Denver Zoo Asian Tropics Fact Sheet

Asian Tropics will help Denver Zoo broaden its animal care, management and conservation efforts. The 10-acre space will allow the zoo to become a conservation center for elephants, rhinos and tapirs. Exhibits will be upgraded to provide a superb and enriching home for the animals with mud wallows, scratching trees, shade structures and water for swimming and bathing. Asian Tropics will be one of North America's largest elephant habitats and have the unique ability to hold up to eight bull elephants in one exhibit complex. Asian Tropics hopes to help conservation efforts to increase the dwindling populations of Asian elephant and Indian rhinos. Less than 35,000 Asian elephants and less than 3,000 Indian rhinos exist on the planet.

The Greenest Zoo Exhibit in North America: Zoo Trustees and staff are determined to achieve LEED® certification for Asian Tropics at platinum, the highest level, from the U.S. Green Building Council, which attests to excellence in energy conservation and other achievements in sustainable design and construction. LEED promotes a whole building approach to sustainability by recognizing performance in five key areas of human and environmental health; sustainable site development, water savings, energy efficiency, materials selection and indoor environmental quality. Denver Zoo will use recycled water, efficient HVAC systems, natural day lighting and ventilation and other "green" construction practices to achieve this certification. Denver Zoo also will use innovative sustainable energy, called gasification to convert more than 90 percent of the zoo's waste into usable clean energy. The biomass gasification system is expected to save Denver Zoo $150,000 a year in energy and waste hauling costs. The zoo's landfill contributions will be reduced by 1.5 million pounds per year to near its goal to become a "zero-waste" facility.

Three themed habitats: A trio of distinct environments ties Asian Tropics together as a whole.

> **The Preserve** will give guests insight of how people care for animals in natural, protected habitats found in Southeast Asia. Habitats in the Preserve will be seamless with no visible barriers between you and the animals. In fact, as you walk along the Preserve boardwalk to view elephants, rhinos and tapirs, you will see gibbons swinging directly overhead as they move between three island habitats.
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> **The Asian Village Plaza** will serve as the visitor hub for Asian Tropics. The Clayton F. Freiheit Elephant House will accommodate eight to 12 elephants, including bull (male) elephants. Flying foxes, Asian small-clawed otters and fishing cats will be housed in the El Pomar Foundation Asian Pavilion.
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> **The Village Outpost** will resemble a rural village and showcase stories from Denver Zoo conservation and biology staff members that will reveal their work with animals and local people in Sumatra, Indonesia, Thailand and Malaysia.

Sustainable Water Use: Asian Tropics will feature more water for elephants than any other exhibit we know of. The deepest foundation includes 20 feet deep settling chambers for the 900,000 gallons of water recirculated to the outdoor pools. The source of the water for the outdoor pools will also be sustainable, coming from Denver Water's recycled water system. Although the Asian Tropics exhibit will hold more water than the rest of the zoo combined, the impact will be minimal, due to the use of the state-of-the-art filtration system and recycled water.

Asian Tropics by the Numbers

10: Acres of space for the project.

1.1 Million: Total gallons of water in the exhibit, 900,000 of which will be re-circulated through the filtration building.

885,000: Total volume in gallons of the zoo's existing water features

1.7 billion: Gallons of water going through the filtration system in a year

50 million: Estimated cost in dollars of Asian Tropics

2,806: Number of donors to Asian Tropics (as of February 18, 2011)

2012: Year that Asian Tropics will open

88,208: Number of square feet of outdoor animal habitat, including swimming areas in Asian Tropics.

16,500: Number of square feet of outdoor animal habitat, including swimming areas in the zoo's *curren*t elephant habitat.

9,000+: Number of square feet of indoor animal habitat for elephants in Asian Tropics.

1,150: Number of square feet of indoor animal habitat for elephants in the zoo's *current* elephant exhibit.

Sustainable Design and Renewable Energy

Denver Zoo works to preserve biodiversity and promote educational discovery through world-class exhibits, enhanced conservation facilities, emerging technologies and sustainable design. Denver Zoo is committed to practicing environmentally responsible operations, minimizing the effect of its operations on the environment, helping to educate guests and the broader community about their impact on the environment and providing leadership for the construction of facilities using renewable and sustainable materials and energies. By employing an innovative waste to energy system and achieving Leadership in Energy and Environmental Design (LEED®) certification for Asian Tropics, Denver Zoo will break new ground and be a national and international leader among zoos, nonprofit organizations and the business community in the wise and efficient use of resources and energy.

Asian Tropics, the largest and most impressive project of Denver Zoo's Millennium Master Plan, will be a model project for sustainable design and renewable energy. Zoo trustees and staff are determined to achieve LEED certification for Asian Tropics from the U.S. Green Building Council, which attests to excellence in energy conservation and other achievements in sustainable design and construction. LEED promotes a whole building approach to sustainability by recognizing performance in five key areas of human and environmental health; sustainable site development, water savings, energy efficiency, materials selection and indoor environmental quality. Denver Zoo is attempting LEED certification at the platinum level, the highest level. Denver Zoo will use recycled water, efficient HVAC systems, natural day lighting and ventilation and other "green" construction practices to achieve this certification.

One of the most innovative components of Asian Tropics is Denver Zoo's work with renewable energy. With the development of Asian Tropics, Denver Zoo is at the cutting edge of testing and applying renewable and sustainable energy systems to produce local, on-site electricity and heat. During the early phases of design development, the zoo forged a partnership with the National Renewable Energy Lab (NREL) and other experts to explore renewable energy options. At the conclusion of a workshop and at the recommendation of the group, Denver Zoo chose to investigate biomass gasification as a viable source of renewable energy. **Employing a biomass gasification system will allow Denver Zoo to use 90% of its waste stream, including animal waste and human trash, to generate clean energy for Asian Tropics.** The zoo has spent three years intensely researching and developing a system to convert facility waste into fuel for the gasification process. This effort has been lead by zoo staff and Denver Zoo has become a leader in the development of biomass applications. Preliminary estimates indicate that the conversion of 90% of the zoo's waste stream in the gasification system could save as much as $150,000 a year in energy and waste hauling costs.

The gasification system will create both electricity and heat through a combined heat and power system. Waste will be measured, mixed and processed prior to being sent to the gasifier. The gasifier will chemically convert waste using a high temperature, low oxygen process to convert it to a usable combustible gas.

To fully understand the possibilities of this system, the zoo has evaluated the quantity, composition and energy content of all of its waste streams, including office products, packaging, concession waste, hay, animal food and animal waste in order to quantify the available energy in the zoo's waste stream as a function of season and visitor count. The zoo has created computer simulation models of the gasification system to test the various components of the operation and evaluate their individual and systematic characteristics.

The gasification system will meet the most stringent emissions standards and will produce one bi-product: ash (which can be used as a soil amendment in flower beds throughout the zoo). The zoo will use the electricity created to operate motors and pumps needed in the new exhibit, and the hot water that is created will heat the 20,000 square foot elephant center and 13,000 square foot rhino/tapir holding facility, 11,000 square foot El Pomar Foundation Asian Pavilion and the 920 square foot gibbon and 1,230 leopard night quarters which will have radiant heat in the floors and walls. Cold water can be "tempered" and used for cleaning and filling the pools with warm water.

Animals of Asian Tropics

Clouded leopard

This beautiful and threatened cat species will return to Denver Zoo with the opening of Asian Tropics. Clouded leopards are well adapted for living in the trees and their arboreal lifestyle will be well supported at Asian Tropics, where numerous tree perches are planned.

Flying fox

Two new species of fruit bats will come to Denver Zoo. The Geri and Meyer M. Saltzman Flying Fox Exhibit will immerse guests in this animal's habitat. These large bats, featuring four- to five-feet wing spans will be eye to eye with guests with no barriers between them and visitors.

Fishing cat

Fishing cats will be able to showcase their skills in the Marynelle Philpott Fishing Cat Exhibit. These cats attract fish by lightly tapping the water's surface with a paw-mimicking insect movement. They then dive into the water to catch the fish that come near. Because their claws do not fully retract, they use their claws like fishing hooks to spear the slippery fish.

Asian small-clawed otter

The Eisinger Family Small Clawed Otter Exhibit will feature a large swim channel for this playful animal. A new species to the zoo, small-clawed otters have short claws they use to locate prey in the water or mud. They also have stiff whiskers called "vibrissae" that can detect the movement of prey in the water. They catch prey with their paws not with their mouths like other otters.

Asian elephant

Once revered by the people of Asia, elephants now have a complicated relationship with humans as man and elephant fight for scarce resources, part of the reason these animals have become endangered. Asian Tropics will allow Denver Zoo to expand its conservation efforts for this species by providing much-needed homes for bull elephants and family groups, supporting the Association of Zoos and Aquariums Species Survival Plan.

Greater one-horned rhinoceros

With less than 3,000 Indian rhinos left in the world, the Greater one-horned rhinoceros is a rare sight and a new species to Denver Zoo. Denver Zoo is currently in the process of awarding grants to support conservation of this highly endangered species.

Malayan tapirs

The black on the front and back with white or gray in the middle is a form of camouflage that breaks up the tapir's outline in the shadows of the forest. Their vulnerable babies are born with stripes and spots to help them blend into the dappled sunlight and leaf shadows of the forest and protect them from predators.

An Increased Role in Animal Conservation

Denver Zoo's mission is to secure a better world for animals through human understanding. The zoo's conservation biology staff works directly on projects to support animal conservation in the wild and at the zoo. This department also awards grants to support other's valuable research. Annually, Denver Zoo provides more than $1 million in funding for the conservation of animals.

Denver Zoo historically has supported the conservation of animals throughout Asia. Denver Zoo is expanding its support of Asian species throughout tropical Asia as a direct link to its Asian Tropics exhibit. Currently, staff is in the process of awarding grant funds to help the conservation of critically endangered Indian rhinos and working to expand conservation projects in support of clouded leopards.

Current Conservation Project Highlights of Species Found in Asian Tropics :

Zoos are working to save endangered elephants through cooperative breeding programs. Breeding programs may be the key to keeping Asian elephants from becoming extinct in our lifetime. Asian Tropics, featuring five yards, will provide spacious homes for a family groupings of elephants, addressing their special needs with an enriching environment and as well as serving as a conservation center for the overall well-being of the species.

In Sri Lanka, staff members worked to build fences around villages to protect the local peoples' livelihoods from elephants. This project helped reduce conflict between humans and elephants enabling them to peacefully coexist.

In Southeast Asia, the loss of wildlife habitat has led to increased human-elephant conflict, including frequent raiding of agricultural crops by elephants. Denver Zoo believes this is a critical issue for elephants in the region and has therefore provided support for mitigation work led by Dr. Melvin Gumal and Dr. Simon Hedges of the Wildlife Conservation Society, since 2007. Their project seeks to **develop, test and implement human-elephant conflict mitigation techniques** and to ultimately build capacity with local farmers so that they are able defend their crops from elephant raids without help from outsiders.
Denver Zoo is a member and supporter of the **International Elephant Foundation** (IEF), a nonprofit organization working to resolve elephant-human conflicts in the wild, preserve habitat for elephants throughout the world and conduct research in support of elephant conservation. In addition to supporting this group's work financially, Denver Zoo's Dr. David Kenny traveled to Sumatra to provide veterinary support for IEF.

Denver Zoo donates critical funding to support **The National Elephant Center** (TNEC). Denver Zoo President/CEO Craig Piper, serving on the Board of Directors and chairing the Facility Design and Construction Committee of this nonprofit, is helping lead TNEC's efforts to enhance the ability to manage the zoo elephant population in North America and to create a sustainable future for elephants through research and conservation efforts by animal care experts.

Since 2010, Denver Zoo has provided support to Dr. Jedediah Brodie for an important project regarding the **ecology and conservation of clouded leopards in Borneo**. The primary goal of the project is to establish protected forest corridors to link seven existing national parks into a network of sanctuaries that will sustain clouded leopards as well as general biodiversity. A secondary goal is to understand how factors such as logging, hunting and other human disturbances affect clouded leopard abundance and distribution.

The Economic Impact of Asian Tropics

Asian Tropics is the largest renovation in Denver Zoo's history and will have a remarkable impact on the local economy. During project construction, Asian Tropics will create jobs for more than 300 on site workers, and once completed, at least 24 new permanent full-time staff jobs will be added.

Denver Zoo has hired or is in the process of filling new staff positions that stem from the development of Asian Tropics including:

- 1 green coordinator to manage the numerous sustainability projects that have come forward from the development of Asian Tropics
- 1 Education Curriculum Development staff to create education materials for schools and visitors

Once completed and fully operational, Asian Tropics will create 24 new positions at Denver Zoo including:

- 12 zoo keepers
- 1 curator
- 1 supervisor
- 1 horticulturist
- 1 life support coordinator (manages water quality)
- 2 staff to operate the gasification system
- 2 maintenance workers
- 2 utility workers
- 2 security officers

The economic impact of Asian Tropics is far reaching in the Denver community during the design and construction process. Although specific numbers are difficult to define, comparison of Denver Zoo's last renovation, the award-winning Predator Ridge exhibit offers some insight. The Predator Ridge and Entrance project resulted in 260 regular on-site workers over the 19-month build out. Throughout the project more than 600 people were involved in project work on site. Hundreds more worked on project fulfillment off site as well. The Asian Tropics exhibit is similar in size to the Predator Ridge/Entryway project, but is a more complex exhibit with a longer, two-year build out timeline, thus creating and sustaining even more jobs. At minimum, we expect a 20 percent increase in the number of workers employed during the construction of Asian Tropics compared to the Predator Ridge/Entrance project, resulting in more than 300 regular jobs on site and 720 short-term positions on site, in addition to the hundreds that will be employed off site during the project.

Asian Tropics will also create work overseas to support Denver Zoo's animal conservation in the field. Currently, Denver Zoo employs a full-time staff member in Kenya to support the conservation of African lions and Grevy's zebras. A similar position will be filled in Asia to support elephant and rhino conservation when Asian Tropics is completed.

Additional stimulus to the economy will also be created with the additional food, supplies and equipment that will total $600,000 to $700,000 annually to operate the exhibit.