

Beyond the Park Gates: Zoos Step Up with Crocodile Conservation Program Support

Colette Adams¹, Ralf Sommerlad², Colin Stevenson³

¹ Gladys Porter Zoo, Brownsville, Texas USA 78520 (cadams@gpz.org)

² Crocodile Conservation Services Europe, Germany, (crocodilians@web.de)

³ Krokodille Zoo, Denmark (coleosuchus@hotmail.com)

Abstract

The mission of the 21st Century zoo is widely accepted to be conservation, education, recreation and research. In the past decade, concern over biodiversity loss has triggered a growing number of these institutions to contribute more funding to conservation and research that directly benefits species in the wild. Despite fierce competition from the “cute and cuddly, or, colorful” classes of creatures, financial and in-kind support by zoos for crocodilians is gaining momentum. Information was collected via questionnaires circulated on list serves and by direct communication in an attempt to quantify the monetary support for crocodilians by zoos over the previous 5 years. Here, we present the results of this analysis, showing that zoo support is behind most conservation programs for endangered crocodilians. We further share insights as to how zoo contributions might be increased in the future.

Introduction

The practice of keeping wild animals in captivity has been described in early records of human history. The first known “zoological garden” was created in ancient Egypt by Queen Hatasu after a voyage of discovery to the Somali coastline in Africa around 1700 BC. Explorers from that expedition brought back plants, rocks and animals, including a chimpanzee. From the big cats in the Coliseums of Rome (72 AD) to the royal menagerie held in the pits of the Tower of London from 1200 to 1830 AD, history is rife with wild animals being kept in captivity as displays of power by monarchs (Kisling 2001; Rees 2011). Indeed, the Coliseum had such demand for ‘beasts’ to use in its grand spectacles that local extinctions of lions, leopards and the loss of elephants from Northern Africa were the result (Hancock 2001; Rees 2011). Incidentally, the Coliseum was so technically advanced it could be flooded to allow ‘games’ with crocodiles and hippopotamuses. Little has been written about what must have been extensive holding facilities for these large numbers of wild animals (Hancock 2001).

In the 1700s, opposition to princely menageries surfaced in France in favor of a new type of establishment that could serve the masses as opposed to only the privileged. This concept took hold in Europe, with prominent menageries being competitively assembled in Versailles, Madrid, and throughout Germany, Italy and England. In 1828, the menagerie at Regent’s Park in England became the first formal zoological garden; the animals living in the pits of the London Tower were moved to that location (Baratay and Hardouin-Fugier 2002).

Zoological parks began appearing in the United States after the Civil War. The first U.S. zoological park was the Philadelphia Zoo, which opened in 1874. By 1900, some twenty zoos opened their

gates, with about two per year opening thereafter through 1940. With some notable exceptions, these establishments served mainly as an entertaining substitute for travel, satisfying human curiosity and craving for exoticism (Baratay and Hardouin-Fugier 2002).

Considering these origins, and given the complexities of running a modern zoological park, zoos have not generically touted themselves as leaders in conservation science. It was not until the 1960s that many zoos firmly embraced their potential roles in education, conservation and research. However, it took another twenty years before this “good idea” began to turn into action.

Today, conservation – along with education and research - is written into the mission of most zoos. The World Association of Zoos and Aquaria (WAZA) has as its own vision that “the full conservation potential of world zoos and aquariums is realized.” (WAZA 2014). Each year, zoos around the world open their gates to over 700 million visitors – more than all popular sporting events combined (Hosey et al 2013). This is a huge audience that is available for zoos to target with the right conservation messages.

Within the past ten years, concern over the loss of biodiversity has translated into significant increases in funding from zoos for *in situ* conservation and research. The Association of Zoos and Aquariums (AZA) collects information annually from its member institutions in an attempt to quantify their monetary contributions. The 2012 AZA Annual Report on Conservation and Science lists contributions totaling over \$160 million USD for projects in 115 countries (AZA 2012). This is a 633 percent increase over the previous decade, when contributions tallied for 2003 amounted to \$21.8 million USD.

Sadly, crocodylians did not receive a large share of the \$160 million in conservation support funding. According to Shelly Grow, Director of Conservation Programs at AZA, crocodylians were the beneficiary of only 1.8 percent of the species-specific projects reported by member institutions in 2012. Because the same conservation contribution data assimilated from AZA institutions is not similarly compiled from the other professional zoological associations - the European Association of Zoos and Aquaria (EAZA), Zoo Aquarium Association (ZAA) and World Association of Zoos and Aquariums (WAZA) – a survey was conducted in an effort to determine the nature and level of involvement of zoos worldwide in crocodile conservation program support.

Methods

A survey was circulated via various crocodile-related list serves, via personal emails, and by networking between zoo personnel and crocodile conservation program leaders. Respondents were asked to detail both monetary and in-kind contributions their institutions had provided for *in-situ* crocodile conservation initiatives each year. Funding amounts for education programs conducted *ex-situ* were not considered. The time span was 2009 to early 2014, covering just over five years. Respondents were also asked to provide information about the species and nature of the program supported. All responses were received electronically.

Results

Sixty-one institutions and support organizations from eleven countries responded to the survey. All of them had contributed to crocodile conservation initiatives within the past five years. Of note is the fact that contributions in 2013 were 236 percent higher than in 2009 (\$323,492 versus \$96,409).

Table 1. Zoo contributions in USD to crocodylian conservation initiatives 2009 – early 2014

2009	2010	2011	2012	2013	2014	Total \$\$	In-kind	Grand Total
\$96,409	\$161,765	\$164,046	\$181,881	\$323,492	\$113,126	\$1,032,720	\$150,650	\$1,183,370

The totals listed above included the cost of a study to determine the amount of genetic variation within and between the two extant populations of Philippine crocodiles. Because of the implications for the conservation of this Critically Endangered species in the wild, the research results are extremely important. Therefore, this *in-situ* work was included in the totals.

Of the 61 respondents, only 8 included in-kind contributions in addition to their institution's financial support. In-kind contributions varied by activity, and included travel expenses and staff time in the field, time to conduct research and publish results, fundraising costs and grant writing.

Respondents listed 12 crocodylian species for which their institutions provided support. Of the species receiving support, it is not surprising that the most endangered crocodylian species featured in this list.

Table 2. Levels of support (in USD) provided by zoos worldwide for crocodylians, 2009 – early 2014

Species Funded \$ (USD)

<i>C. mindorensis</i>	\$262,850
<i>C. siamensis</i>	\$257,647
<i>G. gangeticus</i>	\$172,300
<i>C. intermedius</i>	\$94,230
<i>T. schlegelii</i>	\$56,008
<i>C. acutus</i>	\$48,252
<i>A. sinensis</i>	\$37,060
<i>M. cataphractus</i>	\$18,740
<i>C. moreletii</i>	\$6,320
<i>M. niger</i>	\$5,000
<i>C. rhombifer</i>	\$3,454
<i>O. tetraspis</i>	\$1,000

The IUCN Red List has six species listed as Critically Endangered: the Philippine crocodile (*Crocodylus mindorensis*), the Siamese crocodile (*Crocodylus siamensis*), the Chinese alligator (*Alligator sinensis*), the gharial (*Gavialis gangeticus*), the Orinoco crocodile (*C. intermedius*), and the Cuban crocodile (*C. rhombifer*).

Another species is currently listed as Endangered, this being the Tomistoma (*Tomistoma schlegelii*). There are a further three species listed as Vulnerable: American crocodile (*Crocodylus acutus*); the mugger (*Crocodylus palustris*); and the dwarf crocodile

(*Osteolaemus tetraspis*) (IUCN 2012).

The remaining species are listed as Lower Risk. (It should be noted that several of these Red List accounts are currently in varying stages of revision).

Clearly, looking at the above list, the projects supported by zoos for *in-situ* conservation of crocodylians have focused on Critically Endangered species.

Discussion

Given the mandate from zoo authorities around the world, including AZA and WAZA (AZA 2014; WAZA 2014), and the need for zoos to more and more redefine their commitments to conservation, there is now serious attention to conservation by zoos. Their collection plans are based around the more endangered species. Exhibit designs and interpretive signage attempts to highlight conservation issues and habitats. Their education messages increasingly incorporate status and *in-situ* projects.

For crocodylians, there has been an increase in zoos wanting to house the species that are Critically Endangered, such as the Philippine crocodile, gharial, Orinoco crocodile, Chinese alligator or Siamese crocodile. In Europe, there has also been recent interest in *Tomistoma*. This could be due to more regular breeding within a number of zoos, and hence more availability, but there is clearly an interest in this species because of its endangered status, unique appearance, and under-representation in zoo collections.

Education messages are incorporating the target species into the habitat/ecosystem information presented to visitors through signs and talks, as well as overall ‘themes’ of exhibit space (e.g., Chester Zoo’s ‘Islands’ exhibit, which will feature *Tomistoma* in one of the largest developments in UK zoos, as well as Krokodille Zoo’s Black Caiman Swamp, and Paignton Zoo’s Crocodile Swamp).

Given the need for zoos to drive home a conservation message through their exhibits and education programs, there has been an emphasis on developing or supporting *in-situ* projects – putting the conservation dollar where their education message is. Pushed by key staff dedicated to the crocodylian cause, there has been a corresponding commitment to crocodylian conservation projects.

Funding by zoos has become somewhat creative in recent years. It includes:

1. Donations from net profits
2. Donations from funds collected from visitors via voluntary donor bins/buckets
3. Targeted funding taken as a percentage of entry fees – these are normally short-term projects, or aimed at raising a specific amount
4. Legal arrangements that enable a zoo to acquire a certain species on the proviso that they contribute an annual amount toward *in-situ* projects (the Philippine crocodile program is a prime example of this)
5. Zoo conservation funds that are sourced from major donors (local businesses, councils, governments) from the home city of the zoo. Such a scheme has supported gharial conservation via Zoo Praha (Prague Zoo)
6. Special fund-raising events aimed at a particular project/species. These events are many and varied, depending often on a small group of staff to drive the event

7. Zoo projects that include outside funding, but the zoo provides administrative, staffing and salary support as well as technical advice.
8. A special fund, stocked by interested individuals and zoos, solely for the purpose of supporting crocodylian-related projects. Since 2009, \$125,000 USD has been donated by zoos and private individuals to the AZA Crocodile Advisory Group's (CAG's) John Behler Conservation fund. Much of this money has been earmarked for specific species, but about \$22,000 of it has been donated to the general fund. The CAG has a small grants program and it accepts applications for conservation work with crocodiles. Generally, grant applications have been small – about \$2,000 USD.

Implications for the future

An incidental finding as the result of the survey discussed herein was that 97 percent of responding zoos have crocodylians in their collections. Accordingly, it would follow that increasing the number of institutions holding crocodylians would increase annual support for worldwide crocodile conservation. To accomplish this, in the USA, an AZA Professional Development School, called Crocodylian Biology and Captive Management, was instituted. There is little doubt that the AZA “Croc School” has created a generation of personnel that push for crocodylian conservation within their institutions. A 2010 survey on the effects of “Croc School” attendance revealed that 30 of 57 respondents had sent at least one keeper to the course. Seven of these thirty respondents had added new crocodile exhibits as the result of what they had learned; 6 more exhibits were expected to be established. This model has not just provided invaluable training for AZA keepers, but has built a very solid network of support and ideas for conservation of crocodylians within AZA zoos.

There are other established courses that provide similar means by which future crocodile keepers and conservationists can be trained. Based out of Frankfurt, Germany, Ralf Sommerlad's Crocodile Conservation Services Europe offers a variety of training opportunities as well as assistance in procuring crocodylians for zoological (and other) collections. Shawn Heflick, located in West Palm Bay, Florida, USA, now hosts Crocodile University, which offers comprehensive training in crocodile natural history, husbandry and handling. Dr. Grahame Webb, based out of Australia's Northern Territory, has conducted international training on crocodylian conservation, management and farming for many years.

In Europe, there are now a number of crocodile-specific zoos/attractions, as well as large zoos that have high-profile crocodile exhibits (Paignton Zoo, Chester Zoo, Cologne Zoo). Popular television programs over the past decade and more have increased visitor interest in crocodiles. This has helped to support better crocodile exhibits within zoos, and along with the endangered status of certain species, what was once an ignored group has become a major focus for conservation support.

Traditional avenues of conservation funding through NGOs have concentrated on high profile, ‘charismatic’ species, mainly mammals. Such organizations rely on public donations and these mammal species are an easier sell, given the often limited advertising budgets that must compete in a very tough commercial culture. However it would appear that this extremely mammal-centric culture is slowly changing in favor of crocodylians. In 2013, at the Greenville Zoo in South Carolina, USA, the Philippine crocodile beat a mammal species at their Quarters for Conservation

kiosk. The zoo's visiting public was offered the opportunity to "vote" for one of four conservation projects; three of the programs benefitted a mammal species and one benefitted a crocodile. When the votes were counted, two mammal projects came in first and second, but Philippine crocodiles took third place, thereby beating a mammal species for public support!

Conclusion

The modern zoo incorporates conservation into its core philosophy. Animal collections, exhibits, signs and education programs all put wildlife within the context of habitat/ecosystem conservation. With the recent increase in popularity of crocodilians with the general public, there has been a concomitant increase in focus on crocodilian exhibits in zoos. Over 700 million people visit zoos around the world each year. Zoos are in the enviable position of being able to convert visitor interest into conservation funding – provided the conservation message is strong and incorporated into the thematic presentation of the crocodilians in the collection. In the past 5 years, zoos around the world have contributed in excess of \$1,000,000 USD toward *in-situ* programs for the most endangered crocodilian species. Given the growing acceptance of crocodilians by zoo managers, it is expected that this figure will continue to increase. Not only has the funding increased, but 'in kind' support is also strengthening, with a number of zoos providing resources and materials to *in-situ* projects. The results of this study show that zoos play a major role in crocodilian conservation programs, with some projects made possible only due to zoo support.

Literature Cited

- Association of Zoos and Aquariums website: www.aza.org (accessed June 2014).
 Association of Zoos and Aquariums 2012 Annual Report Conservation Science: <https://www.aza.org/annual-report-on-conservation-and-science/> (accessed June 2014).
 Baratay E, Hardouin-Fugier E. 2002. Zoo: A History of Zoological Gardens in the West. Reaktion Books Ltd.: London.
 Hancock D. 2001. A different nature: the paradoxical world of zoos and their uncertain future. University of California Press: California.
 Kisling VN (ed) 2001. Zoo and Aquarium History: ancient animal collections to zoological gardens. CRC Press: Florida.
 Rees PA. 2011. An introduction to zoo biology and management. Wiley-Blackwell Publishing: West Sussex.
 WAZA website: <http://www.waza.org/en/site/about-waza/vision-and-mission> (accessed June 2014).