

**THE  
KEEPER**  
Spring 2003



**San Diego Chapter  
of  
The American  
Association of  
Zoo Keepers**

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**Inside this issue:**

<i>Exotic Diseases</i>	1
<i>The Education String</i>	1
<i>SD AAZKs President</i>	1
<i>SD AAZK Presentations</i>	4
<i>Treasurer's Update</i>	6
<i>Our Mission Statement</i>	7
<i>Book Report</i>	7
<i>Calendar of Events</i>	8

**Exotic Diseases**

By Yvette Kemp, Kopje Team

It seems that in the last few years we have heard about more exotic diseases than we have in a long time. First it was the pyres of burning cattle carcasses from Foot and Mouth disease in Europe, then it was West Nile disease on the east coast, now it's Newcastle disease in San Diego. It doesn't get any closer to home than that. Since it is so close to home, there are precautions that we need to take to prevent the spread of Newcastle disease, and other diseases, into our work and, for many, into our homes. Learning

about the diseases is a way of learning how to recognize their symptoms and how to prevent spreading them. The U.S. Department of Agriculture's (USDA) Animal and Plant Health Inspection Service (APHIS) are responsible for protecting U.S. livestock and are the sources for most of the following information. Hopefully, by sharing this information with you it will assist us in the care and disease prevention of the animals we are responsible for. If you would like more information, just log onto [www.aphis.usda.gov](http://www.aphis.usda.gov), [www.cdffa.ca.gov](http://www.cdffa.ca.gov), and/

*(Continued on page 2)*

**The Education String**

By Nicki Boyd, Team Area Lead, Children's Zoo

The Conservation mission of the Zoological Society is well represented by our staff through public animal presentations. Nothing grabs people's attention more than an up close encounter with an exotic animal. Most people that come to the zoo are obviously here to see the animals. When you get to meet one face to face with an interpreter, or in our case a

zookeeper or educator, you not only get information on the animal but a more in depth conservation message. We are definitely on the front lines, so to speak, and need to be knowledgeable in all our areas for the Zoological Society of San Diego. This also included our Center for Reproduction of Endangered Species (CRES) and the Wild Animal Park (WAP).

*(Continued on page 3)*

**A Word from SD  
AAZK's President...**

In 2002, SD AAZK was proud to have been able to provide it's members with a diverse array of speakers covering such topics as artificial insemination in Killer whales, The Envirovet Institute, World Wild Tours, and hoof care, just to name a few. We are grateful to our guest speakers for keeping us current on conservation, education, and animal care issue. We are also pleased to have been able to provide some of our meeting at a time and place more convenient to you; our new three o'clock talks had great attendance at both the Park and the Zoo.

The year, Vice-President Bob Cisneros has been working on continuing where we left off in 2002; more diverse and outstanding speakers for 2003! Speakers on the agenda include: CA Wolf Center (January), The Bushmeat Crisis and Conservation-minded Consumerism (February), The San Diego Bird Atlas Project (March), and an evening at Joan Embury's Ranch.

You may have also noticed changes in the way that we communicate with our membership. Our quarterly newsletter, **The Keeper**, has taken on a fresh new look with a broader range of

*(Continued on page 3)*

## Exotic Diseases, cont'd...

(Continued from page 1)

or [www.nwhc.usgs.gov](http://www.nwhc.usgs.gov). It is amazing to see the amount of information we have at our fingertips.

### FOOT & MOUTH DISEASE

(FMD):

FMD is defined as being a highly contagious viral infection that primarily affects cloven hoofed animals, domesticated or wild, such as bovidae, sheep, goats, all wild ruminants and suidae. Other susceptible species are hedgehogs, armadillos, nutrias, elephants, capybaras, rats and mice. Animals with low susceptibility are the camelidae. FMD is characterized by fever and blister-like lesions followed by erosions on the tongue, lips, nares, in the mouth, on the teats, and between the hooves. There are at least 7 types and over 60 subtypes of the FMD virus, and immunity to one type does not protect an animal against another type.

FMD can be confused with other similar but less harmful diseases such as foot rot in cattle and swine vesicular disease, but to determine if mouth or feet blisters are really FMD, laboratory tests must be completed. Other signs that may appear in affected animals include increased temperature, sticky and foamy saliva, reduced consumption, lameness and abortions. According to the USDA, FMD is not recognized as a zoonotic disease.

Unfortunately, FMD can spread widely and rapidly, and because it has devastating economic and clinical consequences, it is one of the animal diseases that livestock owners dread the most. It causes severe loss of meat and milk production and can lead to myocarditis (inflammation of the muscular walls of the heart). And although many animals recover from FMD, the disease leaves them debilitated. There are several ways in which

FMD can spread, but the main methods of contamination are by people, animals or materials with the virus coming into contact with susceptible animals. Other methods include raw or improperly cooked garbage containing infected meat or animal products being fed to animals, and inseminating a susceptible cow from an infected bull. The virus can also remain in contaminated fodder and the environment for up to 1 month, depending on temperature and pH conditions.

FMD is one of the most difficult animal infections to control because it occurs in many parts of the world. The U.S. has been free of FMD since 1929, but there is always a chance of an accidental introduction. If an outbreak were to occur here, it could spread rapidly by routine livestock movements. Then deer and wildlife populations could become infected and be a source for reinfection of livestock. Were this to happen, the economic impact could reach billions of dollars in the first year.

Once an animal has been exposed to FMD, signs may develop in as early as 12 hours. When sheep or goats are infected, the disease may not be diagnosed for a considerable time because signs and lesions can be very mild. Meanwhile, infected pigs tend to develop signs in 3 to 5 days. Unfortunately, FMD spreads rapidly in pigs who can then produce 100 million infectious doses per day! According to the USDA, in an outbreak of FMD, the roles of the 3 primary hosts in transmission are as follows: sheep act as maintenance hosts, pigs act as amplifiers, and cattle act as indicators.

Although the mortality rate of FMD is essentially 100% in a susceptible population of domestic animals, it does not pose a health risk to humans. In an outbreak in Israel, there was also a high mortality rate (at least 50%) in wild mountain gazelles; severe viral pancreatitis accounted for their high mortality.

In 1951, a FMD vaccine was produced but when vaccinating animals, the vaccine should contain the same subtype of virus as the one in the area. This

means that frequent checking of the serotype and subtype during an outbreak need to be done because FMD virus frequently changes during natural passage through various species. Vaccinated animals that are not completely protected can be a source of infection. The virus may replicate and be shed, but the animals may not show any clinical sign of infection.

The USDA has maintained a continued vigilance against FMD, as well as other animal diseases.

Since the outbreak in Europe and other countries, it has increased safeguarding measures against the disease. Some of the measures taken include:

1. Emergency operations centers to coordinate communications, answer technical questions, and provide consumer/traveler information about FMD and other related issues.
2. Heightened alert and increased inspections at ports of entry, borders and airports.
3. Heightened alert and increase coordination of programs in states across the country.
4. Heightened awareness and monitoring the FMD situation worldwide to ensure proper protections are in place in other countries that have confirmed cases of the animal disease.
5. Implementing a renewed public education campaign for travelers. The official attitude of a country regarding control of a disease depends on how seriously the disease affects the country, the financial and technical ability of the country, and what its neighbors are doing. Fortunately for us, Tripartite Exercise 2000, an FMD outbreak simulation involving Canada, Mexico and the U.S., was conducted and resulted in a committed effort by all 3 countries to collaborate on their efforts to prevent FMD in North America.

### WEST NILE VIRUS or DISEASE

(Continued on page 5)

## The Education String, continued...

*(Continued from page 1)*

Many of you may have heard the term “animal ambassador,” this is what we call our animals. We certainly cannot bring a lion or elephant to a local news station, but a meerkat or tree kangaroo can represent a region or habitat that we want to talk about. These ambassadors go to schools, Children’s hospitals, nursing homes and public relation events as a means to educate people. We have about 45 ambassadors, from exotic birds like “Pepe” our Swainson’s toucan with his brilliant colors and larger than life bill, to mammals like “Bandar,” our Malayan binturong who looks like a cross between a bear and a cat and who loves to demonstrate his climbing abilities using his thick black prehensile tail when climbing on our bridge in the jungle path. We even have fascinating reptiles like our albino king snake named “Al,” who greets everyone with a flicking tongue to smell them. How can you not have fun learning about saving precious habitat when a rare and endangered species like our Buerger’s tree kangaroo “Bentley” has just plucked a hibiscus flower from your hand to eat. When Melinda Wittmater, a senior keeper from the Children’s Zoo went to Australia to do field research on tree kangaroos, she was able to talk about the important work we do outside the zoo. Having Bentley as her animal ambassador helped reach thousands of people on TV, here at the zoo, conventions and other venues on the importance of conservation and how we are involved. We have many local species that teach people how to live with animals in our own environment. When people meet “Shaman” our great horned owl up close and personal, they admire her huge yellow eyes and can imagine how good her nocturnal vision must be. Or they

might get to pet an opossum like “Blance” and will hopefully realize they are not dangerous creatures and should be left alone. With each encounter more people can take away a great message that encourages respect and awareness of the unique habitat in our backyards.

Reduce, reuse and recycle are three critical actions that can help save rainforest and our local landfills. The kinkajou is a great representative of a charismatic rainforest animal that people are drawn to. Once they get a chance to meet “Belize” our 7 year old female kinkajou and maybe touch her soft rainforest coat or prehensile tail they are hooked. Her adorable face looks at them with her big brown eyes and we say, “so, do you want to help save this threatened species?” With their eyes glued on this remarkable animal, almost everyone agrees and we say one crucial word...“RECYCLE.”

Did you know that most of our aluminum comes from digging up the soil from a cut down rainforest? If we can just reuse what we already have we would cut down less rainforest thus saving habitat for many animals, plants and insects. The Children’s Zoo has many animals that are invaluable in spreading the word of conservation through education. We also have daily walk around animals that meet and greet our zoo guests. Have you been by lately to see your favorite one?

## ...President, continued

*(Continued from page 1)*

contributors. In an effort to save costs, time and paper, we provided an option to receive The Keeper electronically via e-mail. Members receiving the E-Keeper can now enjoy our newsletter with clear, color photos.

Bowling for Rhinos and our annual Kobey’s Swap Meet fund raisers were great successes in 2002! BFR raised over \$5,800 (over \$100 more than the previous year) and Kobey’s Swap Meet raised over \$1,500 (doubling last year’s efforts). As BFR approaches, we’ll look for your support again. Since our Swap Meet was so successful, there is even a possibility that we may have another Swap Meet Fund Raiser by the end of the summer. Again, we’ll need a few good keeper’s to help “mind the store.”

The funds generated by last year’s hard work supported Rhino Conservation in Africa, rainforest conservation in Australia, support for National AAZK, and even helped financial support to our members, who not only work hard at their jobs, but also find the time to transfer their knowledge and expertise into a presentation format to be shared with other keepers at our yearly conferences.

It is our goal as a professional organization to help you grow; to provide the necessary tools to help you better your skills as an animal care professional. As keeper responsibilities expand, we hope that AAZK can be a solid source of information and resources that will inspire, inform, and incite you to “think outside the boma.”

Your chapter board members have worked hard at providing this service to you. I am proud to work with such a dedicated group! Our goal this year is to spend more time getting the membership involved in some of these endeavors. BFR is always in need of a few extra hands to help with registration. Our annual swap meet at Kobey’s is a perfect opportunity for keepers to share the conservation message with the general public. **The Keeper** is always looking for new writers. We encourage you to share your ideas and experiences with other members.

Though 2002 was a great year, I am certain that with your help, we can make 2003 an even more successful year!

*Leticia Plasencia*

*President, San Diego Chapter AAZK*

# SDAAZK's Recent Presentations:

Reviews by Robert Cisneros

## The Wolves of North America

Presentation by Patrick Valentino, Director of the CA Wolf Center

On January 27th, Patrick Valentino, Director of the California Wolf Center, addressed a crowd of over 40 members and guests. Located in the mountains of San Diego, The CA Wolf Center is a conservation organization dedicated to the preservation of the North American gray wolf through education, SSP supported captive breeding programs, field-based research, and public exhibition.

Once abundant throughout North America, the North American gray wolf was hunted almost to extinction in favor of livestock. Through the Endangered Species Act, wolf reintroductions have made it possible for wolves to make a comeback in the western states. The U.S. Government translocated wolves from Canada into parts of Idaho and Yel-

lowstone National Park., from which the wolves then migrated into central Montana. In the Southwestern U.S., hard-release programs of captive reared Mexican wolves saved the southern sub-species from near extinction.

"Today, North American wolves number somewhere around 4500 in the lower 48 States," remarks Valentino. "Wolves are the top predators of our North American ecosystem," according to Valentino, "preying on the weak, sick, old, and, and young ungulates. In doing so, their culling allows only the healthy ungulates to breed and reproduce. They also keep herds moving so they do not over-graze an area. No other predator is as effective as the wolf against large ungulates," adds Valentino.

In July of 2002, the CA Wolf Center was struck a devastating blow. A sum-

mer fire moved through parts of the center, killing 4 Mexican gray wolves. Though the loss was tragic, their fire defense system was effective in saving 27 of their 31 wolves. Further modifications to the center after the fire will ensure greater safety should the threat of the fire occur in the future.

For more info about the CA Wolf Center, visit their website at <http://www.californiawolfcenter.org>. Information regarding their mission statement, hours of operation, and education programs can be accessed here.

This presentation will be available on VHS in the Zoo library in the near future.

## The Bushmeat Crisis

Presentation by Pete Andrews, Educator, SD Zoo

At the 3:00 pm SD AAZK presentation on February 24th,...

## Exotic, cont'd...

*(Continued from page 2)*

*(WNV):*

West Nile is a mosquito-borne virus which causes encephalitis, inflammation of the brain.

It has been found in Africa, western Asia, the Middle East, the Mediterranean region of Europe, and in 1999 it was first detected in the United States. In September of 1999, the National Veterinary Services Laboratories (NVSL) of the USDA's APHIS Department isolated a virus from neurological and other tissues of flamingos and tragopans (pheasants) from the Bronx Zoo and crows from the NY City area. Samples were sent to the U.S. Department of Health and Human Services Centers for Disease Control and Prevention (CDC) for identification. The CDC announced that the virus was similar to that of the West Nile virus, previously unseen in the Western Hemisphere. They later confirmed it as West Nile and connected it to an encephalitis outbreak that killed 7 people and infected at least 55 others in the NY City area. The virus has since then been identified in horses, mosquitoes, and wild birds in more than 20 states in the eastern U.S. and the District of Columbia.

Birds are the natural hosts for the virus, which can then pass it on to humans and other animals through bites of infected mosquitoes. Mosquitoes acquire the WNV from birds and pass it on to other birds, animals and people. Since the virus is transmitted by mosquitoes it has the potential to infect livestock, poultry and horses. There is no documentation of infected horses spreading the virus to uninfected horses. Clinical signs of West Nile virus infection in horses include ataxia (stumbling and incoordination), depression or apprehension, weakness of limbs, partial paralysis, muscle twitching, or death. As of January 2003, the

USDA's Veterinary Services Laboratories (NVSL) has confirmed 14,717 equine cases of illness caused by West Nile virus.

It is believed that migrating birds play a role in spreading the disease and wild bird surveillance is being used for early detection of the virus. Crow samples are especially important because crows appear to be highly sensitive to the virus. Crows can be sentinels for local transmission of the disease since they normally travel less than 200 miles and generally do not migrate. To date, the virus has been found in over 110 species of birds and, recently, in several bats. APHIS's Wildlife Services (WS) program collects wild birds to test for West Nile virus. They initially focused on east coast States but have expanded their efforts to the Midwest. The U.S. Geological Survey (USGS) is also working with the CDC to learn the current geographic extent of WNV, to understand how it moves between birds, mosquitoes and humans, and to predict future movements of the virus. APHIS's Veterinary Services (VS) treats all situations where birds show neurological signs as having the potential for hosting a foreign animal disease. This allows NVSL to rule out exotic poultry diseases, such as Newcastle and highly pathogenic avian influenza, before testing for West Nile. No treatment is currently available for West Nile virus, however, VS is working to assist all companies interested in producing a vaccine. Most people who become infected with WNV will either have no symptoms or only mild ones. Only on rare occasions does it result in severe or fatal illnesses. And there is no evidence that WNV can spread from person to person or animal to person. As of January 15, 2003, a total of 3,949 laboratory positive human cases have been reported to the CDC, of which 254 cases resulted in deaths.

To decrease the chances of being exposed to the virus, you must decrease exposure to adult mosquitoes. The best way to do this is by removing any potential sources of water in which mosquitoes can breed and lay their eggs.

## *EXOTIC NEWCASTLE DISEASE (END):*

Newcastle disease is a highly contagious and fatal disease of birds caused by a para-myxo virus. It often causes high mortality in chickens, but all birds are susceptible.

Cockatiels, budgies, amazons and cockatoos are highly susceptible to Exotic Newcastle disease. Lorys, macaws, canaries, finches, Mynahs and African greys may not show signs but act as carriers. Some of the other birds affected by this disease are fowls, turkeys, geese, ducks, pheasants, guinea fowl and other wild and captive birds such as ostriches, emus and rhea. It is one of the most infectious diseases of the poultry world and is so virulent that many birds die without showing any clinical signs. And some infected birds that do not show signs of being infected can spread the disease to other birds with fatal consequences.

One of the classical signs of END is tremors and involuntary shaking of the head and body when birds try to move. Other signs may include anorexia, diarrhea, paralysis, twisted neck, difficulty breathing, etc., but these are all signs that may be seen in other bird diseases. To confirm a diagnosis, laboratory tests must be done. Diagnosis can be made in live birds by virus isolation from feces, cloacal and tracheal swabs. Lung, intestine, brain, liver and spleen are suitable organs for virus isolation. And serology can be used for screening. Unfortunately though, there is no treatment for the disease and affected birds must be destroyed.

END was first diagnosed in CA in 1950 among pheasants imported from Hong Kong.

In 1971 a major outbreak occurred in Southern California in commercial poultry flocks where

*(Continued on page 6)*

## Exotic Diseases, cont'd...

*(Continued from page 5)*

almost 12 million birds were destroyed and cost taxpayers \$56 million in an eradication program. It disrupted the operations of many producers and increased the prices of poultry and poultry products to consumers.

More recently, October 1, 2002 to be exact, END was diagnosed in backyard poultry flocks in San Diego. The CA Department of Food and Agriculture (CDFA) and the USDA are currently conducting and eradication program for END. Officials are going door to door to find sick birds in affected areas and are tracing birds into and out of infected flocks. As of December 2002, 1.2 million chickens have been slaughtered and Canada and Mexico have banned shipments of poultry and poultry products from California. Areas that have been quarantined include San Diego, Orange, Los Angeles, Riverside and San Bernardino counties. Recently Santa Barbara, Ventura and Imperial counties were added to create a "buffer zone," in hopes of providing additional security.

On January 16, 2003, END was also confirmed in a backyard flock

in Las Vegas, Nevada. Federal and state quarantines have been established for all of Clark County and a portion

of Nye County, NV. APHIS and the State of Nevada have begun surveillance efforts of the backyard bird population and to establish a task force in Nevada.

Quarantines will be in effect until Exotic Newcastle Disease has been eradicated from CA, and most likely anywhere else it is found. Some of the measures that are being taken include:

- \* Over 695 people working to eradicate this disease.

- \* 6,028 premises quarantined while investigations continue.

- \* 1,220 of these premises contained birds infected or exposed to END and have or will be humanely destroyed. Once the birds are removed, premises are cleaned and disinfected.

Because END is such a highly contagious disease, measures have been taken at the San Diego Zoo and Wild Animal Park, as well as the L.A. Zoo, to ensure the safety and welfare of the bird collections. All the San Diego Zoological Societies walk-through aviaries have been closed and animal presentations with direct contact possibilities between guests and birds have been suspended. The Veterinary Services and Bird Department also held an in-

formative question and answer session for all zoo staff affected by the outbreak of the disease. Several guidelines as to the care of our bird facilities and their surroundings were also implemented and can be obtained from either department. Although Exotic Newcastle Disease is not a public health threat and does not affect the safety of poultry or eggs, it can have a devastating affect on our economy, and more closely, our wonderful bird collection.

To learn more about these or any other animal diseases, refer to the internet. It really is a sea of information!

## The Treasurer's Update

As of February 2003, our treasurer, Nicki Boyd, reported our checking account to consist of \$3,796.40 and our savings account to total \$3,159.98.

The 2002s fundraising activities enabled us to increase our account funds. The largest monetary fund-raisers were :

August: event at Joan Embery's ranch which raised \$470.00.

October: the WAP photocaravan which raised \$340.00.

December: swap meet which raised \$1,543.27, the highest amount raised yet.

It was decided by the Board that \$750.00 would be donated to National AAZK.

It was also decided that contributions would go several SDAAZK members for financial support to attend conferences coming up this year.

Other monies will used to support for this years Bowling for Rhinos and the year's expenses as needed.

The Board discussed the possibility of scheduling more swap meet events and looking into sponsoring a school in East Africa, among other things.

## San Diego AAZK Chapter Mission Statement

After much ado, the San Diego Chapter of AAZK has decided to use what is written in the constitution of AAZK as our Mission Statement.

This statement represents who we are and what we are all about. It is something we believe in and hope that you do too. We are very proud of our Mission Statement and are happy to share it with you here.

- ◆ To promote and establish good relationships among professional zoo keepers; to promote and establish a means to stimulate incentive and greater interest in the zoo keeping profession.
- ◆ To support deserving projects of conservation and to help educate the general public to the need for worthwhile projects of preserving our natural resources and animal life.
- ◆ To establish materials beneficial to zoo keeper education.

Our thanks to Bob Cisneros, SD AAZK's Vice President, who spent time and thought into deciphering our meetings and feelings and put the statement together.

### Book Report:

*"A Different Nature" The Paradoxical World of Zoos and Their Uncertain Future*

by David Hancocks

**Reviewed By** Robert Cisneros, Sr. Hospital Keeper, San Diego Zoo

Though most of us may never be directly involved in the construction and design of new or renovated exhibits, we occasionally are asked for our input. We generally look at exhibit design from keeper and animal perspectives, striving for new and improved ways to help display our animals while providing an enriched and education visitor experience. In his book *A Different Nature*, David Hancocks, an architect and Director of the Open Range Zoo in Melbourne, Australia, looks at the history of zoo exhibits and the genesis of modern zoo design. Beginning with an interesting history of zoos from Sumeria 4,300 years ago to modern times, Hancocks describes how zoos have transformed from a menagerie of conquests to leisure parks and conservation centers today. Though he doesn't always have favorable things to say about some current zoo exhibits, he does offer praise where praise is due... though never holding back a punch or two at zoos who fail to meet with his criteria.

What exactly are his criteria? Summed up, Hancocks feels that zoos should be

institutions that promote respect for animals and present a holistic view of nature. He often criticizes architects who do not meet the needs of the animals when they plan exhibit designs. In many cases, according to Hancocks, animals are required to adapt to flaws in architectural design. He often cites examples of this, but does provide examples where these needs have been met (including the gorilla exhibit at the San Diego Zoo).

Not one to just complain about what is wrong with zoos today, Hancock also devotes time to describe what is right with our exhibit designs. The concept of Alandscape immersion@ (exhibits that surround people and animals in replicated natural habitats) is detailed. He praises the Bronx Zoo, Woodland Park Zoo and Arizona-Sonora Desert Museum, lauding them for their dedication to worldwide conservation and diverse education programs.

Is the bad really bad? You'll have to read for yourself and decide. His

view of SSP (Species Survival Plans) for example, is a bit reactive and you'll find that not all of his views are argued objectively. His reactionary stance throughout the book makes his a reformer of sorts. Though reformers can sometimes be extremists, they do have a powerful way of provoking thought and change. Hancocks book, *A Different Nature*, is a call for us to reinvent zoos. Exhibit designs and interpretive animal displays are forever improving, and thought provoking books such as this keep us from becoming stagnant.

Read this book with an open mind. The historical review of zoos is certainly worth the read. And though his critic may sting at times, it is generally well presented and supported.

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*The San Diego AAZK Chapter*

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## CALENDER

### LOCAL EVENTS 2003:

#### *Watch for Updates*

**March:** Phil Unitt, "Birds of San Diego"

**April:** Mark Edwards

**April 27:** Earth Day Celebration in Balboa Park, "Step Up to Conservation"

**May 17:** Bowling for Rhinos at Kearney Mesa Bowl in Clairemont, 6:00 pm

**June:** Social

**July:** Gathering at Joan Embery's Ranch

### NATIONAL/ INTERNATIONAL EVENTS:

**AZA Managing Animal Enrichment & Training Program Course;** March 19-22 Orlando, FL. Info at aweider@aza.org

**AZA Eastern Regional Conference**  
March 26-29 Hosted by Riverbanks Zoo & Garden, Columbia, SC.

**AZA Central Regional Conference**  
April 30- May 3 Hosted by Milwaukee County Zoo, Milwaukee, WI

**AZA Western Regional Conference**  
May 14-17 Hosted by Calgary Zoo, Calgary, Alberta, Canada

**2003 AAZK Annual Conference** September 26 - 30 Hosted by Cleveland Chapter of AAZK. Info at (216)661-6500

**1st International Conference on Zookeeping** in The Netherlands October 2 - 10, 2003 at Birdpark Avifauna. Info at <http://es.geocities.com/ixlares20/index.htm>

**6th International Conference on Environmental Enrichment** November 2 - 7 Hosted by Johannesburg Zoo Info at [www.jhbzoo.org.za](http://www.jhbzoo.org.za)

