which actions “organize scientifically controlled managed breeding programs for selected wildlife as a hedge against extinction” (AZA 2006). SSPs sound like well planned and thought out conservation programs with little room for question or doubt. For experimental aspects of SSPs, related to reintroduction, the public is meant to be assured that procedures are just as scientific because zoos use “technologies relevant to field conservation,” and technology is another safety word that is backed up by scientific knowledge to accomplish tasks. All habitat that is a potential release site for SSP specimens is “restored or secure.” (AZA 2006)

The reality is that SSP is still in flux, unsteady, and their success rates are more than questionable. But zoos rely on science to carry the SSP through the learning process, not sure that the public understand the life or death repercussions of the

experimental phase of reintroducing captive bred endangered animals back into non-captive environments, or the failures. The public is supposed to feel confident about a “genetically diverse and demographically stable” population of an endangered species so that the actual low rate of successful reintroduction is excluded from view. SSP as a conservation action seems to be entirely marginal thus far, inconclusively successful despite reassurances that all available science, management, and technology is applied. What the public learns about conservation, when SSP is taught to people to be a model of conservation, is just as much about the process of SSP as about the end result. And both are questionable, at best.

Species Survival Plan in Action

There are several case studies of specific SSP species that illustrate these issues. Golden Lion Tamarins, or GLTs, are small primates in the *Callitrichinae* family, and often advertised as a success story of SSP. The bright orange-gold tamarins live in social groups that are active throughout much of the day in play, grooming, foraging, and activities that delight zoo visitors. GLTs have been bred successfully in captivity, while they are critically endangered in the remote forests of Brazil from which they come. They have a very limited range and their population is continually threatened by habitat destruction, and just as significantly, poaching. Zoos were also responsible for the removal of GLTs from their Brazilian rainforests before they began captive breeding (Baraty and Hardouin-Fugier 2002).

The first attempt at reintroduction was in 1983, only two years after the SSP program’s inception (AZA 2006). Poco das Antas Biological Reserve was chosen as the

site. The reserve was expanded and theoretically secured as a safe site to introduce fifteen individuals where they might interact and interbreed with a small existing population. All fifteen GLTs died. Between 1984 and 1996, 147 more were released, though only 24 survived to successfully breed offspring. Causes of death were exposure to transmittable infections, to temperature variations, predation, injury, stress, poaching, or lack of useful foraging skills. Captive animals are treated for all illnesses, so their immune systems are ill prepared for parasites and bacteria commonly battled in the rainforest. Temperatures are controlled in captivity so extremes in heat and cold are never experienced before release, and as a result the GLTs do not know how to seek insulated shelter. They are not accustomed to scanning for predators, nor do they know which prey is potentially harmful. Trying to feed on venomous snakes caused the deaths of several hungry tamarins. The sheer variety in environment stimuli was overwhelming to some as well, who became frightened and stressed to the point of incapacitation (Oates 1999).

The public, however, is rarely informed of the harsh reality of reintroduction. Instead zoo publicity showers acknowledgements regarding the survivors, the growth of funding to the reserve, and the improved resources that the local community has received through ecotourism. In the SSP reintroduction process, individual tamarins are sacrificed for the sake of the survival of the species through the trial and error approach of scientists who “develop and test technologies relevant to field conservation” (AZA 2006). The reliance of those in control on the credibility of the scientific process of the lives of the tamarins costs the lives of very real individual, feeling animals that suffered. The ignorance, or denial, of the role that humans have played in shaping the constructed

nature that surrounds captive tamarins, creating the natural selection they see as based in science, is a failure of zoos to acknowledge that their conservation efforts are really more about humans than about the SSP species.

In fact, we should wonder why we are surprised that reintroduction fails. Most keepers are trained to make an animal's life easier and more comfortable. Keepers want to take care of their needs and tend to their illnesses when they are responsible for the individual animals' well being. Zoos select for genetic traits based on what they believe to be the most essential characteristics to health and success of the species. But if those traits are not expressed or reinforced or learned, then the result is a GLT that is genetically strong in terms of human conceptions, but is still poorly equipped to care for itself, and therefore ill-suited to survival and the passing on of its genes. Once the GLTs have been released, there are other factors required for survival that lie beyond the control of genetics.

If wild members have died off and released members die as well, there is perhaps something else that needs to be addressed beyond mere population numbers. Ecological pressures selecting against survival for that species may have to be considered more closely, as well as how humans have had a hand in the development of those pressures, such as through deforestation that causes increased competition for habitat (Beck 1995). Others, such as Colin Tudge, find hope that captive breeding "can save many of the species that cannot be saved by habitat protection alone" (Tudge 1991, 47). Zoos have been referred to as Arks, saving the endangered species from extinction (Robinson 1992). And when conditions are right, zoos will supposedly release the genetically pure species back where they came from and the species will survive, thanks to the work of the

scientists who developed the technology. The metaphors, the actions, the roles of zoos, are all about humans as the subjects, and the actual animals that are at stake here are the peripheral actors they control, being acted upon from anthropocentric motivations.

A mainly human centered approach will never actually heal the complications that are jeopardizing the real lives of real individual animals far beyond the control of zoos. If humans are always the priority, how are the animals going to react to the solutions? Wildlife conservation at this point is more about captive animals than their in-situ counterparts (Baratay and Hardouin-Fugier 2002). And captive animals are always secondary to the humans who dominate them. Zoos speak of long-term conservation, and present claims of working towards a sustainable future, but as long as their definition of conservation places humans before animals and the places they inhabit, sustainable development will always be in terms of human survival at the cost of other living entities. And perhaps zoos will boost the populations of some species, but never of all, and the expert-led process will not be a democratic or sustainable ark (Robinson 1992).

When Genes Set the Standards

When a species is selected to be an SSP member, zoos must establish that there is an adequately diverse genetic bank available for captive breeding (Koontz 1996). If there is not already a diverse enough collection, then wild capture is deemed appropriate and necessary. Lowering wild populations by a few more individuals now might lower their current numbers, but the idea is that zoos are saving them down the road. Without enough diversity in the captive population, zoos fear they will not be able to maintain a diverse enough genetic bank to provide enough variability for the long-term survival of

the species. But sometimes this extraction can destabilize a demographically delicate balance even further in the habitats from which the individuals are removed.

The countries where these animals are captured are often impoverished developing nations, more directly dependent upon their natural resources for their livelihoods. Many people have cried out that the practice of removing in-situ animals from developing nations and bringing them back as “rescued” animals to developed nations is yet another example of the North’s extraction of the South’s resources, and this reinforces dependency. Acquiring genes sets the standards for behavior in which “The North wants access to resources of the developing world without compensating for them” (Eudey 150). Those animals are precious resources for ecotourism and for drawing in conservation funding, which are lost when zoos in the north extract the animals from the South and earn money off them and their offspring as attractions, none of which benefits the nation from which they were taken.

The drive to collect a genetic bank of individual specimens also ignores how that removal will impact the individuals that are left behind, in-situ. The individuals who are collected are valued for their genes and how those genes can create future generations, rather than the value of the individual for itself. The captured specimens are given the best care possible in their new incarcerated state, but now the conservation of remaining in-situ animals is focused instead on captive animals. The captive animals are now ambassadors of their in-situ counterparts, no longer being represented, but doing the representing. They are personalized to the public as individuals, but their use-value is all in terms of their genetic worth to the species.

The genetic health of the animals is ranked on a scale. According to the desirability of genes as judged by scientists, certain individuals are considered more valuable than others. The International Species Information System (ISIS) is the computer program used by zoos to keep a genetic record in a database of the gene sequences of every individual member of an SSP (ISIS 2006). The individuals are ranked on a numbered scale from most valuable to least valuable in terms of their genes. Zoos subscribe to ISIS to make compatible matches between two highly valuable individuals, from which transfers between zoos are arranged to facilitate the breeding of what they deem to be the most optimal pairings. The genes of the individual as it contributes to the species decide the trajectory of the individual's captive life. For example, if a pair of fennec foxes, an SSP species of fox native to African deserts, had lived in a pair together for years, this would be no guarantee that the zoo housing them would not trade one for a more genetically optimal individual. If the female had cysts that compromised her reproduction likelihood, and the male was considered valuable on the rank, the female would be traded with another institution. She would not be high enough on the hierarchy to merit consideration of her social status. Insuring that the male reproduces takes precedence over the bond that the pair had.

Animal care then is provided in terms of meeting what humans decide are the biological needs of the animals more so than the particular individual animal's needs. And biological needs in a captive setting are much different, as evidenced by the previously mentioned deaths of many GLTs, than biological needs upon release. Only in the last few decades have zoos incorporated long-term plans into their management to ensure that an animal is not sold or traded or neglected after it has contributed to the

genetic population. The well being of the species survival ranks higher on zoo professionals hierarchy than the individual personalities of each animal housed within each institution.

Genetic purity is another concern of zoos that look to ISIS to preserve their genetic bank (Baratay and Hardouin-Fugier 2002). Hybrids are crosses between two species or subspecies. Subspecies are groups of a species that may be separated from other members by geography or by morphology. Scientists decide what characteristics, either physical or genetic, decide what does or does not qualify as a pure species, a hybrid, or a subspecies, and arguments between scientists on such decisions are frequent. Changes in how science organizes animals occur constantly. Turkey vultures and black vultures have only recently been categorized as being more closely related to storks than to raptors, as previously thought. Ruffed lemurs are currently considered one species in which there are two distinct subspecies, red-ruffed and black-and-white ruffed lemurs. Implications for conservation both in and out of zoos hinge on decisions about the purity of the lemurs. In Madagascar rainforests, the only place in the world ruffed lemurs are found, conservation of the red-ruffed lemurs existence could perhaps depend upon raising their subspecies status to that of a full species. They have a much smaller range than black-and-white ruffed lemurs, and are severely threatened by habitat loss as a result of deforestation. But if black-and-white ruffed lemur populations, which have a much larger range, are high enough, than the red-ruffed become overlooked since the species as a whole is not critically threatened. In zoos, hybrids between the two, which are found to occur in Madagascar where ranges overlap, are much lower on the ISIS hierarchy than “pure” red-ruffed or “pure” black-and-white-ruffed.

Ultimately, individuals are overlooked in SSP conservation in favor of the species as whole. At the same time, however, “Individual creatures often have welfares, but species never do. The notion of a species is an abstraction” (Jamieson 1995, 61). But if the individual is passed over in favor of the species, then welfare gets displaced and nothing is left but the abstracted notion of a species. The bottom line here is that humans are assigning value to the worth of an individual animal based on his or her genetic purity. The animals are separated, forced into matches according to scientific prescription, separated again, relocated, or simply overlooked if they do not make the grade. Furthermore, only special elite SSP animals receive this extra attention. The animals are treated like scientific objects to be traded, remade, and created in the name of conservation.

While the public is not made aware of the processes involved in SSP, that does not lessen the implications of the relationship zoos have engendered between animals and those who care for them. A dominating hierarchical subjugation of the individual animals to the technology of ISIS in the name of conservation science has interwoven a network of agents caught up in captive breeding. The result is that conservation is viewed in terms of humans, then species and genes, then individual animals, and last the places their non-captive relatives inhabit. Conservation remains entirely anthropomorphic, relying on the credibility of a subjective science to explain human decisions on the future of many individual animals. The survival of real individual members of species living outside of protected zoos is at stake, and losing them in the process of conservation perhaps reinforces the first part of conservation in regard to human roles, but loses the animals and the places they come from.

Chapter Three: At the Zoo

From Impressions to Ideas: Design Layouts and the Visitor

The previous two chapters have argued that zoos have a lot to say about how humans view conceptions about nature, the environment, and the science of conservation. Shifts in zoo design and presentation have shown that “nature” is a constant flux of matter, culture, discourse, ideology, and creation. From the early beginnings of zoos, it is evident that they are both constructs and constructors of ideas about nature. From the manicured lawns to sleek modernity to immersion, how humans see themselves within the world has affected their attitudes towards animals and the form of their zoos. Conservation, the concern for sustainable levels of available resources including animals, natural resources, and ecosystems, has motivated current constructions of nature in zoos. Zoos strive to be seen as key players in the global conservation movement. The previous chapter illustrated how active conservation efforts are conflicted between process, result, and goal. An examination of the SSP illustrated just how involved human attitudes are in shaping conservation actions. This chapter will study how zoo design and presentation influences visitor perceptions about the animals both in-situ and ex-situ, their respective habitats, and what the perceptions mean in terms of goals of conserving those animals and their habitats in the future.

Exhibits, signage, presentation, design, and other visual cues will perhaps give another perspective on the relationship zoos have with human ideas about nature, wildlife, and conservation goals. In response to the environmental movement, society began to question the role of zoos in conserving nature. Conservation, rather than preservation, is the dominant environmental discourse, and zoos have adopted the

emphasis on human use, then animals, then habitat, into their mission statements.

Science has provided the credibility and justification for zoos' conservation programs thus far, now a closer look at the visual elements of zoos will give another perspective on how zoos have shaped, and have been shaped by, conservation.

Zoos are aware of the importance of the visual impressions they create for the visitors (Ogden et al. 2004). Design layouts are constructed as careful tools to guide the guests on a planned trajectory (Hancocks 2001). In 2004, The AZA published a report about visitor attitudes, and the demographics of the visitors reappeared over and over again as a top priority to administrators regarding how they perceived visual information (Conservation Education Committee Subgroup 2004). The particular background of an individual absolutely impacts how he or she is going to interpret the experience, and by trying to appeal to a broader base of demographics zoos can reach out to more of those individuals (Conservation Education Committee Subgroup 2004). It is not easily possible to control or change the demographics themselves, only to try and tailor the information to be more accessible.

There is evidence that the visual context of an animal in its enclosure is equally important to how a viewer perceives that animal (Finlay et al. 1988). A visual design approach that presents ideas rather than objects is going to absorb the attention of the viewer and create a more meaningful experience. According to David Hancocks, "Zoo designers and educators cannot expect people to fully understand what an animal is if it is not presented to them in context", referring to that animal's ecology as a context of information (Hancocks 2001, 83). Zoos historically express a preference for exhibiting exotics, recognizing that many of the visitors at zoos have never been to the geographic

places to which the animals are considered to be native. For visitors to care about conserving an environment or a species, and not just that specimen in that particular exhibit, establishing a coherent connection from captive to non-captive contexts makes all the difference.

In the previous chapter, zoos were critiqued for losing sight of the individual animal in favor of the species. The same critique applies here; if zoos do not recognize how valuable the individual is in forming a perception and attitude towards that species of animal, then they have failed to match process to result in representing zoo captives as ambassadors for their ex-situ relatives. Emphasizing the species at the cost of highlighting the individual personality of each animal distances visitors from the potential to draw broader conclusions. This is where I believe the importance of high animal care standards matter. Creating a positive, healthy environment for each animal encourages behaviors toward which visitors are more positively receptive, and thereby engendering support for zoos and their broader conservation messages. Furthermore, to enhance education potential, those exhibit environments should strive to mimic more closely the flora that species might have encountered if living in a non-captive setting.

Details are what matter in exhibit construction. Visual knowledge is the primary source of information about the animals (Davies 2000). Believability through constructed authenticity is a pursuit that attempts a more faithful effort at realistic portrayals than exhibits simply meant to be impressive. All exhibits are of course artificial constructions of an imagined wild counterpart, but from an educational perspective there is no connective value in presenting a nature that simply does not exist beyond zoo walls or does not remotely resemble the habitat an animal comes from

(Robinson 1992). As Hancock states, “The more degrees of distortion in the representation of the habitat, the more unnatural the animal both behaves and appears” (Hancock 2001, 148). The observer will learn nothing about the ecology of the animals and will fail to draw meaningful conclusions about the dependence on an animal to its particular environment.

The architecture of an exhibit deals with the physical construction of the structures. Important design factors include how close the exhibit is in proximity to the visitors, how much mobility it affords the animals, how it incorporates physical characteristics, such as flora, rocks, etc., and how distance between exhibits influences the duration of attention that is gained from the audience (Bitgood et al. 1988). If the animals are obstructed from view, or are very far away from the viewer, then less observation time is going to be spent by the visitors than at exhibits where the animal is more visible or close up to the guests. How the exhibits are arranged also influences the movement of patrons. For instance, exhibits across from each other on pathways compete for attention, in contrast to those that are staggered or sequential. Other distractions include sounds from carousels, train rides, animal vocalizations, music tracks, or vendors (Bitgood et al. 1988). All of these factors should be taken into consideration when designing a zoo.

How zoos organize their animals is a reflection of form meeting content. If the rhetoric and the development of conservation programs is the content that zoos utilize when speaking about nature, animals, and the future, then the form is their presentation of the content to the public. Presentation is comprised of the design, architecture, layout, signage, visual graphics, public shows, animal display, and overall experience of the

park. Because the volume of zoos in America is too large to examine through an exhaustive analysis of their exhibits, I have chosen two case studies as examples. This does not suggest that there are not variations, or that some are not more effective or deficient in different arenas, but that these two should give an informed impression of the methodology many zoos use when organizing their parks.

The first example, the Palm Beach Zoo at Dreher Park in West Palm Beach, Florida, was formed as municipal property. It has been expanding rapidly over the last decade, affording the opportunity to examine its brand new exhibits as well as cover some of the older ones that many other zoos would have in common with one another. The Palm Beach Zoo serves as representative of many other parks. The second example is truly an entertainment park, Disney's Animal Kingdom. The size, magnitude, and nearly endless budget set it apart from most other zoos that have more limited resources. However, Disney's effort should be an indicator of what can be achieved in innovative, forward thinking design when money is not a barrier. Disney's presentation of conservation is very revealing of the boundaries humans have created, the images we are drawn to, and the messages that zoos wish to convey to us.

Palm Beach Zoo at Dreher Park

The Palm Beach Zoo at Dreher Park has been growing tremendously in recent years, though much of the development has been centered on additions rather than renovations to existing structures. Renovations have been completed in the older section on more of an as-needed basis when exhibits became dilapidated or compromised. Upon entry there is a fountain, inviting children to play in the water while parents look on from

the edge. While attractive and popular, one design consideration of the zoo is that the very initial impression then is not about the animals, but entertainment. The fountain serves as the axis from which looped pathways are the spokes.

Each of the loops has a general theme, and all are connected to the fountain and other side pathways. Standing in the fountain facing north, one can see the signs for what each section holds. For the most part, the zoo is arranged according to biogeography and/or theme. There is the Tropics of the Americas, Florida, and Austral-Asia. The Austral-Asia is the most intermingled, holding animals from Central America, Africa, Australia, and Asia. The animals are displayed together according to which region they are from. Many of these exhibits are some of the oldest in the park. The architecture is wooden, and most are still covered by zoo mesh, a tough durable screen material. It has the clarity and visibility of screen material, however, and so from some angles the mesh casts a visually obstructing shadow. Here the exhibits are very close together, a layout plan that has been shown to shorten the attention span of visitors in front of each exhibit (Bitgood et al. 1988).

The red kangaroo exhibit and yellow-footed rock wallaby exhibits in Austral-Asia are adjacent and made out of chain-link fencing. These two exhibits are popular because there are quite a few animals in each, joeys are a frequent sight, and most of them are visible at all times. However, the exhibits are barren and covered in red dirt, except for twice a year when sod is laid down. The animals devour the sod quickly as a rare treat and the only spectacle of the species' foraging behavior, and soon the red clay is back. These exhibits do very little to teach about the behavior of either species. The rock wallabies have only one large rock formation that sticks out from the clay jarringly, and

rarely is utilized by more than one or two wallabies. The kangaroos have only a hill and a barn, and spend nearly all their time lounging about. No behaviors are encouraged by these exhibits other than to lie about idly until feeding time, and providing no sense of the ecosystem from which the animals come. The visitors learn nothing more than what kangaroos and wallabies look like.

Just past the kangaroos is the Bengal tiger exhibit, one of the older exhibits but arguably one of the best even in the face of the brand new state of the art jaguar enclosure. A mist machine creates a humid fog one might find in the dense rainforests of India, while bamboo and palms surround the visitor pathway. Inside the enclosure there is a waterfall that flows into a pond, long grasses, and flora from all sides. It is lush, green, and gives the audience a good sense of what it would be like to see a tiger wandering in and out of the foliage with the stripes acting as camouflage.

The solitary male tiger that currently resides there demonstrates his camouflage on his walks around his territory by traveling the back fence line inside the cover of the palms. Otherwise he is sleeping; a common behavior for a cat. The setting of this exhibit relies on many classic techniques of waterfall, pond, grass, and trees, and yet rather than seeming trite and planned, the overgrowth and mixed vegetation between palms, grasses, bushes, and bamboo affords variety that is more likely to occur when unmanaged by horticulturalists. The tiger and his habitat are intertwined as the collective presentation to the visitors' visual realm. The visitors are not distracted by anthropocentric recreations of Mayan temples inside the exhibit as with the jaguar enclosure, but entirely focused on watching a tiger weave in and out of dense vegetation. It is easier to imagine his non-captive counterparts under this scenario when the two work together rather than fight for

visual attention. This approach can be harnessed as a potentially powerful tool of conservation education in zoos.

The Tropics of the Americas is the newest portion of the zoo. It was added on where a nature trail used to be, and is an extension of an older portion of the park. It contains a café overlooking a lake, the Amazonian Market Place, and replicas of Mayan temples. The zoo deserves commendation for tying in cultural and historical education to the presentation of the animals. Mayan culture has a unique place in the Palm Beaches, given large numbers of migrants from Guatemala and southern Mexico, and the zoo celebrates the culture that has been brought to Florida soil but is now often unrecognized in day-to-day life of most residents. Here is a great example of trying to appeal to a broader demography by sharing a story with those who do not know it well, and celebrating the story of those who are often overlooked. Now at least two distinct demographics have been reached from one presentation.

Signs in this region of the zoo give information about unique habitats called cenotes, found in southern Mexico and Central America, and an exhibit replicates a cenote filled with waterfowl and capybara. The story theme brings together knowledge of ecosystems, historical culture, and wildlife. The signs are colorful, they utilize pictures and provide condensed valuable information, and are placed strategically in visitors' lines of sight without distracting them from the animals. This approach could be even more effective, however, by drawing attention to current Mayan heritage in the Palm Beaches rather than only immersing the audience in a removed setting that gives them no information about the current state of conservation of the culture, the ecosystem, habitat, or wildlife.

The jaguar exhibit in the Tropics of the Americas is a beautiful, expansive enclosure that is home to a family of four jaguars. The jaguars have a variety of surfaces to choose from, including grass, stone, water, logs, trees, and other mixed vegetation. While aesthetically pleasing, little of it is relevant or an accurate portrayal of the habitat that is actually characteristic of the Central American forests non-captive jaguars inhabit. Jaguars sleeping on ruins are hardly educating visitors about the natural behavior of one of the top predators found throughout Central America and into Mexico and South America. The ruins outside the exhibits support the multi-dimensional education experience for the visitors, but inside the enclosure create a distraction that detracts from learning about jaguars. Unlike the tiger exhibit where the scenery supports the tiger, the aesthetics of the jaguar exhibit compete with the jaguars themselves and create a less coherent context for the visitor to imagine non-captive jaguars. The visitor spends just as much time looking at the pool and the Mayan ruins as they do on watching the lounging cats.

The Florida region of the zoo has a pioneer theme that is meant to represent the state's wildlife as it was in the early 1900's. There are several appealing qualities at work here. The Florida exhibit utilizes storytelling, a powerful technique that engages the visitor and gives them a thematic experience they can absorb from one exhibit to the next. Connecting the exhibits in this way is an effective design strategy. The panther cannot practically be kept with the otters, but by using a story setting, the visitor still relates the two as being together in Florida habitat in a meaningful way. The pioneer section thus manages to shed some of the physical boundaries that wear on the audience's

ability to constantly try and relate separate species into a mental ecosystem and imaginatively present a scenario that does the connecting for them.

The Florida Pioneer section also ties together natural and cultural history. Zoos are often criticized as fostering segregated realms of knowledge, separating zoology from botany, natural history, science museums, etc. (Robinson 1992; Hancocks 2001). The Palm Beach Zoo breaks that pattern by showing Florida in a historical as well as in a zoological sense. The importance of such a technique is that to be successful, conservation must encompass many realms of knowledge: social, historical, ecological, biological, zoological, etc., to be successful. Offering a multi-dimensional visual perspective to visitors aids them in making interdisciplinary connections while other zoos talk about such connections but leave the responsibility to the visitor.

Critically, however, the Palm Beach Zoo does not take this opportunity to encourage the guests to compare what they see at the zoo with what Florida looks like today. Conservation education could come into play here, drawing attention to the fact that the majority of the animals housed in this section are either critically endangered or are no longer found in Florida. Most of the birds within the cages are injured- wild-born raptors that did not heal well enough to be released- but none of this information is offered to the guests. This a lost opportunity to draw attention to the role the zoo plays in rehabilitating native wildlife, which is an active role in conservation. Instead, visitors get the impression of birds in cages too small to afford room for flight, very rarely doing anything other than biding their time. They are given only very basic facts on small signs that have faded print on a faded background. That image can translate into an unnecessarily negative visitor impression about the Florida Pioneer section.

While both the Florida Pioneer section and the Tropics of the Americas do an excellent job of delivering interdisciplinary messages about culture, history, and wildlife to the visitors, the presentations are starkly different. The older look of the Florida region seems duller when compared to the brand new impressive grandness of the Tropics of the Americas. Incongruence of design technique can confuse the visitor. Mixed visual styles send conflicting messages about attitudes towards animals and how people place them within human perspectives on the world. Education, influencing attitudes about conservation, and encouraging conservation action may be less effective when there is no consistency in the delivery of the ideas. There is not a best, or correct approach, but when techniques are too different they conflict rather than work together.

The justification for the differences in style and presentation has largely to do with funding. The amount of money it would require to overhaul the entire zoo and recreate it in a uniform style is beyond the zoo's available resources. Not upgrading any of it at all until enough money was saved to renovate completely would leave the zoo outdated and unable to compete with other regional zoos. Practically, the solution is to work on bits at a time. And as stated, the older sections boast some of the better thematic design approaches than the newer exhibits. The tiger and the otter exhibits are some of the best designs, and some of the oldest. It is unreasonable to expect zoos with limited budgets to be perfect in every aspect of their exhibits, but sometimes rather than expanding, working with what is already there would be more helpful. Exploiting one at the cost of another, or creating settings that hurt visitor conceptions about an animal's ecology, or even their image of the zoo, are detrimental beyond practical excuses.

In the Austral-Asia section, Ring-tailed, red-bellied, and black lemurs are featured on small islands. The distinct coloration of ring-tails makes them zoo favorites, used as ambassadors of lemurs, a unique prosimian endemic to the island of Madagascar. Nearly all species of lemur are threatened by habitat loss and development. Lemurs are specialized niche species, with many found in only one small locality on the island. Ring-tails are one of the only truly matriarchal species, and live in troops of six to thirty individuals. When zoos obtain ring-tails for breeding in SSP, they receive both males and females. The Palm Beach Zoo unfortunately has only one of each sex, a common situation for many SSP species regardless of their social structures in non-captive scenarios. Showing the ring-tails in pairs blocks them from engaging in many of their behaviors related to intra-troop affiliations. Vocalizations, grooming behaviors, and hierarchy establishment are all minimized when a male-female pair is forced to live together. Males are always sub-ordinate in non-captive settings, and rarely bond to a female, generally only staying with a troop for up to three years. Females bond to one another instead, with close familial ties. When ring-tail lemurs are exhibited in pairs like this, the visitors learn little more than to appreciate their attractive coloration.

Whenever animals are presented out of context like this, mixing species that would never encounter one another, or in social systems that only occur in captivity, engaging in behaviors atypical of their wild counterparts because they are not given an alternative, the public suffers as well as the animal. Conservation efforts are hindered under such conditions, and this applies to all zoos that give in to this mistake of convenience regarding many species. Education should seek to be as faithful as possible, and subtle cues that are misrepresented can harm the potential for these captive

ambassadors to convey meaningful conservation messages. If an animal that requires a large territory to survive is not ever displayed as such, people will not understand why they are such important indicators of ecosystem health. If an animal lives in a social group that requires a larger set of resources to support the whole troop, people will not make the connection that saving one or two will not save the species. Both education and conservation are compromised: two pillars that every zoo claims to uphold. Terry Maple, former director of Zoo Atlanta, stresses that zoos should instead understand that “having fewer animals is better when they live in appropriate groupings within higher quality habitats” (Maple 1995, 25). The desire to boast a large, diverse collection from a variety of taxa still lingers in the motives of many curators, at the cost of effective contextual presentation.

Disney’s Animal Kingdom

Disney’s Animal Kingdom cannot use the excuse of limited space availability or insufficient resources for their similar mistakes. It is easily one of the largest animal parks in the United States with the nearly endless funds of Disney behind it. And yet the ring-tail lemurs are shown in a similar setting as the Palm Beach Zoo. A male-female pair wanders quietly around their tiny island or sleeps curled up in a synthetic log. They share space with an inconspicuous pair of male collared lemurs, a father son pair also atypical of any social arrangement among free-ranging collared lemurs in Madagascar.

Disney is the master of storytelling. They have always shown themselves to have creativity and thoroughness in creating an image of a particular setting. However, that setting clearly seems to have an agenda that weighs almost entirely on entertainment

complete with actors to play the parts of indigenous peoples, a problematic concept in itself. Disney should be at the forefront of research, education, and conservation with all of the resources they could attract and commit to those purposes. And yet they choose to sacrifice much of that for the sake of the story plotline. The park has several dominant themes. There is Dino Land, their attempt at a natural history theme, and Africa and Asia. One reaches Africa by crossing a river on a bridge and passing through a huge entryway reminiscent of the doors to Jurassic Park the movie.

Once inside Africa, the story surrounds you from all sides. All of the rides, signage, and employee jargon are scripted to pretend that you are somewhere in Africa, where “the illusion is that wild animals exist” (Williams 2001). Storytelling is what so many people go to Disney for, and why people continually return to an imagined world that Disney encourages. Generating excitement and interest is their strongpoint, but using it as an effective educational means is their weakness. The opportunity to teach visitors about effective conservation, about the precarious position some of the animals in their park face in-situ in Africa, and the need for an international commitment for improvement is subjugated to Disney’s refusal to acknowledge anything other than a feel-good effect of safety, contentment, and the all important happy ending. Disney often resorts to exploiting and reinforcing stereotypes about cultures, animals, and regions so as to maximize entertainment, rather than using their assets and capabilities to break down harmful social ideas about the roles that people play amidst their environment.

The African Kilimanjaro Safari is one of the greatest attractions on the park. Disney of course pretends that the reservation is real and that it protects many species, and that you are there. It is immense, housing dozens of different species in spacious

grasslands with not a single visible fence in sight. Giraffes, rhinos, hippos, lions, cheetahs, elephants, okapi, Thompson's gazelles, impalas, gerenuks, and dozens of other hoof stock are just some of the featured animals. And it is made even more exciting by allowing those animals to browse in their extensive ranges at their leisure so that not all animals are guaranteed in sight throughout the ride. When you do spot one, it is an event, as if you were actually on the Serengeti Plains scouting for wildlife. The trick of the large habitat ranges is to help hide the physical divisions such as moats, trenches, or fences blocked by vegetation, and Disney does a truly fantastic job of creating a seamless illusion that the giraffes really might wander across the vehicles path at any moment. In this sense Animal Kingdom presents a potentially effective approach to conservation education.

The conservation theme on the "two-week" Kilimanjaro ride is "poaching". Your safari guide is in contact with a park ranger, who calls out over the intercom for your help in saving Little Red, the park's infamous elephant infant, from poachers who have already wounded her mother. You then take off on an adventure off the reservation grounds to rescue Little Red. You see the poachers' camp, filled with ivory tusks sawed off from adults, and the bones of dead elephants. But the ranger manages to catch up to the poachers, and you come to their truck in time to see Little Red happily swinging her trunk from the bed. The lesson then, is that poachers threaten the lives of elephants, but not other animals, and that the rangers save the young from the poachers. With such a feel good ending the deaths of all of the elephants they did not save, evidenced by the tusk display, are masked and no other reasons for the endangerment of elephants in the wild are suggested. Nor is the possibility acknowledged that safaris can be both an aide

to local human populations when they have an investment in the park, and a hindrance to conservation when locals do not benefit but instead are exploited as a resource themselves (Adams and McShane 1992). In short, despite the potential provided by exhibit design, conservation education is forgone for the sake of entertainment.

Animal Kingdom's Colobus monkey exhibit is called the "Endangered Animal Rehabilitation Center." Once again, a fallacy of conservation action is created for the sake of the story. Disney's "Endangered Animal Rehabilitation Center" does not actually rescue injured Colobus monkeys or release them to a new and protected site. It is a fictitious feel-good story of conservation. The defense for such slogans is exposure, arguing that simply making visitors aware of the endangered animals is an aide to conservation; nobody is going to allocate support for an animal that they have never heard of or know nothing about. However, the risk of this "green washing" of conservation is that the public will grow complacent. When presented to visitors repeatedly with no real connections to grasp behind the stories, they will grow accustomed to the merely rhetorical use of conservation, and the concept will lose its sense of urgency and necessity.

Disney's Africa is also where guests can find Rafiki's Planet Watch, the path to the Conservation Station. One has to take a train ride to get to this distant attraction, which is by no means a central feature of the park. Upon arrival, you travel down a pathway with signs and several stations along the way. The Conservation Education Trends Report released in 2004 by the AZA found that public attitudes reflect a concern primarily for quality animal care, and that all zoos must emphasize this first before educating about conservation action outside the zoo (Conservation Education Committee

Subgroup 2004). Storytelling is the method the AZA suggests for hooking the audience into such conservation methods and Animal Kingdom appears as the epitome of this presentation form (AZA 2006). Yet they tell us only about animal care on Disney property, instead of animal conservation, at both the Colobus monkey station and at the Conservation Station. They do not seem motivated to move towards the next step, in which they would deliver conservation messages that extend beyond the walls of the park.

At Conservation Station, the pathway from the destination platform leads you past a cotton-top tamarin conservation exhibit. According to the spokesperson, the cotton-tops are separated because of aggression, but the signs say that Disney is engaging in behavioral research to help them save the forests where they come from. Nowhere does it say where cotton-top tamarins live in the world, nor how understanding the behavior of these individuals living in cages with stable and predictable controlled environments will teach the researchers about behavioral choices made in the wild. In fact, until the last few years, there has been a surprising logical gap in the scientific research community between understanding animal behavior and conservation biology. I believe that zoos could gain more of the conservation credibility that they seek by working with the scientific community to integrate animal behavior and conservation biology studies. Typically scientists specialize in one or the other, and very little work has been done to establish this important link. Captive breeding programs are perhaps the best illustration of how failures to include both animal behavior studies and conservation biology research result in incomplete and unsuccessful conservation attempts, but how integrated approaches, as with the California Condor, have proved to be more rewarding.

The most helpful and useful conservation effort is a small stand on the path back to the train where guests are encouraged to learn ways in which they can welcome animals into their own backyards. The Multi-Institutional Research Project, an initiative of the AZA, helped to form the Backyard Habitat station (Ogden et al. 2004). It starts with small ideas, simple tasks that are feasible, but that require a change in visitors' actions, not just a change in their thoughts. Research suggests that changing perceptions does not always lead to a change in behavior in zoos (Ogden et al. 2004) and I believe that practicality has a lot to do with this.

People need to be made aware of the ways in which they can promote conservation in their own surroundings, such as through the Backyard Habitat approach. The emphasis on exotics in zoos makes conservation action implausible for the visitor when the regions the animals represent are on the other side of the globe and no simple contributive solutions are offered. Planting a flower that will encourage a butterfly to stop by their landing in a downtown apartment is far more meaningful than looking at butterflies bred inside an office room clinging to painted green walls as featured inside the Conservation Station building.

On one sign at the Backyard Habitat stand, Disney defines conservation as "People taking care of animals and the wild places where they live". The definition places people in charge of animals and wild places. But what are wild places? What does "taking care of" imply? Taking care of daily needs, basic needs, species needs, individual needs, future needs? If you take care of animals is it not conservation unless you take care of the "wild places" where they live? It is expected that a zoo should foremost concern itself with what lies within its walls; it is very much true that visitors

are not going to gain confidence in conservation messages are if they are not convinced of the zoos' ability to take care of immediate animal needs. But if successful conservation must truly be a boundary-free endeavor that incorporates zoos, wildlife sanctuaries, reserves, parks, cities, nations, and international communities, then teaching the public of only a very narrow avenue of conservation as it applies within zoo walls will not contribute to worldwide conservation efforts outside of zoos. Zoos cannot claim to educate and support global conservation if they only apply their own rhetoric to the walls that incarcerate their captive animals. Content is not meeting form in terms of zoos' goals for contributing to global biodiversity conservation when signs such as the one found at Disney's Backyard Habitat convey only narrow simplistic messages in relation to complex problems.

Exotic is Better!

Exotic animals attract a lot of attention. Exotic refers to an animal that lives far from the reference location, or is rare, or more recently, to animals that have been moved from one location to the reference location by some other force than individual locomotion. To the public, they are novel, interesting, and pique curiosity. In short, exotics attract visitors to the park. The implication in zoos is that exotic is better, because it is exciting to see something out of the ordinary. A preference for exotic animals is not a new pattern, either; exotic animals have formed the substance of zoos, menageries, and private collections as far back as ancient the Chinese and ancient Sumerian civilizations (Hancocks 2001). Giraffes, for example, are noted to have been favorites of Caesar, of the Ottoman rulers, Cosimo de' Medici, Timur, and just about every other famous ruler

(Sherr 1997). Exotic animals have been a status symbol of the wealthy, elite, powerful, and royal (Baratay and Hardouin-Fugier 2002)- zoos are merely extensions of an age-old fascination.

Zoos reinforce the idea that native animals are not as exciting, interesting, or worthy of extensive attention as foreign or unknown species. Even in the Palm Beach Zoo's Florida exhibit, they put a natural history spin on native wildlife, and in doing so have managed to make hometown nature "exotic" and unknown. Flamingos have not bred in Florida for more than a century, and are generally acknowledged to be from the Caribbean (Williams 2001; Maehr and Kale 2005). Perhaps zoos are responding to what they view the public attitude to be, or more likely they are shaping and reinforcing the preference for exotics through their own choices and selection. The public is definitely going to be more interested in exotics when more energy goes into their displays, exhibits, signs, and education programs. Curiosity is the first intrigue of an unfamiliar species, but this does not imply that other educational opportunities are automatically greater for an exotic than a native. There is little reason to believe that public knowledge about ecology, behavior, habitat, conservation status, or wellbeing is greater for native species than for exotic species, thus perhaps increasing the interest in exotics in zoos so as to learn something new. In fact, my own experience of having worked with both native and exotic species education suggests that there is significant interest in learning about all forms of wildlife when given the chance for a personal, meaningful encounter.

The truth is that even native wildlife is "exotic" to the average person. Very few people are in the habit of scanning the skyline for birds of prey or going out late at night when the nocturnal animals are out foraging. Many people live in urban areas that are

devoid of habitats where animals feel comfortable enough to call them home. Many animals have retreated further west in Florida where there is less development, such as the water moccasin, or have simply become vanishing species, like the roseate spoonbill. This need for exposure is why Disney's Backyard Habitat station is helpful, and why red-tailed hawks are exotic to the average guest. The success lays in presenting them to public in an informative, useful way that shows, for example, that many of the same features that make a spectacled owl special can be found on a great-horned owl. Or that panthers are as special as jaguars because they are so critically endangered. But the practice of zoo presentation is such that the Bengal tiger and the jaguars have beautiful spacious exhibits that are inspirations, and the Florida panther's is much smaller and simpler in comparison.

Many of the Palm Beach Zoo's conservation actions, in the form of research, funding, and involvement beyond its walls, reinforce the preference for exotics. Florida beaches are the nesting sites of Loggerhead, Green, and Leatherback sea turtles, for which there are numerous opportunities for helping to protect the beaches that are essential to the breeding and successful continuation of these species. The Palm Beach Zoo, however, donates funding to conduct research into nest sites on the coastal beaches of Venezuela. Florida panthers are critically endangered, but the zoo supports jaguar research and conservation projects in the Yucatan. The zoo's most notable contribution to native wildlife is their policy of accepting local wildlife for rehabilitation, and providing funding to a local rehabilitation organization, the Busch Wildlife Sanctuary in Jupiter, Florida. But local ecosystems, habitats, and species conservation are all minimized in zoo endorsements.

The take-home message to visitors about the importance of native versus exotic species is that exotics deserve the most attention. The defense of their messages says that the only way to gain interest and influence action is by exposure of the animals, and that foreign, far-reaching places with delicate ecosystems are not going to draw international support for conservation if people are not aware of the plight or sympathetic to the threatened wildlife. By the same token, however, visitors are not going to show concern, change their attitudes, or more importantly become motivated to take action if they are never made aware of the local situation as well. From personal experience working in wildlife education, I have seen that Florida residents seem to have little idea of the threatened status of many animals they take for granted, such as the Eastern burrowing owl, the gopher tortoise, or the Eastern diamondback rattlesnake. They often do not even know what an Eastern spotted skunk looks like. Locally is where the call to action is the most viable, and where people can make a difference by very small changes in behavior or attitude.

The concept of how to instill a sense of investment in local wildlife should not be foreign to zoo curators. Nearly all international conservation programs work by trying to interact with the local peoples in the region of concern. Changing their attitudes, judgments, and actions is the primary tool for wildlife and ecosystem conservation throughout the developing world, where many people rely on natural resources more directly for their daily needs, and consuming the goods nature provides for survival. They have to be oriented to understand the long-term repercussions of their actions and conservation policy needs to ensure a personal investment in protecting those resources.

And yet these acknowledged and established ideas that are accepted in context of developing regions are ignored in our own backyards.

We have removed ourselves from our imagined nature to the point that we ignore the consequences of our actions. We too rarely acknowledge that what is the best method of conservation in a developing region could also be the best for ours. Because of our presumedly more “developed” status and heightened environmental awareness, we are supposed to know better, and be better at fixing degraded ecosystems in our own midst. Yet we often display a degree of separation in human relationships with the rest of nature that only furthers the very real global crisis. The California Condor has shown us what can be achieved when zoos wield their energy and pull for public support, but other cases are too few and far between; none gaining significant interest until the animal populations have dipped well below sustainable levels.

Conclusion

Where Should Zoos Go From Here?

Currently, the primary role of zoos in biodiversity conservation is to provide the public with a venue where they can learn about animals and the habitats they live in. Zoos are also the only major sources for captive breeding and reintroduction programs, one aspect of conservation strategies. They contribute and partake in research and field components to conservation as well. Zoos have always used science as a source of credibility with which to gain public approval, and model their parks to convey dominant discourses on nature, animals, and the environment, revealing human attitudes and perceptions in the process. Shifts in discourse over the history of zoos have been reflected in changes from the upper-class social event to triumph of human technology exhibited in the Modern Age to the shift towards Landscape Immersion and Naturalistic portrayals that were the result of the environmental movement.

The current discourse, Conservation, reflects human attitudes about attaining sustainable development while helping ensure the survival of the world's flora and fauna. Zoos' role in the future of biodiversity conservation will hinge on how they convey conservation messages to the public, and on how well their actions match their rhetoric and expressed goals of their conservation stances. Programs such as the SSP will not be enough to save endangered species, and are still problematic in their approach, but that they may aid in garnering support for habitat protection and other arenas of conservation. I have also emphasized that the ways in which zoos present their role in conservation through design and layout shows that they potentially impact attitudes and actions on part of the visitors towards conservation goals.

Zoos do not have to take on all of global conservation as their responsibility, but they can help to inform the public of all that is involved. As a major source of access for people to be exposed to many animals they otherwise might never encounter in person, zoos can take action by providing new avenues of ideas, and exposing the public to more interwoven patterns of thought. Zoos have the advantage of being able to blend educational ideas with an interactive, visual experience that many people enjoy.

When zoos point to the concrete ways in which they contribute to conservation, they point to the species survival plan, to population management plans, to their high quality standards of animal care, to the research they fund and conduct, and to the projects they sponsor globally. But this research has hopefully shown that there is more depth and many more implications to even those efforts that are filled with good intentions. It is not that zoos do not truly wish to aid in the protection of species and species' habitats, it is rather that they do not always realize all of the repercussions of the choices they endorse. Zoos question why they are not making as substantial an impact as they might hope, even when they plan new exhibits based on higher standards and more naturalistic designs. The public has not responded with a change in actions or behaviors about their environment, even when evidence suggests that they have undergone a change in perceptions (Ogden et al. 2004). But few zoos make that link themselves, and rarely offering an alternative behavioral choice to the visitors, to the animals, or to their messages. The Backyard Habitat at Disneyworld is one of the few examples where an attempt is made to bridge the link between attitude and action.

Zoos are not, and cannot, be responsible for changing the way that all Americans think about themselves and their relationship with nature. Zoos will not single-handedly

heal the nature-culture divide, or melt the boundaries that we have built. But they can try much harder not to reinforce those boundaries. They have taken important steps to remove iron bar enclosures, cement floors, or even visible barriers altogether from the visitor side of exhibits. Landscape immersion and naturalistic exhibits were major leaps towards reconceptualizing humans and non-human animals.

Yet there is still more to be done. How much has changed when those steel doors and cement floors are still found on the backside of every animal's exhibit that is classified as a dangerous animal? Practicality, safety, and keeper utility has a lot to do with the fact that off-exhibit night houses are very much the types of enclosures that were created during the Modern age. But the implicit connection is that somewhere through all the changes to landscape immersion and naturalistic exhibits, the Modern ideas have managed to maintain a grasp on human attitudes towards non-human animals and concepts of nature, and that the conflicted perceptions will have real consequences for the success of zoos as contributors to biodiversity conservation.

Zoos must evaluate the implicit messages about conservation that they are sending to visitors. Many zoos need to carefully examine whether or not their intended message is really what they have created, and how this will impact conservation actions. Words meeting actions, actions meeting goals, and goals meeting the true needs are a very involved complex process in the context of a global biodiversity crisis. If SSP is more about captive animals than non-captive animals, more about humans than animals, and is more about the scientific process than the individuals who are at stake, then form is not meeting content.

It is true that most zoos across the nation have limited funding, but the Palm Beach Zoo in West Palm Beach, Florida, has shown us that some of the best visual messages can be achieved with modest resources. Furthermore, Disney's Animal Kingdom has illustrated how even plentiful resources do not necessarily result in helpful conservation messages. Quality of exhibits and designs over quantity of animals obtained and presented should be the foremost concern of all zoo personnel, from the groundskeepers to the curators, in creating a valuable experience that is a serious endeavor at upholding conservation goals.

Not every exhibit has to be an intentional lesson in the conservation of the animal it houses. This is why implicit messages are so important; visitors are being shown a context in which to imagine that animal whether or not they learn about that animal's conservation status. If an exhibit has not been chosen to be a focus of a specific message, it should not be an exploitative fabrication. Similarly, if there is not enough funding to spread amongst all the exhibits, the effort should be made that an effective presentation in one should not come at the cost of a conflicted or misleading idea in the others. Zoo planners should continually ask themselves whether or not the context they have created to present to the visitor validates the captivity of the animal housed in the enclosure.

Current evaluation studies need to pay closer attention to the implications that many of their procedures and guidelines are based upon. Zoos need to constantly consider that what they emphasize says just as much about what they do not focus on as what they do, as in how exotic species given preference over natives will perpetuate the struggle for local conservation action. Professionals with specialized backgrounds and expertise will be integral to each element, but a complete segregation of disciplines will

ultimately limit their success. Therefore, education has to expand beyond the education department, animal care has to include the education department, horticulture has to address education and animal care, and so on. Similarly, keeping zoos limited to zoology, and not to natural science, natural history, culture, botany, etc., will also limit the message of interdependence of the global conservation effort.

Funding for research, programs, renovations or expansions is an issue, but grant writing and research should be another serious undertaking of all zoos. If zoos want to be seriously considered a part of global conservation efforts, than they also have to gain the support of the academia and of the foundations that provide funding. This includes legislation on the local, regional, and national level. Zoos can embrace their histories of being tied to municipalities, and use it to their advantage. Grant writing can be the source of substantial funding, especially when in tangent with research relationships with universities. Everyone stands to benefit when organizations work together to offer multiple viewpoints, ideas, and energy. Biodiversity conservation is an interdisciplinary problem that needs an interdisciplinary approach to seeking helpful solutions.

Will zoos really be the future of biodiversity conservation? They certainly will not be the ark of the world's endangered species. There are simply too many species and too little space in zoos. The intent is certainly valuable and worthwhile, but is not the solution. The answer lies in a combination of many conservation efforts both in-situ and ex-situ. A commitment by the people, made possible by awareness and then support, will be the most important element in the future of conservation. Zoos do have a chance at being one of the most powerful players in this field. They are already experts in appealing to the public. They are practiced in story telling, thematic approaches, and

blending entertainment with learning. If they manage to become more consistent in their messages and more well rounded in their approaches, then zoos stand to be the leaders in conservation education to the public.

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