Conserving wetland biodiversity in a concrete jungle

Among crowd-pleasing lions and leopards, the Johannesburg Zoo is also taking care of the survival of a number of South Africa's critically endangered species. Petro Kotzé paid them a visit.

Petro Kotzé

The role of zoos has changed considerably over the years. The Johannesburg Zoo for example, covering 56 ha and founded in 1904, was initially donated to the public for recreational use by the firm of the late Hermann Ekstein. Today, part of its core business strategy is the preservation and management of biodiversity through direct conservation action, education, research and recreation. Reputable zoos such as this one are described as respected scientific institutions that work cooperatively towards attaining serious conservation goals.

The Johannesburg Zoo is guided by the World Zoo and Aquarium Conservation Strategy, published in 2005 by the World Association of Zoos and Aquaria (WAZA). According to this strategy, zoos must strive to integrate all aspects of their work with conservation activities and promote fundamental values of sustainability and social and environmental responsibility. From first charging a visitor over 16 entrance fees in 1961, they now also generate thousands of Rand for direct funding of conservation projects and protection of habitats in the wild.

In February, the zoo, like the rest of the country, celebrated World Wetlands Day. Apart from the official proceedings, the institution also runs two specific programmes dedicated to the conservation of two of South Africa's critically endangered wetland species. While the flagship programme is the Wattled Crane Recovery Programme (WCRP), the Amphibian Conservation Project is also ongoing, and reached an important milestone earlier this year.

In both these cases, the zoo keeps captive populations of endangered species to act as genetic reservoirs or assurance populations and for potential reintroduction to the wild. The WCRP was formed in 2000, when concern over the decline of the Wattled Crane in South Africa led to

Above: *The Wattled Crane enclosure at the Johannesburg Zoo, open for the public to view.*

Below: *Wattled Cranes typically lay a clutch of one or two eggs. One is taken from the nest to a participating facility where they are incubated and hatched.*

Johannesburg Zoo

a Population and Habitat Viability Assessment (PHVA) workshop.

CREATING A VIABLE WATTLED CRANE POPULATION

The Wattled Crane (*Bugeranus carunculatus*) is one of only three crane species indigenous to South Africa and is the most critically endangered crane species on the African continent (the South African Wattled Cranes are also genetically unique from other African populations). Due to habitat loss and renowned poor reproductive success there has been a 35% decline in the South African Wattled Crane population over the last two decades. By 2004, the *in situ* population in South Africa was estimated to be a mere 235 birds. The remaining birds, says Louise Matschke, Johannesburg Zoo curriculum specialist, occur in the Southern Free State and the midlands of KwaZulu-Natal.

Johannesburg Zoo

One of the outcomes of the mentioned PHVA workshop was the recognition of the need for a captive propagation and release programme to ensure species survival by creating a viable genetic reservoir. The South African Crane Working Group of the Endangered Wildlife Trust (EWT) that was involved with the conservation of the Wattled Crane in its natural habitat, partnered with the African Association of Zoos and Aquaria (PAAZAB) and private avicultural institutions to create the WCRP.

This programme aims to firstly, maintain a captive breeding flock to serve as a genetic reservoir in the case of catastrophic extinction of the species in the wild. A second aim is the supplementation of the wild population through the release of captive-reared fledglings into existing wild populations. In 2006, the Johannesburg Zoo took over the management and coordination of the WCRP.

The existing captive flock consists of 30 birds, housed at the

Above: *The zoo's conservation farm in KwaZulu-Natal, showing the Wattled Crane encampments. These birds are monogamous, and the set-up allows the birds to 'check out' potential partners.*

Below: Ex-situ *bred chicks released into the wild will initially be fed with puppets accordingly to a similar successful method applied in the US.*

Johannesburg Zoo

Johannesburg Zoo

Thoko Masina, or 'Mama Thoko", takes care of the Wattled Crane chicks.

Johannesburg Zoo as well as their conservation farm in KwaZulu-Natal. "The ideal is to build up a viable flock of 40 individuals, consisting of 20 males and 20 females," says Matschke. As the Wattled Crane has the lowest reproductive rate (*in situ* and *ex situ*) of all the crane species, this is an ideal which is easier said than done.

Wattled Cranes are monogamous by nature, and typically lay a clutch of one or two eggs. Only one chick is reared and the second egg is abandoned. The department of Nature Conservation in KwaZulu-Natal allows for the removal of second eggs which are incubated, hatched and the chicks taken to the chick-rearing facility at the Johannesburg Zoo.

The hatchlings are hand reared and bird keepers use hand-puppets to walk and feed them in order to ensure natural imprinting. Minah Mabitsela, a bird keeper at the zoo, explains that it is a very labour intensive process. The birds have to be watched very closely, she says, weighed regularly and fed and walked every two hours. "For the past five years they have received about six chicks per year," says Matschke. Once the breeding flock is big enough, the *ex-situ* bred chicks from the zoo's breeding flock will be released into the wild. At the moment, says Matschke, the zoo practises artificial insemination on certain birds to increase the reproductive output. "Artificial insemination is used as we have more females than males", she says, "but in the future we hope they will breed naturally in a captive situation." She says that it's hoped that the first birds will be released into the wild in KwaZulu-Natal within the next year or two.

THE ZOO'S WETLAND PURIFICATION SYSTEM

Braamfontein Spruit runs through Johannesburg, enters the zoo through two storm-drain pipes and is eventually deposited into man-made dams, just opposite Jan Smuts Avenue. The stream picks up a number of pollutants on its way, including littler, human waste, plant matter and discharges from some of the animal-enclosures. This used to be deposited in Zoo Lake.

The lake bore the brunt of the damage, and public outcry over the state of the public open space demanded rectification. Consequently, the zoo constructed a ± 1 ha wetland purification system in 2002. Water that enters the zoo from the two stormwater channels enters the primary sieve tank, where large objects such as bottles and tins are removed. From here the water flows into a large catchment tank, and then into a sludge settlement tank where solid waste is removed (solids suspended in the water settles at the bottom of the tank and is pumped into the city's sewer line, while some is also used for compost). The biological purification system involves the water flowing through a channel, and into the first of three reed-beds planted in a zigzag pattern, allowing the plants and indigenous fauna time to remove impurities.

The water then exits the wetland system, moves under Jan Smuts Avenue, and then enters Zoo Lake. In March 2002 the faecal coliform count for bacteria in the water entering the zoo was 75 000, reduced to 0 by May of the same year. Some of the water is also channelled back into the zoo for their own use, explains Matschke.

ONE MORE STEP TOWARDS ENDANGERED AMPHIBIAN CONSERVATION

In response to the call for action from the WAZA to respond to the amphibian extinction crises, the Johannesburg Zoo established the Johannesburg Zoo Amphibian Conservation Centre for the captive propagation of South African wildlife amphibians.

The project started in March 2006, with the aim to initially keep and breed common species of indigenous amphibians in captivity. If done successfully, the keeping and breeding of endangered analogue species of indigenous amphibians

could be tackled. Furthermore, the programme aims to compile husbandry guidelines and protocols on how to keep and breed the species being kept in the collection, to successfully breed each species of frog to an F3 generation and to conduct research on the breeding, enclosure design and husbandry of each species of amphibian. Timothy Netsianda, amphibian and reptile keeper at the zoo says they also aim to establish and implement a frog collection protocol with special emphasis on the prevention of disease transmission.

The first, common species chosen for the collection, says Netsianda, are the Painted Reed Frog (*Hyperolius marmoratus*), Guttural Toad (*Amietophrynus gutturalis*), Bushveld Rain Frog (*Breviceps adspersus*) and Cascade Frog (*Hadromophryne natalensis*).

Above: Education is an important part of the zoo's Amphibian Conservation Centre.

Below: Common species of frogs are kept at the zoo for public viewing.

Petro Kotzé

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To date, the Painted Reed Frogs and Guttural Toads have been successfully bred, and it was found that the breeding pattern of the first was similar to that of the critically endangered Pickersgill's reed frog (*Hyperolius pickersgilli*). This frog occurs in only 11 currently known locations from Kingsburgh in the south coast of KwaZulu Natal to iSimangaliso Wetland Park in the north. In January, the zoo received their first 30 individuals of the species.

The project could last as long as 25 years, during which frogs will be collected in the wild in order to establish an assurance population. These will be divided between the zoo and Seaworld at UShaka Marineworld. It is foreseen that the captive breeding programme will eventually result in endangered individuals that can be released back into the wild once suitable habitats have been restored or created. This part of the project is done in conjunction with the South Africa Association of Marina Biological Research, North-West University and Ezemvelo KZN Wildlife.

Netsianda says that what makes the zoo special is that it not only provides the opportunity for research, but to educate ordinary people. In fact, the zoo places particular importance on education, especially of the thousands of children that visit annually. In this way, even though the species inside the zoo are far away from home, the people that learn about them will take home knowledge about the natural environments that they came from, and the importance of their survival. ❑

THE ANIMALS IN THE ZOO

The original animal collection at the Johannesburg Zoo consisted of one lion, one leopard, one giraffe, two Sable antelope bulls, one baboon, and one genet, one pair of Rhesus monkeys, one pair of porcupines and one Golden eagle. Today the zoo houses over 320 species of animals, totalling about 2 000 animals. These include at least 10 endangered species, five critically endangered species and the Scimitar Horned Oryx which is considered extinct in the wild.

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