

reproductive. These initial studies suggested that some of the rhinos were having infertile cycles, perhaps due to early miscarriage.

In the reproductive or behavioral study of any species in captivity, it is important to understand the normal biology of their free-ranging counterparts. With the use of hormone analyses from non-invasively collected samples, this is now a possibility. We organized a collaborative project with Professor Norman Owen-Smith from the University of Witwatersrand in South Africa, because he is renowned for his study of the behavior of free-ranging white rhinos. Professor Owen-Smith had already established a field study site in the Umfolozi Game Reserve that we were able to join. Funded by several granting organizations, we began a project to study the hormonal and behavioral aspects of reproductive biology in wild rhinos.

To be able to find and follow rhinos in the bush, we installed radio transmitters in the horns of several females so that we could track them by radio signals. Females coming into heat were usually accompanied by a dominant bull who attempted to court the female with 'hic-pant' vocalizations and tried to rest his chin on her hindquarters. We are currently analyzing the fecal samples in our lab to see if we find the same type of hormone patterns that we found in our captive population. In our studies with captive rhinos, we had found two types of reproductive cycle, a short one lasting about 35 days and a long one lasting about 70 days. The longer cycles appeared to be associated with subfertilities, but we were uncertain which type was really normal. So far, our behavior data from the field point to a normal cycle of about 30 to 35 days for wild rhinos.

If this trend holds, then we will have a better understanding of the reproductive problems facing captive rhinos and will be able to apply this information to appropriate management and treatment. These efforts should help prevent the

looming crisis in the captive propagation of the southern white rhino, a magnificent species saved from extinction during the last century and one that we hope will begin to breed well in captivity.

Nancy Czekala in *CRES Report* (Winter 2001)

San Diego Zoo, California, U.S.A.

Four newly-hatched Anegada iguana (*Cyclura pinguis*) hatchlings mark the first successful breeding of this species in any zoo. The iguanas, which are native to Anegada Island in the British Virgin Islands, are the third most critically endangered iguana in the world. There are fewer than 300 remaining in the wild, and their population has undergone an 80% decline since the 1960s, severely threatened by free-ranging livestock, habitat loss and feral cats that kill off juvenile iguanas.

San Diego's group of iguanas is the only captive-breeding group in existence. These new hatchlings serve as an important safety net against extinction in the wild. In addition to the breeding group at San Diego, the Center for Reproduction of Endangered Species (CRES) has helped establish a head-starting facility on Anegada designed to house and care for up to 100 juvenile iguanas until they are large enough to be released into the wild. Ongoing field studies by CRES biologists include surveying the wild population of iguanas and studying their nesting ecology.

Although these rare iguanas were initially housed away from the public at the CRES facility, they are now on exhibit at the zoo's Reptile Mesa.

AZA Communiqué (December 2001)

Schwerin Zoo, Germany

Because the old Siberian tiger enclosure, built in 1972, was not compatible with today's style of animal management, plan-

ning to replace it began in 1994. The new enclosure, opened in May 2000, includes a tiger house with six night quarters, keeper access and keeper areas, two entrance enclosures with keeper access, two main outdoor enclosures (of 1,220 m² and 407 m²) and a visitor area. The outdoor enclosures are built into a hillside covered with mature oaks and beeches, and the existing understorey, composed primarily of elder, provides the backdrop, creating a densely wooded environment similar to the tigers' natural habitat. Additional planting was primarily used outside the exhibit and for greening the fences, and some of the plants are native to the Amur River region.

A man-made creek traverses the exhibit, ending in a large pond and a water hole. (This creek runs out into the visitor area for a few metres before returning into the enclosure, strengthening the impression that the tiger habitat and the visitor area are united while creating an additional attraction.) Planting and furnishing in the exhibit are varied in order to create different spaces and heights. These variations provide retreats for the tigers, which usually live a solitary life in the wild. The enclosure surface was either left natural or is filled with sand and gravel. Tree trunks in the entrance enclosures keep the tigers busy with climbing and scratching. The tiger house is an unheated log cabin with a 'green' roof that retains rainwater.

Abridged and adapted from the Schwerin Zoo presentation in the ZooLex Gallery at www.zoolex.org. [Visitors to the website will find many more technical details and numerous colour photos of this exhibit.]

Sea World, Surfers Paradise, Queensland, Australia

The Polar Bear Shores complex, completed in December 2000 as the first stage of Sea World's Ocean Science Center, depicts an Arctic summer theme. Polar bears, which are only relatively

recently derived from the brown bear, are quite capable of flourishing in the wild under climatic conditions which, at certain times of year, appear quite un-Arctic; for example, a polar bear denning area at Hudson's Bay in Canada experienced a temperature average of 35°C over two weeks in the summer of 1998. Sea World's fully shaded open-air exhibit, with chilled underwater viewing, is the only polar bear display in Australia.

Polar Bear Shores was designed to promote natural behaviours to the maximum extent feasible in a non-wild situation. Visitors will witness bears climbing, basking, diving, swimming, foraging for food, and - with successful breeding - caring for young. The complex comprises a public presentation area (the on-exhibit bear habitat, with pool and landscaped dry areas) and a service complex, including off-exhibit exercise yard, dens and pools, and support facilities. The off-exhibit facilities are designed to ensure that male and female bears may be housed and moved separately; two distribution races enable an isolated bear to be moved between the dens, exercise yard and on-exhibit area without contact with a bear in any other of those locations.

Wild polar bears are essentially solitary for much of their life, and special care needs to be taken with captive animals to minimise intra-specific aggression; so physical structures, such as formed rockwork and logs, are placed in the on-exhibit habitat and the exercise yard to allow a bear to remove itself from the view and/or attention of a more dominant animal. The primary exhibit area allows for stimulating topography changes using proven environmental enrichment techniques. These include variation of terrain, 'furniture' such as logs, rocks and water features. An array of toys such as boomer balls are introduced into the exhibit to stimulate the bears' naturally inquisitive nature and to provide for physical exercise. The exhibit is landscaped with trees and shrubs. The terrain has a com-