ZooPrints

Conservation Special Edition

OMAHA'S HENRY DOORLY ZOO & AQUARIUM

Life's best things.

Letter from the CEO

Welcome to another special conservation edition of ZooPrints. Another season is beginning to breeze on by. And this time of year, we turn our focus entirely to the conservation efforts put forth by Omaha's Henry Doorly Zoo and Aquarium staff.

Last issue, our dedicated group of animal care staff and scientists took you on an adventure to the depths of South Africa, the forests of Madagascar, the coral reefs in Curaçao and the creek beds in Nebraska. This time, we've encountered similar adventures, but with very different focuses. For instance, page 5 captures our Zoo's most recent trip to Madagascar, where we continue to uncover more secrets into the lemur population and habitat. In addition, page 7 gives a glimpse of our veterinary staff's recent trip to Belize working with partnering zoos to build a research facility to support Central America's diverse wildlife.

Our commitment to conservation never seems to grow thin and with your continued support, our drive and passion to protect plants and animals for generations to come grows even stronger. With that, I encourage you to give these stories a read and learn about the behind-the-scenes adventures that are the bread and butter of Omaha's Henry Doorly Zoo and Aquarium's commitment to conservation.

Dennis Pate
Executive Director and CEO

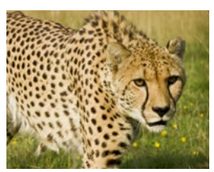
Reviving Animal Populations Through New Partnerships

Having enough space to effectively breed and produce offspring that are socially and behaviorally competent, healthy and adaptable is key when trying to maintain strong populations of endangered wildlife.

The Conservation Centers for Species Survival, C2S2 for short, has just that. Formed in 2005, C2S2—with support from U.S. Fish and Wildlife Service—manages more than 25,000 acres of specialized habitat and handling facilities dedicated to endangered species recovery. These facilities are geographically distributed across the United States at five partner institutions: Fossil Rim Wildlife Center in Glen Rose, Texas; San Diego Zoo Global in San Diego, California; Smithsonian Conservation Biology Institute in Front Royal, Virginia; the Wilds in Cumberland, Ohio; and White Oak Conservation Center in Yulee, Florida.

With the help of these institutions, C2S2 has been able to provide naturalistic homes to a large scale of endangered species in the states—such as the California condor and Florida panther—and abroad, like cheetahs, elephants, giant pandas and Przewalski's horses. In addition, they're able to research the fundamental biology of each species so the animals can one day be reintroduced in the wild.

Another institution has just been added to C2S2's list of partners to help fight the conservation crisis: Omaha's Henry Doorly Zoo and Aquarium in Omaha, Nebraska.



Omaha's Henry Doorly Zoo and Aquarium made its partnership with C2S2 official on Jan. 1, 2013. It's the first zoo outside of the organization's founding group to be asked to join, and is unique in that it will also utilize Wildlife Safari Park as a resource.

A leader in animal conservation and research, the Zoo will play an advisory role in the organization for sable antelope, addax and cheetah conservation.

Omaha's Henry Doorly Zoo and Aquarium and other zoos alike are unable to hold large populations of every animal. The Zoo is focusing on the large populations of species it already has, some of which are being housed at Wildlife Safari Park. In turn, the Zoo will make sable antelope and cheetah offspring available to other facilities.

In the future, Omaha's Henry Doorly Zoo and Aquarium hopes to expand its list to include cranes, amphibians and plants.

Cover Photo: Omaha's Henry Doorly Zoo and Aquarium is a leader in cheetah conservation and research. Amanda Mohn, a licensed veterinary technician at Omaha's Henry Doorly Zoo and Aquarium, is performing a medical procedure on a cheetah at the Zoo.

Omaha's Henry Doorly Zoo and Aquarium has implemented a lights-off program to conserve energy. This bright idea calls for all Zoo staff members to hit the lights at the day's end. You, too, can take part in this challenge. Just cut out our "lights off" emblem below and place it above your light switch as a reminder.

Prominent Zoo Supporter Suzanne Scott Remembered

Suzanne Scott, a longtime supporter and board member of Omaha's Henry Doorly Zoo and Aquarium, passed away this past September at the age of 83.

Scott, the wife of Walter Scott Jr., was known to those outside of the Zoo as Suzanne: a prominent Omaha philanthropist who put community involvement first in the city she loved most, a place where many buildings bear her name.

To Zoo staff members, she was simply Sue: the vision for the world-renowned penguin exhibit in the Suzanne and Walter Scott Aquarium, worker bee and one of the family.

While she may be difficult to spot in Omaha's Henry Doorly Zoo and Aquarium's collection of photos taken over the years, this undercover donor's legacy is hard to miss.

Scott originally started out as a volunteer at Omaha's Henry Doorly Zoo.

She was later hired in 1984 as the founding executive director of the Omaha Zoo Foundation, where she doubled the size of the Zoo's membership campaign during her tenure.

Scott was also involved in the transport of two baby gorillas to Omaha's Henry Doorly Zoo and Aquarium from the Cincinnati Zoo, one of whom was the world's first test-tube gorilla, as well as trips to Africa and China with Zoo staff working on a movie for the Lozier IMAX® Theater and on a quest for giant pandas.

Scott and her husband Walter are most notable for their leadership on the development of the Kingdom of the Seas Aquarium, which opened in 1995 and was dedicated to the Scotts' grandchildren.

The Scott Aquarium underwent expansive renovations as part of the Omaha Zoo Foundation's Gateway to the Wild campaign and reopened to the public on April 5, 2012.

Sue's Carousel, a 36-foot carousel featuring 30 wild animals and horses, also bears her name.

Other community organizations and affairs were also touched by Scott's leadership and energetic giving, including the Boys and Girls Clubs of the Midlands, Children's Hospital and Medical Center, Children's Hospital and Medical Center Foundation, Goodwill Industries, Joslyn Art Museum, Holland Performing Arts Center, The Salvation Army Advisory Board and the University of Nebraska Medical Center.

She also served as board chairs for Bellevue University and United Way of Midlands, and chaired the Ak-Sar-Ben Women's Ball Committee.

Nutrition Research in Endangered Species Management

Dr. Cheryl Morris, Associate Scientist, Comparative Nutrition

The nutritional requirements available for exotic species are few and far between. Extensive research is necessary to formulate optimal diets for these animals. Omaha's Henry Doorly Zoo and Aquarium's Nutrition Department's research program is focused on the development and promotion of optimal nutrition to help bring about a greater understanding of this great unknown.

Through this program, Omaha's Henry Doorly Zoo and Aquarium nutritionists have recently developed a pork-based carnivore diet for Zoo felids, or cat species, that will be accessible to all zoos later this year.

Pork meat is not traditionally used in zoos. Use of this meat was viewed as an opportunity to develop a complete diet that would provide a novel protein to felids and other carnivore species.

When considering the overall health of carnivores, having a novel protein in their diet is beneficial, as it provides natural variety to the carnivore's overall diet plan. Natural variety is a component of environmental enrichment, which improves overall health and well-being of the managed species. In addition, a novel protein that is easily accessible, such as pork, provides an ingredient that can be useful in managing felids with sensitivities to other meats like beef.

Omaha's Henry Doorly Zoo and Aquarium's Nutrition Department has also critically analyzed the diets of lemurs managed in zoos.

Samples of plants consumed by wild lemurs in Madagascar were collected, dried and shipped to the Zoo's nutrition laboratory and examined for key nutrients in a collaborative study with the University of Illinois at Urbana-Champaign. A survey was conducted with Association of Zoos and Aquariums–certified zoos that currently manage lemur populations to collect data on their diets. Data gathered from the study was then compared to nutrient values of the native plants in Madagascar. Results suggested that dietary fibers and fats were significantly lower in zoo diets. These findings have provided a better understanding of lemur nutrition and necessary data for organizations formulating lemur diets. Many of the managed species in zoos can suffer from similar ailments experienced by humans, such as obesity.

In 2009, Omaha's Henry Doorly Zoo and Aquarium's Nutrition and Great Apes Departments began an extensive series of diet adjustments to improve the weights of the male gorillas in Hubbard Gorilla Valley.

Many of the male gorillas at this time were fed a high-sugar, high-starch diet and were significantly overweight. Both departments adjusted their diets to reduce the caloric content by 30 percent, without decreasing the total volume of food, to provide optimal nutrition. This change eventually resulted in an increase of dietary fiber, ample browsing opportunities and more variety for the male gorillas.

By May 2013, all of the gorillas' body conditions were assessed and were in optimal condition, with no further weight loss indicated.

Omaha Zoo Chairman Receives Innovative Conservation Award

Dr. Lee G. Simmons, Omaha Zoo Foundation chairman, was named the 2013 recipient of the Conservation Breeding Specialist Group's Ulysses S. Seal Award. This award is given to those who exemplify innovation in applying science to conservation.

Some of the projects and ideas that led to this honor include the creation of a number of different drug delivery systems that are much safer and more reliable to anesthetize animals in captivity and in situ, as well as the advancement of Omaha's Henry Doorly Zoo and Aquarium's reproductive science and molecular genetics fields through hands-on research.

His support for the Zoo's Genetics Department helped make possible the Zoo's comprehensive program in Madagascar, which led to the discovery of 21 new lemur species.

Under Dr. Simmons' mentorship and support, Bermuda ferns, extinct in the wild, were propagated at Omaha's Henry Doorly Zoo and Aquarium's plant laboratory and returned to their natural range. Thousands of rare Malagasy orchids have also been reintroduced to their natural habitats.

Most recently, responding to the International Union for Conservation of Nature's urgent call for the international zoo community's assistance in facing the amphibian extinction crisis, Dr. Simmons led the design and construction of a cutting-edge facility for captive assurance populations at Omaha's Henry Doorly Zoo and Aquarium.

Notes from the Field

Dr. Edward Louis, Director of Conservation Genetics

Dr. Ed Louis with Zeppelin, an Aye-Aye

Another year brings new adventures to the island nation of Madagascar, the only place in the world where you can find wild lemurs. Since coming to Madagascar 15 years ago, I have visited more than 160 sites and studied more than 5,000 lemurs. Much of the field work is now done in collaboration with the Madagascar Biodiversity Partnership, a non-governmental Malagasy organization, which evolved out of Omaha's Henry Doorly Zoo and Aquarium's conservation programs.

After 23 hours of flying, I arrived in Antananarivo, the capital city, and immediately jumped into one of the program's four-wheel drive trucks—something I learned you cannot get anywhere without. I traveled up north to Sahamalaza, a protected site managed by Dr. Christoph Schwitzer from Bristol Zoo in Bristol, England. We helped their program by putting tracking collars on the critically endangered Sahamalaza sportive lemur. The coastal site of Sahamalaza is the sole place to see this small chinchilla-sized lemur, as well as the blue-eyed black lemur—the only primate besides humans to have blue eyes.

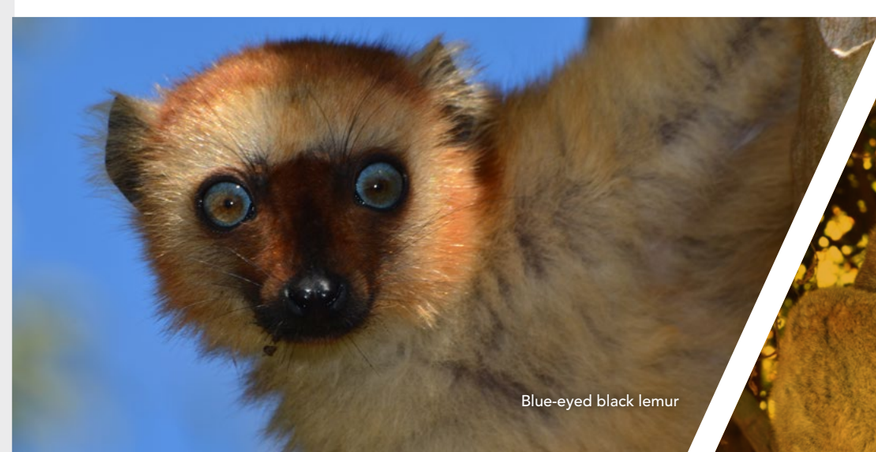
After a brief but successful trip, I traveled further north near the port city of Antsiranana, one of Omaha's Henry Doorly Zoo and Aquarium's four permanent sites. Here, our conservation program is working to save the most endangered lemur and arguably the world's most endangered primate, the northern sportive lemur. One of 50 remaining individuals is nicknamed Sir Branson, after lemur ambassador and Virgin Group founder Sir Richard Branson. By following this lemur over the next year, we hope to learn more about this species' courtship behavior and interactions. Sadly, the lemur's forest—Montagne des Français— is rapidly being destroyed for charcoal. Our team is fervently working with the local community to stop this habitat from disappearing by introducing alternative fuel sources and building a reforestation program.

After my work up north, I rushed back south to the capital city to participate in the release of the first lemur strategic plan since 1993, which I was happy to be involved in as a co-editor. This plan addresses the problems that Madagascar faces in saving lemurs and identifies 30 priority sites in which 90 percent of all lemur biodiversity is found. Included among these priority locations are Omaha's Henry Doorly Zoo and Aquarium's four permanent field sites. Since lemurs are now considered the most threatened group of all mammals, it is our hope that this strategic plan will provide guidance to maintain this biodiversity for years to come.

Next, my travels took me to Kianjavato in southeastern Madagascar, home to our largest field program. We excitedly prepared for 50 visitors coming from the International Prosimian Congress meeting, who were in for something extraordinary.

Kianjavato is the only place in Madagascar where it is guaranteed to see the enigmatic nocturnal aye-aye. Our visitors all got a chance to see an aye-aye up close and we were happy to share our conservation story of studying and working to save this species. Since 2010, our program has been using radio collars to monitor these elusive lemurs. We currently follow three adult males and one female named Bozy, who gave birth to her second baby in June.

continued on page 8



Blue-eyed black lemur

Sir Branson, a northern sportive lemur

Omaha's Henry Doorly Zoo and Aquarium's plant research laboratory, located inside the Bill and Berniece Grewcock Center for Conservation and Research, is using the latest biotechnological practices for the conservation of many threatened plant species.

Saving Biodiversity through Plant Biotechnology

Margaret M. From, M. Sc., Director of Plant Conservation

All plant species that exist on Earth today are interdependent. Plants provide the basis for all other life forms. Consequently, any positive or negative impact on a single species can carry ramifications throughout the ecosystem.

When a plant goes extinct, it takes with it approximately 10 to 30 non-plant species. Sometimes, many more. Those non-plant species can include animals, insects and microbes that form the biodiversity we value in our world. Plants provide us food, fiber, timber, fresh air, clean water, soil mass and almost half of all of our medicine supply.

Only about two to three percent of the 250,000 currently known plant species have ever been investigated for their medicinal value, according to Botanic Gardens Conservation International. And, many plant species are going extinct before we can ever begin to understand their benefits to other life forms.

Today, botanists throughout the world search the plant kingdom for new medicines, even in the wild places still to be found in the United States.

Omaha's Henry Doorly Zoo and Aquarium's Department of Plant Conservation research laboratory conducts research and reintroduction of about 200 threatened plant species in the following countries: United States, Madagascar, Bermuda, China and Costa Rica. The Zoo's plant laboratory was recently awarded a three-year grant to cryopreserve seeds and spores for plants from South African threatened habitats.

Several species researched at the Zoo's laboratory have been saved from extinction through the intervention of the Zoo's lab personnel and their collaborators from each species' country of origin. The species studied and reintroduced to the wild include lilies, orchids, ferns, aloes and carnivorous plants—to name a few.

Biotechnological methods allow the lab to produce many plants in-vitro from small samples of seeds and the resulting plants are subsequently used for reintroduction in their native habitats. Omaha's Henry Doorly Zoo and Aquarium's plant scientists collect small samples of seeds to ensure there won't be any negative impact on wild plant populations.

Sterile in-vitro culture practices mean that the laboratory is able to propagate much larger numbers of plants from the seeds collected than what is able to survive to adult size in the wild, if the same number of seeds were to naturally disperse in their native habitat.

Reintroductions are made in the same area, where the seeds were collected with the goal of augmenting wild populations so that sustainable populations will continue to exist in the country of origin.

Thousands of young plants have been reintroduced from Omaha's Henry Doorly Zoo and Aquarium's laboratory to Madagascar, Bermuda, Nebraska and Minnesota with some being sent back as far as China. Collaborative reintroductions have been made with the Madagascar Forestry Department, Bermuda's Ministry of the Environment, the Audubon Society, The Nature Conservancy, U.S. Fish and Wildlife Service, as well as several other state, local and regional conservation organizations.

Small numbers of the species researched are also kept at the Zoo for future study and education purposes. In addition, Omaha's Henry Doorly Zoo and Aquarium's plant laboratory has also created a frozen seed bank as a backup plan for species recovery well into the future.

By storing the seeds in liquid nitrogen at -197 degrees Celcius, the seeds will remain in a slowed metabolic state where they can remain viable for years and later be thawed, cultured and used for additional research and introductions. Zoos everywhere are now being called upon to contribute to the preservation of habitats where the animals they care for originate. Plants create those habitats. Once a species is extinct, it's gone forever. And through plant reintroductions, zoos are able to support their conservation mission for generations to come.

Encroachment in Belize

Dr. Julie Napier, Senior Veterinarian

Burgeoning human populations and controlled forest fires to increase the size of farmland are the main reasons as to why the habitats of many endangered species are being encroached upon, especially in Central America.

Belize, located between Mexico and Guatemala, is a country rich in natural resources and diverse wildlife, including many species found at Omaha's Henry Doorly Zoo and Aquarium and Wildlife Safari Park.

Exotic cats, including jaguar, puma, ocelot, as well as smaller cats like margay and jagarundi, inhabiting the country have constant interface with natives and domestic animals.

In May 2013, a team of veterinarians from Omaha's Henry Doorly Zoo and Aquarium in Omaha, Nebraska; Rolling Hills Zoo in Salina, Kansas; and Zoo Miami in Miami, Florida, initiated a project at the Lamanai Field Research Center in the Orange Walk District of Belize to provide veterinary expertise and support to a group of primary researchers studying these felid populations in the areas surrounding the Indian Church and San Carlos villages.

Zoo veterinarians conducted designated capture periods to safely and effectively immobilize any exotic cat or bycatch species for the study, all in an effort to better understand each species' health and behavior.

Free animal health clinics with physical examinations and parasite treatments were also organized to provide health care to villagers' dogs and cats and to obtain blood samples for future comparative serological studies to wild felids for disease assessment. The trip resulted with the creation of an on-site laboratory facility capable of processing and storing blood samples, in addition to undergoing viral testing.

With equipment donations from the three zoos involved in this project, researchers in Belize now have a fully operational hubspot to help determine the relative health of wild cat populations.

Omaha's Henry Doorly Zoo and Aquarium hopes to continue its efforts with these wild cat populations, as well as establish more research projects in Belize with the many other indigenous species, such as howler monkeys and tapirs.

Biobanking for Research

Dr. Naida Loskutoff, Director of Reproductive Sciences

Developing effective methodologies for banking biomaterials—such as gametes and tissues—is becoming an increasingly important tool for research in conservation sciences, particularly in veterinary medical fields, reproductive technologies, molecular genetics, comparative nutrition and rare plant conservation.

Reason being: With dwindling populations of wildlife in nature, research can be conducted on banked tissues that can eventually lead to increasing our knowledge of how to more effectively manage wildlife and prevent any further loss of genetic diversity.

Omaha's Henry Doorly Zoo and Aquarium's Reproductive Sciences Department has been actively involved in several programs to develop successful biobanking programs in several countries.

In October 2012, I was invited to give a week-long course on reproductive technology and crybanking genetic diversity at the Brazilian Association of Wildlife Veterinarians in Florianópolis, Santa Catarina, in Brazil.

Following my time there, I was appointed as a research associate and curator of the biobank of the National Zoological Gardens of South Africa in Pretoria, South Africa. My staff—Jonathan Aaltonen, laboratory supervisor, and William Synder, research assistant—and I have been training the zoological gardens' technical staff and interns on the proper tissue culturing techniques, in-vitro embryo production, as well as sperm and embryo cryopreservation or freezing for long-term storage.

continued on page 8

Conservation Firsts

Most projects at Omaha's Henry Doorly Zoo and Aquarium are collaborations with other zoos' research programs or veterinary specialists. Some of our most notable ones have required the use of in-vitro fertilization, resulting in some conservation firsts across zoos and aquariums worldwide.

First infant gorilla produced by in-vitro fertilization, in collaboration with the Cinncinati Zoo

First tiger cubs produced by in-vitro fertilization, in collaboration with the National Zoological Park

First gaur calf produced by in-vitro fertilization,, in collaboration with TransOva Genetics in Sioux Center, Iowa

Biobanking *continued from page 7*

Assisted reproductive technology will not replace natural breeding long term, but it can aid in wildlife conservation. This is so because gametes—sperm and oocytes, or eggs—can be recovered from animals even after their death to produce embryos and, after transferring into suitable recipient animals, or surrogates, result in offspring.

In January 2013, Omaha's Henry Doorly Zoo and Aquarium welcomed a new doctorate student, Colleen Lambo, DVM. Under my supervision through her appointment as graduate faculty in the Department of Obstetrics and Gynecology at the University of Nebraska Medical Center, Dr. Lambo will work on a dissertation project that will help further the success of assisted reproductive procedures, such as artificial insemination and embryo transfers, in felids—particularly tigers, all of which are threatened or endangered.

Several levels of students are regularly welcomed into Omaha's Henry Doorly Zoo and Aquarium's program with the hope of someday encouraging students to pursue careers in conservation sciences, beginning at the high school level.

Each year, as a way to keep the interest alive, I deliver keynote addresses throughout Nebraska, such as the Expanding Your Horizons and the Science, Technology, Engineering and Math programs to encourage seventh- to ninth-grade girls continue their studies at their respective colleges and universities in these fields.

Field Notes *continued from page 5*

The International Prosimian Congress attendees were impressed with the comprehensive conservation work based at the field station, which includes lemur monitoring, an expansive community-based reforestation initiative and the introduction of green technologies. Surprisingly, I was honored at the International Prosimian Congress meeting with a distinguished professor award for my commitment to supporting and training Malagasy graduate students, who are an integral part of all of our endeavors. Over the years, Omaha's Henry Doorly Zoo and Aquarium's conservation genetics program has helped more than 45 graduate students complete their master's and doctorate degrees.

Out of all of the work that the Zoo supports, our reforestation program in Kianjavato inspires me the most. With the help of local participants, we planted more than 100,000 trees in the region in the past two years, making the future brighter, and hopefully greener, for these communities and the lemurs. As of October, I'm back in Madagascar and look forward to sharing more stories of hope and progress.

Omaha Zoological Society
Omaha's Henry Doorly Zoo and Aquarium
3701 S. 10th Street
Omaha, NE 68107-2299

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March 1-October 31: 9 a.m.-5 p.m.
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