

Suggested Guidelines for Bear Enrichment

The Ursidae, or bear family, is comprised of animals that normally inhabit large home ranges and have great strength proportionate to body size. Successful captive management must address the bears' innate motivation for movement or travel, as well as containment issues relative to their potential to destroy their enclosures.

Natural History

The world's eight bear species are distributed throughout North and South America, Europe and Asia. Spectacled bears inhabit the Andes Mountains of South America. The giant panda is restricted to central Chinese provinces. Malayan sun bears are found in Southeast Asia and sloth bears in central Asia, whereas Asiatic black bears are widely distributed throughout the entire Asian continent. Polar bears range across the arctic coasts of North America and Eurasia. American black bears live throughout the North American continent; however, the widest distribution in any bear species is seen in the brown bear, whose habitat includes North America, Eurasia and northwestern Africa. Species with wide geographical ranges have resulted in several subspecies, many based on size and pelage differences.

Bears live in habitats that range from arctic ice floes and tropical forests at sea level to grasslands and alpine forests. From the terrestrial and aquatic polar bear to the highly arboreal sun bear, they utilize various parts of their habitats, depending on their physical adaptations.

Ursid diets are as varied as their habitats. Whereas the American black bear is omnivorous, others, such as the giant panda, are folivorous, or carnivorous, such as the polar bear. Bears are intelligent and opportunistic. They quickly learn where their food comes from, and in captivity, when it is delivered, becoming predictable in their behaviors.

In general, bears are well adapted to their environments. They have adequate eyesight and hearing to negotiate their natural environment, accompanied by an excellent sense of smell. Many are excellent climbers, whereas others travel great distances in search of food or mates. Several species that tend to be solitary, such as the brown bear, will congregate during major feeding events, such as the beaching of a whale carcass or the salmon run. All species are heavily built with powerful limbs and can be dangerous if provoked. They possess strong claws that are adapted for tearing and digging and, for some, climbing. Random and variable enrichment can provide novelty and stimulation that mirror activity and changes in the animals' natural world.

The management of captive bears can be challenging. Stereotypic behaviors, such as pacing, pattern swimming, food solicitation from the public, and repetitive behaviors can be common in the captive environment. The nocturnal or crepuscular nature of some species may cause animals to be inactive or hidden during much of the public viewing period. Promoting normal wild behavior through the provision of suitable species-specific

enrichment can lead to improved mental and physical health. Well adjusted animals should exhibit behaviors that reflect reduced stress levels and are appropriate for public display.

Exhibit Enrichment

Ursids are relatively large and destructive animals requiring appropriately sized enclosure furniture. Depending on the naturalistic state of the exhibit, it may be beneficial to install sleeves or other such structures to provide attachment points or stability to allow for large or heavy items.

Because many bears are strong diggers, enclosure mesh must be heavy gauge, but also embedded deep in the ground to prevent the bears from opportunistic tunneling. Vertical climbing opportunities are desirable for many species, and juveniles of normally terrestrial species may also benefit from climbing structures. However, large props can break, causing injury to animals, and providing potential escape routes. Therefore, climbing structures should be monitored for structural integrity and the potential of being used by the animals for escapes if broken or compromised.

Off-exhibit areas should offer suitable climbing, sleeping or denning opportunities, especially if the animals will spend evenings or winters in these areas. Bears can benefit from continuous indoor and outdoor access options. Many facilities provide considerable artificial-looking enrichment in holding areas, while maintaining naturalistic public viewing exhibits. Although the type of enrichment may differ, it must be stressed that all bear areas should contain appropriate and sufficient enrichment choices. For example, shelter, sun, shade, heated rocks, cooled areas or water features either on or off exhibit provide options that allow animals to regulate their own activity levels, temperature and visibility to the public.

Built-in visual barriers can provide a retreat for the animals from the public or cage mates. These can include rock structures, uneven terrain, tree plantings, logs and brush piles. Dens can provide escape from the elements as well as natural cubbing areas or shelter for species exhibiting winter lethargy.

Live trees and bushes can provide visual barriers, as well as shade and climbing opportunities. Certain trees may need collars, electric fencing or other barriers to prevent damage from bears clawing, scratching and rubbing on the trunks. Trees in proximity to exhibit barriers, may provide escape opportunities and should be trimmed to ensure that the bears cannot walk or jump out of the enclosure or use fallen limbs to facilitate escape. Similarly, strong animals may be able to knock down or rearrange furniture against perimeter fencing, which can lead to escapes from the enclosure.

Various substrates provide considerable interest for many ursids. Mulch, sand, gravel, soil, grass, leaves, hay, and moss can encourage natural exploratory behaviors. Ingestion is not normally a problem with these items, but animals should be monitored when first offered access to new substrates. A variety of substrates can provide bears with options for foraging and digging, as well as nest building.

Water features are desirable for many bear species and often encourage species-typical behavior. Shallow pools and streams provide a source of drinking water and can be stocked with live fish or floating objects, while deeper pools provide swimming and loafing options.

Dietary Enrichment

Bears are generally omnivorous, but differ in their levels of carnivory, folivory or insectivory. The highly carnivorous polar bear relishes certain types of vegetable material and the mostly folivorous giant panda will opportunistically eat meat. These tendencies allow for a great deal of variety in food enrichment, including timing, delivery and content. For example, artificial termite mounds and distance suction feeders might be provided to highlight specialized insect feeding adaptations, as seen in sloth bears.

Carcass feeding encourages the normal behavior of animals at a kill. The entire carcass can be eaten, so a variety of nutrients are obtained and natural jaw action, tooth wear and digestive processes occur as well. In a social group, the pecking order, loosely based on size and reproductive condition, will also be observed, where subordinate animals may have to wait their turns to eat. Encouraging such natural behavior, however, is not without risks. These may include injury from other members of the social group, tooth breakage, or impaction and blockage from ingested bones.

Social Enrichment

For maximum activity benefit to the animals, as well as for public interest, zoos often exhibit bears in pairs or groups, although many species in the wild are solitary for much of the year. Housing animals in social groups can be an effective form of enrichment, but staff should regularly monitor behavior, food intake, and use of enrichment and exhibit furniture to ensure the needs of all animals in the enclosure are being met. Subordinates often need places in which to escape unwanted attention without becoming trapped. Food should be provided in more than one location to ensure that all animals are able to access appropriate quantities. Multiple food stations, multiple daily feedings, and scattered foraging opportunities are all methods to alleviate this issue. Mother and cub groupings may also be successful until animals reach sexual maturity or become aggressive. Breeding and cub rearing opportunities can be valuable enrichment, in that not only are both mother and cub mentally stimulated, but this also allows both to perform species-appropriate behavior while providing cubs with an environment in which to develop normal social skills.

Seasonality

Several bear species exhibit winter lethargy and may den up during certain parts of the year or in response to cold, inclement weather. Keepers need to be aware of this seasonality, as well as normal daily activity patterns when providing bears with enrichment opportunities. The animals may need 'down time' and thus should not be expected to maintain certain activity levels at all times of the day or year. Natural dietary fluctuations may correspond to seasonal behavior, requiring a shift in the type and/or quantity of food offered.

Training as Enrichment

Training programs provide animal stimulation and can be valuable management tools. Many

bears can be trained to perform simple behaviors, such as body part presentations, or mouth open for physical examination. Training for co-operative shifting can facilitate safe and reliable keeper access to exhibits for placement of enrichment as well as during emergency situations. Crate training should be considered where appropriate to minimize stress and improve keeper and animal safety during transport. To facilitate transports, holding areas should be designed with training or interaction areas that are safe for both staff and animals. Removable panels or attachment sites for crates should be considered.

Safety Considerations and Documentation

Safety should be a primary consideration when introducing new enrichment. Input from supervisory staff is important and animals should always be closely monitored when new items are offered. Horticulturists should be consulted regarding browse or plant toxicity. Donated leaves, limbs or trees should be checked for prior pesticide application. Christmas trees should be free of tinsel, fire retardant, fake snow, greening agents, etc.

Because individual animal responses to the same enrichment can be very different, careful observation and documentation are necessary. A written assessment of each enrichment event is desirable. This provides a permanent record that can be valuable in reducing future problems, such as the potential for ingestion, entanglement, or aggression from or toward cagemates. In addition, documentation and evaluation of enrichment can lead to additional applications for medication delivery and other methods for improving animal management. One animal may wrestle with an item for extended periods, while another might destroy it immediately and leave it, and yet another might try to ingest it. Documentation of individual differences will allow keepers to tailor enrichment to maximize its benefits. The assessment may be added to a compendium of ideas that may spark interest from other staff, for other species, or at least reduce the constant "reinvention of the wheel".

Conclusion

Captive bear management remains a challenge. Bears are recognized by and popular with zoo visitors, giving them a high profile. Increasing public concerns regarding animal welfare can often be addressed or resolved through the provision of and interpretation of enrichment. Conservation of wild populations and their habitat and the importance of well adjusted animals for reproductive success, are messages that can stimulate public appreciation for these magnificent animals.

A successful bear enrichment program will provide a balance between risk factors associated with enrichment and maintaining species-appropriate behaviors and that promote physical and psychological well being for captive bears. Incorporation of enrichment as part of the keepers' daily husbandry routines can help to ensure the health of the animals, and therefore the educational value of the exhibit, and create a positive perception among the visiting public.

Exhibit Enrichment

- Climbing structures: trees, telephone poles, rope, logs, rocks, firehose hammocks

- Weather considerations: rain cover, shade structure, sunny spots, wind breaks
- Substrate for lying, sleeping, or nest building: grass, moss, hay, straw, leaves, Christmas trees
- Substrate for digging: grass, soil, sand, mulch, rotting logs
- Visual barriers: brush or log piles, trees, rocks, caves, hills
- Variety of feeding sites
- Water features: pools, waterfalls, moats, sprinklers, misters
- Mechanical devices to deliver random food items
- Options for hanging items
- Training area for safe access for vet examinations or training sessions
- Safe shift area to allow keeper access for daytime enrichment additions or feeding
- Vehicle access for large exhibit renovations or furniture replacement

Dietary Enrichment

- Browse for eating, destroying and displaying
- Carcass feeding
- Live animal feeding; insects, invertebrates, rodents or fish
- Variety of feeding times
- Increased number of feedings
- Variety of meat, bones and produce offered
- Mix of whole versus processed or chopped foods
- Edible local plant material, in and surrounding exhibit
- Strong or bitter tasting foods (can be used to cover up medications when needed)
- Cereal, popcorn, seeds or nuts for foraging
- Treat foods: peanut butter, jelly, honey, leaf eater biscuits, hard-boiled eggs, sugar cane, Jell-O-filled bamboo sticks
- Frozen foods or popsicles
- Termite mounds
- Suction feeders

Social Enrichment

- Conspecifics or mixed species for social stimulation
- Social opportunities: species appropriate social groups
- Training for husbandry and management behaviors
- Keeper interaction

Novel Enrichment

- Recycled items: cardboard boxes, shredded paper, cardboard tubes (alone or stuffed with food items)
- Plastic barrels or beer kegs; free or hanging, may be filled with food items
- Plastic 2x4's with holes drilled in
- Piñatas
- Cut browse or Christmas trees for nesting, destroying or display
- Fur or feathers from other animals

- Deck brush heads for rubbing on
- Boomer Balls®
- Auditory enrichment: music, nature sounds, recorded vocalizations of same or other species
- Olfactory enrichment: hunting lures, spices, herbs, condiments, perfumes, items marked by other species
- Feces from prey species

Safety Considerations

- Animals can become entangled in ropes and hanging apparatus or extremities may be caught.
- Animals may fall while trying to reach enrichment placed high in the enclosure
- Water features must provide a suitable escape area for the species.
- Dietary enrichment can lead to tooth decay, obesity, allergic reactions, impaction, diarrhea, choking or aggression from cage mates.
- Items, or pieces of them, may be toxic or hazardous if ingested.
- Objects, if broken, can produce sharp edges that can cut animals.
- Social or mixed species exhibits can lead to injury or death due to aggression or harassment by cage mates.
- Plants or parts of plants may be toxic to animals. Prior treatment of plants with pesticides or fire retardant can be toxic.
- Enrichment might cause excessive stress to animals.
- Training sessions may put a keeper in a compromised situation if a safe and appropriate set up is not present.
- Safe keeper access for providing enrichment requires a secure shift area.
- Dietary enrichment may result in the animal not eating important nutritional components of its regular diet.
- Parasites may be transmitted through enrichment items if not properly cleaned and disinfected.

Bear enrichment guidelines compiled by Laurie McGivern, Bird Supervisor, Dallas Zoo, AAZK National Enrichment Committee.

Reviewed by:

Else M.B. Poulsen, Head Zookeeper, Arctic Ring of Life/Bears, Detroit Zoological Institute

Jay Pratte, Senior Mammal Keeper, Dallas Zoo

Alicia Shelley, Keeper, North America Region, Columbus Zoo and Aquarium