

Polar Bear Shores Complex -- first stage of an Ocean Science Center, Queensland, Australia from ZOO LEX (www.zoolex.org)

Note: This month's feature exhibit design is the Polar Bear Shores Complex in Queensland, Australia. The exhibit is the first stage of an Ocean Science Centre.

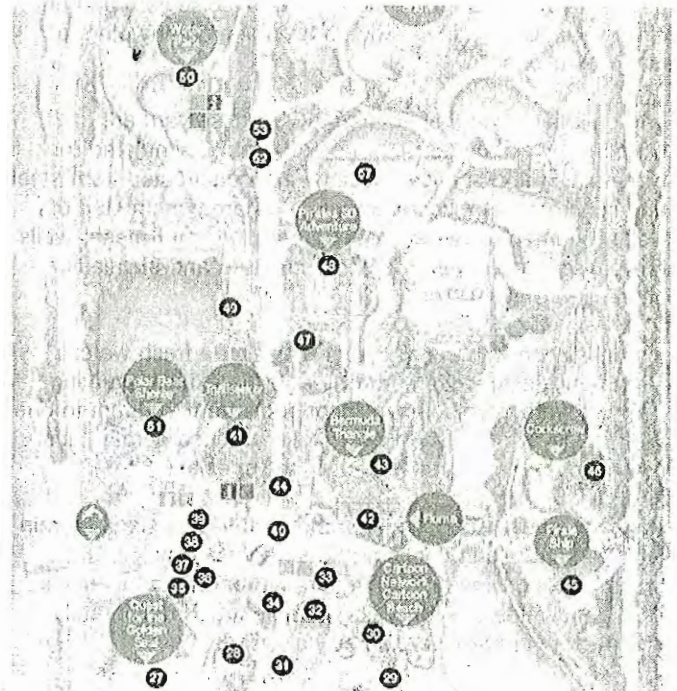
In publishing this design, we at ZOOS' PRINT do not intend suggesting in any way whatsoever that zoos of the South Asian region exhibit polar bears. Although many countries with hot climates part of the year keep Polar Bears successfully, conditions of power supply and hygiene in this region are not sufficiently reliable to risk these valuable animals. Keeping polar bears in Calcutta Zoo and Mysore Zoo was tried with bad effect last century and does not bear repeating. The concepts involved are good applied to a variety of species and habitats, however, and that is what we wish to promote.

These Zoo Lex features in ZOOS' PRINT are poor reflections of the web site. We suggest you check the same enclosure in living colour at www.zoolex.org and see their many other features. Polar Bear Shores Complex address is PO Box 190, Surfers Paradise QLD 4217, Queensland, Australia and can be further viewed at <http://www.polarbearshores.com.au>. The exhibit won the 2001 Queensland Tourism - State Tourism Attraction of the Year (Australia)

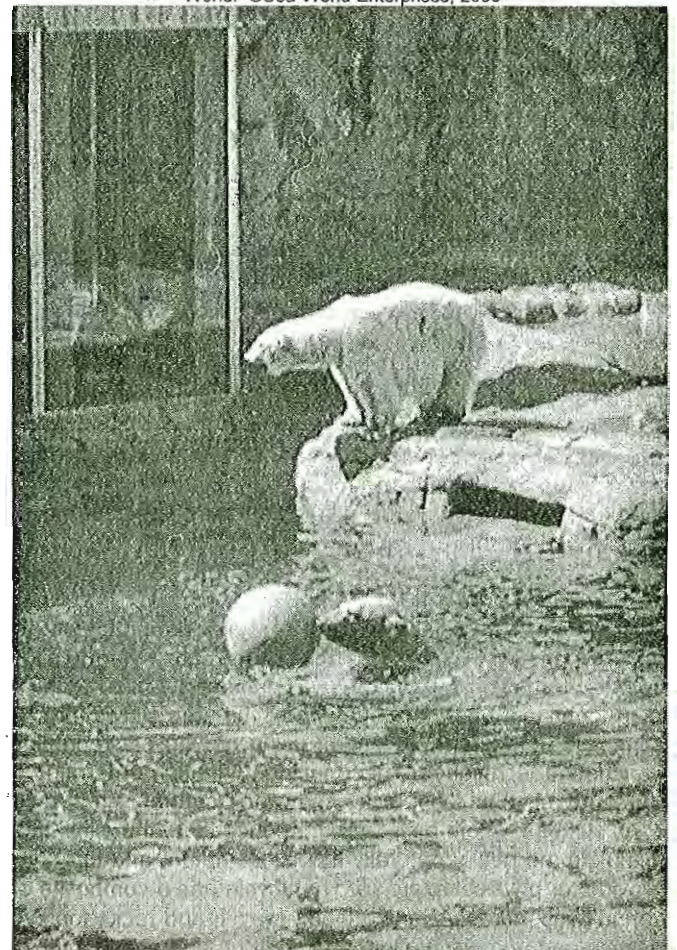
DESCRIPTION

The Polar Bear Shores complex is the first stage of the Ocean Science Center which was completed in December 2000. It 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, for particular periods, would appear to most to be un-Arctic in nature. For example, Polar Bear Provincial Park, a polar bear denning area along the 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. Visitors to Sea World - 40% of whom are from overseas - are able to observe the bears' skilled and graceful underwater swimming and hunting abilities through large underwater viewing windows, and are treated to fascinating interpretive information about the animal. Polar Bear Shores was designed to promote natural polar bear behaviours, to the maximum extent feasible in a non-wild situation. Guests will witness bears climbing, basking, diving, swimming, foraging for food, and - with successful breeding - caring for young.

The Polar Bear Shores complex includes a public presentation area (the on-exhibit bear habitat facilities comprising pool and landscaped dry areas) and a service complex (the off-exhibit facilities comprising exercise yard, dens, pools, and support facilities). Husbandry and service facilities are located in an enclosed and air conditioned area at the rear of the public presentation area. They include five dens, an administration and records office, incorporating security video surveillance equipment, a storeroom and a freight dock.



Site plan — Detail of the overview map showing Polar Bear Shores within Sea World. ©Sea World Enterprises, 2000



The large main pool is up to 4 meters deep to encourage diving. ©Sea World Enterprises, 2001

The off-exhibit facilities are designed to ensure that male and female bears may be housed and moved separately to each other. Two bear distribution races enable an isolated bear to be moved between the dens, exercise yard and on-exhibit habitat area in isolation from a bear in any other of those locations.

The on-exhibit bear habitat and the exercise yard are bounded by a 5 meter high, non-scaleable, simulated rock wall. Exhibit and service buildings are constructed from steel and concrete. Bear containment doors are constructed of welded non-corrosive stainless steel plate and mesh; walls are constructed of strengthened concrete and stainless steel plate and mesh.

In conjunction with the main pool system, a fresh water stream including weirs flows through the exhibit, creating different water levels in individual pools from 200 mm to one meter. Differing grades of river stone are incorporated, just as occurs in the natural habitat of the species.

Sprinkler and misting systems are installed to simulate rain and mist and aid in cooling, and strategically placed fans create cooling wind and bring into the exhibit and exercise yard a multitude of scents, both ambient and deliberately introduced via purpose-planted herb beds.

Size of exhibit: In Canada, the Manitoba Department of Natural Resources, which is responsible for Polar bear management, have indicated that Polar Bear Shores meets their recommended standards for housing Polar bears. These standards are amongst the highest in the world. The total dry area is 861 m², the total area of pools 471 m² and the total water volume 587,500 liters. The public presentation area is 41 m wide in north-south direction and 32 m wide in east-west direction.

COSTS: Australian dollars 7,000,000 including for design.

OPENING DATE: December 26, 2000

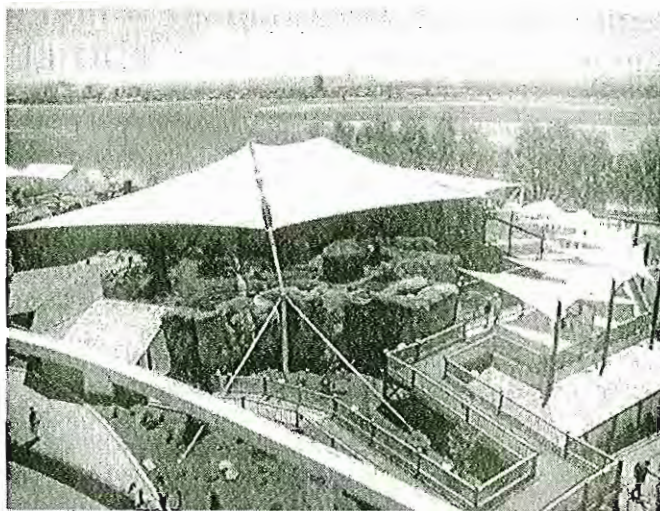
LOCAL CONDITIONS: This is a climatic diagram for the closest weather station.

PLANTS

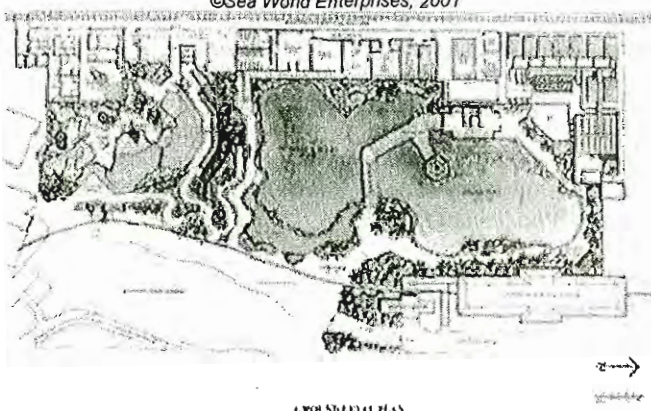
The plants were chosen to fit the Arctic Summer theming. We chose to plant species of herbs, shrubs and trees which are close to those which are found in the natural habitat of the bears. The plant list specifies the Latin names of the plants used for this exhibit.

FEATURES DEDICATED TO ANIMALS

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 bear. 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 "boom balls", are introduced into the exhibit to stimulate the bear's naturally inquisitive nature and to provide for physical exercise. The terrain has a composite of various substrates including loam, gravel, and rocks for digging and burrowing. Dry beds of stone and gravel are used to encourage the animals to fossick to find food.



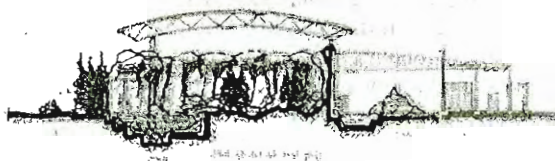
bird's eye view — A retractable shade cover allows 90% solar filtration. The fabric roof shade structure incorporates sprinkling systems to simulate rain.
©Sea World Enterprises, 2001



OCEAN SCIENCE CENTRE - CONCEPT PLAN



Boulders line the sides of the main pool in various sections where the bears can hunt for the fish in a natural environment.



CROSS SECTION B-B

SERVICE COMPLEX

Several climate control facilities are available to the bears: All pools have water chilled to 15-17°C. A retractable shade cover allows 90% solar filtration. The fabric roof shade structure incorporates sprinkling systems to simulate rain. The exhibit is landscaped with trees and shrubs. The bears will use air conditioned dens when they are not actually on exhibit or in the exercise yard.

Stimulation of the bears olfactory senses is provided by strategically placed wind generation fans. These fans direct breezes that bring new and interesting smells and animal scents, just as the bears would encounter in the wild. The simulated rock walls incorporate misting systems to portray arctic mists and provide additional cooling.

The exercise yard has an retractable shade cover, a pool with chilled water, a bear pit with gravel for digging, sprinklers and a wind generator.

Five individual dens are provided: two of them are general dens, one is an isolation den and two are female dens. One of the maternity dens has incorporated an additional maternity den.

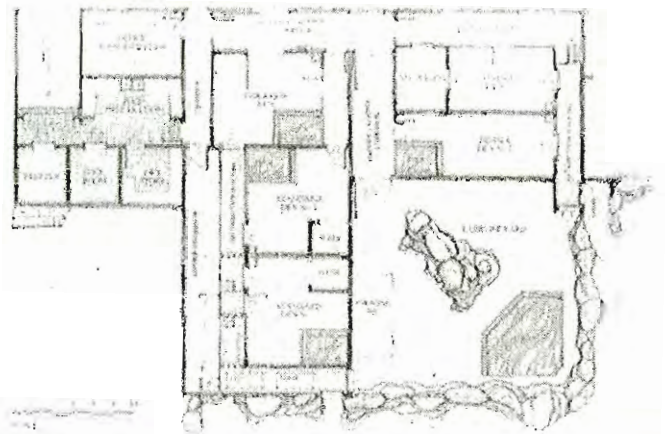
FEATURES DEDICATED TO KEEPERS

All dens and keeper service corridors are subject to video surveillance. All keeper corridors incorporate intercom facilities. The off-exhibit dens and service area incorporates the latest in bear containment doors (remotely-operated from secure keeper corridors) and locking devices. All bear containment doors incorporate open/close electronic sensors; a number of doors has incorporated over-ride locking pins which are monitored from the secured exhibit office.

Both the on-exhibit bear habitat and the off-exhibit exercise yard incorporate bear exclusion "safe havens" into which keeping staff may rapidly retreat in the event of an emergency.

FEATURES DEDICATED TO VISITORS

The design of the viewing platform and walkways represent the natural environment of indigenous Arctic Circle people. The walkways depict the atmosphere of a traditional arctic village after a good hunting season, and highlight crafts, hunting equipment, and arctic wildlife. The inclusion of an audio component, with appropriate traditional songs and stories, takes the visitor on a truly unique trip to the Arctic Circle. High-level guest vantage points incorporate unobtrusive barriers to prevent an accidental fall into the bear enclosure.



Underwater and ground-level viewing panels are engineered to exceed minimum bear-impact stress specifications. ©Sea World Enterprises, 2001

INTERPRETATION

Interpretation was focused on providing signage and a habitat which will be easy to read and comprehend by children and adults alike, and which provides considerable information on both the biology of the species and relevant conservation issues. On-site educational presenters provide a more personal interpretive experience.

Educational signage is located throughout the park, providing information on Sea World, environmental issues, and the animal species on exhibit. In addition to behaviour-related signs, Polar Bear Exhibit signage highlights basic species facts, cultural significance, wild management programs, and conservation issues facing the species. This signage is distributed along the walkways, on the high-level viewing platform, and in the underwater viewing gallery.

Polar bear keepers are responsible for conducting three educational sessions daily. The content begins with an overview of all bears and their ecosystems, dividing them into their specific groups. Then discussion focusses on the acquisition, care and training of polar bears at Sea World, concluding the session with a focus on conservation issues facing the species. Information is provided to guests to relate the behaviour which is on view to that in the wild.

Sea World is one of the few zoological facilities in Australia which can educate students and guests on conservation issues concerning marine animals and their environment. A multi-level learning style was developed for the Polar bear education program encompassing interpretive graphics, and live keeper presentations for all guests, while an additional formal education program and worksheets are available for visiting students. Written materials are collated to cover a wide range of subject areas and learning abilities.

MANAGEMENT

Two full-time keepers are specifically dedicated to the polar bear exhibit. Weigh scales and foot baths are located at the bear entry points from the exhibit and exercise yard in both distribution races to enable the physical condition of bears to be monitored, and to provide for paw medication to be readily administered as required. A bear crush is located in bear distribution race no. 1 to enable basic veterinary procedures to be undertaken without compromising the safety of either bears or personnel. An isolation den is available to enable the veterinarian to perform on a (sedated) bear the more involved procedures which cannot be undertaken in the bear crush; the den may also be used to quarantine an ill or recovering bear.

Pool water is refrigerated to 15-17°C by use of a large chiller unit. Ozone is utilised for disinfection via a 10% by-pass flow supplied by a 40 gram ozonator through dry air (2 mg/l). This is mixed with the filtered water in a vortex mixing chamber with a contact time of two minutes. ORP or redox taken from the mixing chamber is used to measure and monitor the automation of the ozonator, along with redox probes in the return to pool line. Should problems arise with the main ozonator or its many ancillary components, a back up oxidation treatment system becomes operative. This system utilises sodium hypochlorite, dosing at 1.0 mg/l, which is controlled by redox probes on the return to pool lines. The turnover time is one hour, the filtration rate 4.161 sec/m². Algae control is carried out by copper sulphate or simazine, as well as denitrification. Backwash water is disinfected via sodium hypochlorite.

Operant conditioning programs are an integral component of Sea World's zoological operations. The Polar bears undergo



An array of toys are introduced into the exhibit to stimulate the bear's naturally inquisitive nature and to provide for physical exercise.
©Sea World Enterprises, 2001

protected contact operant conditioning. The training incorporates husbandry matters, veterinary programs, gate and pen conditioning, as well as physical and psychological challenges. A conditioning program greatly reduces the occurrence of stereotypic behaviour when the challenges of the natural environment are not present. The holding areas have been specifically designed to facilitate the use of "target" and "station" conditioning. These techniques, in conjunction with positive reinforcement, are utilised to condition voluntary movement of animals within the exhibit, husbandry behaviours, animal separations, and to create stimulating mental challenges for the bears.

Browse and scatter feeding, olfactory scent stimuli, and unpredictable feeding schedules are utilised to promote physical, mental and olfactory enrichment. Live fish is released into the shallow creek pools and the main pool of the exhibit. Other food items are deliberately hidden by keeper staff throughout the exhibit to stimulate food motivation and challenges for the animals.

CONSERVATION

The future survival of many marine mammals in the wild is being assisted through the research, education and support provided by institutions such as Sea World. At Sea World, many people will be able to see Polar bears for the first time in their lives. We will provide a first hand, personal connection with these animals - a direct living experience. This unique, interactive experience provides a foundation for peoples' understanding of these unique creatures and in turn, their desire to conserve and protect them. The Polar bear can focus attention on the fragility of, and threats upon, both the Arctic and Antarctic and the need to understand and protect these environments.

Sea World Enterprises assist international Polar bear conservation efforts by providing an Australian centre for education, breeding and keeping. This is done by cooperating with legitimate zoological organisations world wide and commitment to the American Zoo and Aquarium Association breeding recommendations.