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Animal Keepers' Forum

AKF



September 2013 Volume 40 No. 9

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The American Association of Zoo Keepers, Inc. exists to advance excellence in the animal keeping profession, foster effective communication beneficial to animal care, support deserving conservation projects, and promote the preservation of our natural resources and animal life.

ABOUT THE COVER

This month's cover photo features a double-wattled cassowary (*Casuarius casuarius*) chick hatched at the Virginia Zoo on June 11, 2013. Named Hallager (after Sara Hallager, the Ratite TAG chair), she is only the fifth cassowary hatched in an AZA-accredited institution in the last ten years.

Hallager's parents, Boris and Earline, were introduced to one another in February 2013. Cassowary introductions can be dangerous as the females are known to be quite aggressive. Luckily, the pair took to each other almost immediately. Earline had always broken the eggs she laid when she was housed without a male, so staff remained cautiously optimistic when courtship and then copulation were observed. A total of four eggs were laid and incubated by Boris (female cassowaries take no part in chick rearing). Boris has proven to be an excellent father: he is protective, attentive, and happily mashes food items into small pieces that the chick can easily swallow.

Double-wattled cassowaries are listed as endangered under the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act). Cassowaries are considered a keystone species because of their role as seed dispersers.

Hallager was the only chick to successfully hatch this breeding season, but staff are confident that she will be the first of many. This month's photo was provided by Alexandra Zelazo-Kessler, Lead Keeper of Birds at the Virginia Zoo.

Articles sent to *Animal Keepers' Forum* will be reviewed by the editorial staff for publication. Articles of a research or technical nature will be submitted to one or more of the zoo professionals who serve as referees for **AKF**. No commitment is made to the author, but an effort will be made to publish articles as soon as possible. Lengthy articles may be separated into monthly installments at the discretion of the Editor. The Editor reserves the right to edit material without consultation unless approval is requested in writing by the author. Materials submitted will not be returned unless accompanied by a stamped, self-addressed, appropriately-sized envelope. Telephone, fax or e-mail contributions of late-breaking news or last-minute insertions are accepted as space allows. Phone (330) 483-1104; FAX (330) 483-1444; e-mail is shane.good@aazk.org. If you have questions about submission guidelines, please contact the Editor. Submission guidelines are also found at: aazk.org/akf-submission-guidelines/.

Deadline for each regular issue is the 3rd of the preceding month. Dedicated issues may have separate deadline dates and will be noted by the Editor.

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ANIMAL KEEPERS' FORUM

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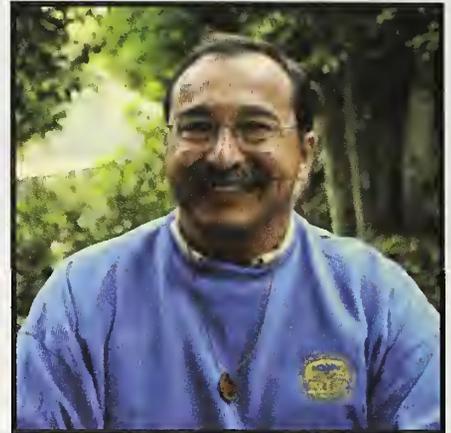
FROM THE PRESIDENT

"To improve is to change; to be perfect is to change often."

— Winston Churchill

"Act as if what you do makes a difference. It does."

— William James



Last spring, the Executive Board of Directors met in Topeka for our Mid-Year meetings. During these meetings, we examined our current workforce (committees, programs, and projects) and made some adjustments that we felt would help improve the way that we provide our services to our membership. Using our mission statement as a guide, we concluded that the affairs of our working groups amount to four major components: Education, Conservation, Recognition, and Communication. Based on our mission, our current workforce fit neatly into these four compartments.

- 1. Education:** Professional Development Committee, Behavioral Husbandry Committee
- 2. Conservation:** Conservation Committee, Grants, and Bowling For Rhinos
- 3. Recognition:** Awards Committee, National Zoo Keeper Week, Chapter of the Year
- 4. Communication:** Communication Committee (new), Social Media, Membership Correspondence, Web Update Coordination.

The Board of Directors will continue to serve as oversight to these working groups; the grouping will, however, make our focus much easier. All things related to products will be handled by Ed Hansen, our CEO/CFO. Ed will also be responsible for maintaining our webpage as part of his regular duties. The Association President will focus on coordination of these groups plus professional and educational partners and liaisons as well as Chapter communication. Bear in mind that these are merely fine-tuning details and not an exhaustive list of responsibilities.

You have already noticed changes over the past few years with our conference format. You can expect to see some fine-tuning of those changes at future conferences, beginning in 2014. Our goal is to provide concentrated learning at the conference level with a greater take-home value. We will be fine-tuning our workshop tracks, providing you with a greater opportunity to concentrate on specific animal care skills. We'll be doing this on both the beginner level and advanced, and we'll be focusing on specific animal groups, as well.

For those of you who don't make it to a conference on a regular basis, AAZK Online - the Collaborative Learning Environment, is in the process of adding more learning modules. Representatives from CypherWorx have been contacting Chapter Presidents about great pricing packages for Chapters; several Chapters have already purchased group subscriptions. It is just one more opportunity for you as a member to grow in your profession.

The Board of Directors will be meeting again this month for our annual Board of Directors meeting just prior to the conference in North Carolina. We will be evaluating our current progress, fine-tuning the goals and direction of our organization. Our Association is a work in progress, but suffice it to say that what we do makes a difference!

Our Association is moving forward in ways that will help you in your profession.

As always, I welcome your thoughts and input. E-mail me at bob.cisneros@aazk.org; I would love to hear from you. Drop me a line, I promise to write back.

Respectfully,

Bob Cisneros

"Some men see things as they are and say why - I dream things that never were and say why not."

— George Bernard Shaw

COMING EVENTS



Post your
upcoming events
here - e-mail
shane.good@aazk.org

October 3-6, 2013 Advancing Bear Care 2013

Woodlands Wildlife Refuge,
Clinton, NJ. For more
information visit
bearcaregroup.org

October 14-16, 2013

Orangutan SSP Husbandry Workshop

Los Angeles Zoo & Botanical
Gardens in Los Angeles,
California
For more information go to:
lazoo.org/orangutanssp2013

October 15-18, 2013 (ICEE) International Conference on Environmental Enrichment

Hosted by the National
Zoological Gardens of South
Africa. For more information
go to: [http://www.nzg.ac.za/
icee2013/](http://www.nzg.ac.za/icee2013/)

October 24-27, 2013 From Good Care to Great Welfare Presented by the Center for Zoo Animal Welfare, Detroit Zoological Society

Limited scholarship opportunities
available. For information contact:
Elizabeth Arbaugh, Curator of
Animal Welfare, Detroit Zoological
Society, aw@dzs.org



November 10-14, 2013 Zoological Association of America (ZAA) Annual Conference

Phoenix, AZ
For more information go to
zaa.org. Deadline for abstracts is
April 1, 2013.

November 11-15, 2013 Training and Enrichment Workshop for Zoo and Aquarium Animals

Moody Gardens, Galveston, TX
For more information contact:
dolsen@moodygardens.com

April 13-18, 2014 ABMA's 14th Annual Conference

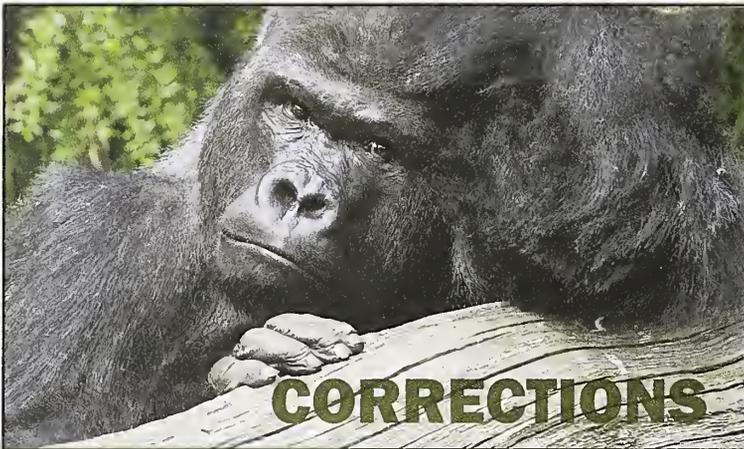
Dallas, TX
For more information go to:
theabma.org

September 8-12, 2014 AAZK National Conference

Orlando, FL
Hosted by
Disney's Animal Kingdom
For more information go to:
greaterorlandoazk.org

October 6-8, 2014 3rd International Flamingo Symposium

San Diego, CA
Hosted by SeaWorld San Diego
For more information contact
laurie.conrad@SeaWorld.com



In the July 2013 issue, Volume 40, Number 7, we regret to report the following errors:

1. Carol Sodaro's last name was misspelled on page 329 (Fig. 6).
2. There should have been a credit that the Contra Freeloading article by Hilda Tresz on P. 320 first appeared in ABMA's *Wellspring* – Volume 11, Issue 2 – Spring 2010.
3. The footer incorrectly labeled the issue. It should be cited as Vol. 40, No. 7.

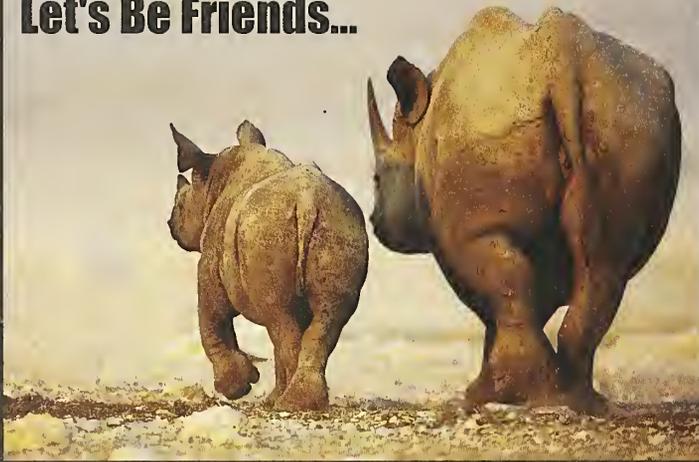
ATTENTION ALL PHOTOGRAPHERS!

AKF Needs Your Photos

Attention all photographers, the **AKF** needs your photos as potential cover photos and special feature photos throughout the issue. All photos need to be high resolution, 2625 x 3375 pixels or greater, and 300 dpi or greater in resolution. All photographers will need to submit a photo release form that can be found at aazk.org/animal-keepers-forum/aazk-photo-model-release-form. Photos that clearly depict facility logos and behind-the-scenes shots will need permission of the facility to be used.

Subjects for the photos should revolve around animal husbandry, conservation, education/interpretation, professional development, significant achievements in the industry (births, exhibits, staff, etc.), and can also include some of the more humorous or unique situations that we all come across each day in our occupations. Captions for each photo should also be submitted.

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AAZK Conferences

Asheboro, NC
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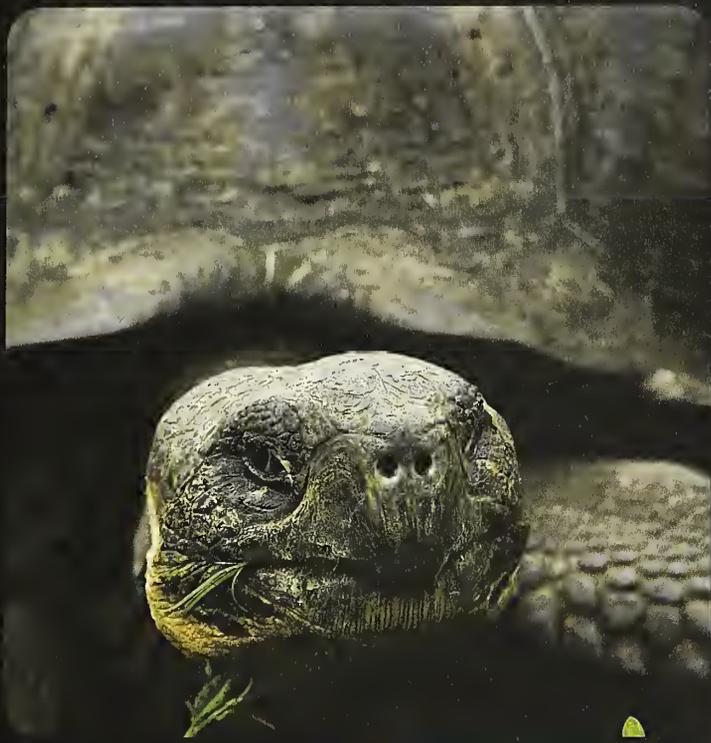
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Worm Farms in Zoo Offices



*Debbie Johnson
Registrar
Chicago Zoological Society – Brookfield Zoo
Brookfield, Illinois*

INTRODUCTION

Anyone who has ever visited a zoo knows there are many amazing animals to see, however, few know about an animal some zoo staff keep that works behind-the-scenes to help the zoo's conservation efforts - worms.

These mini-heroes work silently to help keep our landfills free of organic waste, and at the same time make exceptional compost. Many zoos practice green or sustainable initiatives, for example recycling paper, purchasing recyclable items, and using LED light bulbs instead of incandescent bulbs. These green initiatives promote environmental sustainability through waste reduction, reuse, and recycling, and set an exceptional example for the community. With an increasing human population, we are generating more waste than ever before, and with this comes the problem of needing to dispose of the waste, including food waste. Worm farms can fill this void and help keep food waste out of the landfills. They are an easy way to recycle food scraps.

In 2010, 250 million tons of trash was generated; 85 million tons of the trash was recycled and composted, or a 34.1% recycling rate (United States Environmental Protection Agency [US EPA], 2012). According to the United States Environmental Protection Agency (US EPA, 2011), yard trimmings and food scraps make up 27% of the solid waste stream in the United States. Most of this waste goes into landfills, which produce methane gas, a contributor to climate change. Instead of filling up landfills, considerable amounts of this waste can be composted. Only 2.8% of food waste was composted in 2010 (US EPA, 2011). Most people are familiar with recycling paper, plastic and metals, but food waste composting is a dimension of recycling that is often overlooked.

Brookfield Zoo provided paper and plastic recycling bins in office areas, however, food waste collection in office areas for composting had not been offered. I wanted to start a small scale project to collect food scraps in offices using worm farms. Vermicomposting is using worms to convert organic material into compost. This green initiative can be done in a small space such as a house, apartment or workplace. By initiating worm farms at the zoo in offices, I hoped to help educate employees about conservation behaviors that can be done in the workplace while practicing sustainable options. Collecting food scrap material is easy to do in a workplace. Instead of throwing the scraps in the regular trash, it is placed in a compost bin. The material is fed out to the worm farms once a week, with extra material going to the zoo's main compost pile.

IMPLEMENTATION

Food scrap compost collection was started in four office areas at the zoo. Participants had the option to place food scraps in their own desktop compost bin or a compost bin in a shared area, such as a kitchen or break room. The majority of participants used the shared compost bin to deposit their food waste. Most staff did not want food waste sitting on their desk and preferred a central location to deposit their scraps. Since shared bins were preferred, desktop bins were removed and all future waste material has been collected in shared bins. Fruit and vegetable scraps were collected along with coffee grounds and tea bags (Fig. 1). No meat, dairy or junk food was collected in order to prevent odors in the compost bins and worm farms. Manure was not added to the bins. Used coffee filters and napkins were added as a trial, but those materials did not seem to break down and stayed intact inside the worm farms for months, therefore

By initiating worm farms at the zoo in offices, I hoped to help educate employees about conservation behaviors that can be done in the workplace while practicing sustainable options.



Figure 1. Example of food scraps fed to worm farms at Brookfield Zoo. Personal photograph by author.



Figure 2. Desktop worm farm at Brookfield Zoo. Personal photograph by author. November 2010



Figure 3. Three-tiered worm farm at Brookfield Zoo. Personal photograph by author. November 2010.

are not presently added to the worm farms.

Two worm farms were obtained and placed in zoo offices; one farm was a small desktop farm (Fig. 2), the second farm was a three-tiered farm (Fig. 3). There are many worm farms available for purchase commercially, or a worm farm can be homemade from wood or plastic containers. If making a homemade farm, directions can be obtained from local agriculture extension offices, and libraries have instructional books on vermicomposting. An excellent resource is Mary Appelhof's (1982) book *Worms Eat My Garbage*. Worm farm containers must have holes to give the worms oxygen. Mesh covering the holes will keep out pests, as well as keep the worms inside the farm. The container should be made of dark material, or covered if transparent, so light does not filter through, as the worms avoid light. The size of the worm farm depends on personal choice, space available to place the farm, and how many food scraps will be collected. A small desktop farm is ideal for one person. A three-tiered farm would be needed for a larger family, with food scraps being placed in each layer. For each pound of food scraps per week, plan on one square foot of surface. Before selecting a worm farm, weigh your food scraps out weekly for a few weeks to get an idea of the size farm needed. The worms will sustain their optimum population according to the available food supply and space.

Red wiggler (*Eisenia foetida*) was the species of worm placed in the farms. According to the University of Illinois Extension (Nelson, 2006), red wiggler is the species of worm most recommended for vermicomposting. They do well in a shallow worm farm, as it replicates their environment in the wild, the

first few inches of soil. Red wigglers are also ideal as they readily eat food scraps. The worm farm project started with four pounds of red wigglers. For each one pound of food fed per day, two pounds of worms were used, as worms eat about half their weight in food per day.

The worms in the Brookfield Zoo worm farms reproduced within a few months. Cocoons and baby worms were found in the bedding. Coir (coconut fiber) was used as bedding, along with some shredded newspaper. The worms will eat the bedding along with the food scraps; therefore non-toxic bedding must be used. Newspapers printed with soy ink were used in the zoo office's worm farms. The bedding should be moist but not dripping wet. Crushed egg shells were added to the farms to provide grit, as the worms do not have teeth, they have a gizzard. Calcium carbonate, sand and soil can also be added.

The bedding was changed every three to four months, after it turned a dark black/brown color and the original bedding was no longer identifiable. If worms are fed on one side for a few weeks before changing the substrate, they all concentrate on the food side, and are easier to pick out if you don't want to lose the worms with the compost. When changing bedding, a plastic sheet was placed on the ground and the bedding was placed on it in handfuls. The worms can be separated out at this time, and saved to be placed back into fresh bedding. An alternative method is to place food on one side of the worm farm for a few weeks, and the bedding changed only on the side where no food was present, as the likelihood of worms being on that side is slim, as they tend to congregate on the food side. Afterwards,

According to the Association of Zoos and Aquariums (AZA) (2012), there are 224 AZA-accredited zoos and aquariums in North America. Zoos also have the capacity to educate the public and explain the benefits of green initiatives such as vermicomposting.

place food in the new bedding, and the worms will migrate over to this area within a few weeks, and the old bedding from the other half can be changed out.

When adding food, the bedding is pushed aside and the food placed in the depression, then covered up with bedding. The food scraps were not chopped into pieces before adding to the bins, but apple cores were sometimes broken into pieces by hand when placed into the bins. Smaller particle sizes decompose faster inside the farms. Worms seemed to congregate more on decaying food particles. Moisture content of the bedding was checked visually and by hand when feeding. Red wigglers tolerate a wide range of temperatures, from 40 – 80 degrees F, and do well at room temperature (Dickerson, 2001).

CONCLUSION

According to Cassells and Lewis (2011), there are more small and medium businesses worldwide than large corporations. These small and medium businesses often think that on an individual basis, if they convert to green practices, it will not make much of a difference since they are so small and just one business. What they don't realize is their combined impact is huge. Similarly, if zoos started worm farms in offices, a difference could be made. According to the Association of Zoos and Aquariums (AZA) (2012), there are 224 AZA-accredited zoos and aquariums in North America. Zoos also have the capacity to educate the public and explain the benefits of green initiatives such as vermicomposting.

The zoo staff participants who collected food scraps for the worm farms thought being "green" was important and wanted to recycle organic trash. Selecting a specific action zoo employees could participate in instead of just educating them and giving them facts about composting made them aware there are everyday solutions people can do to help our environmental problems. Contributing solutions to problems is important for positive behaviors to develop and continue (Jensen 2002; Yalowitz 2004). Collecting compost materials in zoo offices increased the participants' awareness of conservation issues, and made a connection with workplace green initiatives. It also set a positive example for co-workers. By proactively implementing compost collection, it reminded staff to be aware of their environmental impact. The ability to be green isn't just theoretical; there are small ways to practice it in the workplace and at home. People's choices can make a difference.

Vermicomposting was an easy process to initiate in the workplace. Worms don't make noise, the farms are easy to take care of, and daily care is not required. The compost produced can be used as plant fertilizer. Surplus worms can be used as a food item as behavioral enrichment for zoo animals. Worms will eat what otherwise would have been thrown out as garbage. The worm farms have been a fun and easy way to enrich the workplace environment, along with animals and soil. The project was successful and is expanding, with more offices slated to receive worm farms.

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INSIGHTS into Mountain Bamboo Partridge Ethology

*Orion McCarthy,
Bird House Intern
Smithsonian National Zoological Park
Washington D.C.*

INTRODUCTION AND GOALS

While the Mountain Bamboo Partridge (*Bambusicola fytchii*) is neither rare nor endangered, little is known about the species. The range, habitat and relative population status are known, but the ethology of the species is lacking in documentation, especially compared to its relative *Bambusicola thoracicus* (Chinese Bamboo Partridge). Few zoos have the species on exhibit and its status in aviculture is listed as rare (Cowell, 2008). As one of the Smithsonian National Zoo's less researched collection birds, I found it compelling to further investigate Mountain Bamboo Partridge behavior and reception to training.

My project revolved around training six adult and three juvenile Mountain Bamboo Partridges to respond to a

specific sound to aid in their capture for necessary welfare tasks such as tagging and moving individual birds. The system I developed involved lightly banging on a foodpan three times in quick succession with a pencil to get the attention of the partridges. Once they looked up and moved towards me, I rewarded them with mealworms. I repeated the process until the birds followed me up to the vestibule area of exhibit 55 (see Figure 2) where they could be cornered and trapped. My goal was for the birds to eventually respond to the sound only, making mealworms unnecessary.

Throughout the seven weeks of my project, this goal grew to encompass observing the partridges to unravel complex social dynamics. Scale training the birds ultimately became another goal as well.

BACKGROUND INFORMATION ON MOUNTAIN BAMBOO PARTRIDGES

Mountain Bamboo Partridges are part of the order *Galliformes*, or gamefowl. Found throughout Southeast Asia, they live in bamboo scrub forests and grasslands (Butchart & Ekstrom, 2012). These birds are fairly common in their range, rated as Least Concern by RedList™ (Butchart & Symes, 2012). However, their population is in decline due primarily to habitat loss (Butchart & Symes, 2012). They have brown mottled plumage, characteristic eye stripes and a spotted underbelly. They exhibit little sexual dimorphism: the only notable differences between the sexes are that males have a black band above their eyes where females have brown, males have a spur on their lower leg while females do not, and males tend to be slightly larger.

The basic facets of Mountain Bamboo Partridge behavior are such; they spend most of their time concealed in scrub growth, only flying when startled, usually making loud wing beats and calling out to startle attackers, and quickly return to cover after danger has passed. Breeding occurs in the summer months, and both parents are responsible for the upbringing of the chicks (Newcomb, 2005). The gestation period averages eighteen days (Twycross, 2012), although we have found it to be closer to three weeks. Beyond that, little is documented about the behavior of these birds outside of the individuals observed in captivity at Smithsonian National Zoo.

INDIVIDUAL PARTRIDGES OF SMITHSONIAN NATIONAL ZOO

Throughout the majority of my project (which spanned two months from the 3rd of July to the 22nd of August, 2012) there were six adult and three juvenile Bamboo Partridges on exhibit. The juvenile chicks were born in May 2012. Of the adults, four were male and two were female. There were two male juveniles and one female juvenile. Five chicks were born in the second week of August in two clutches (A clutch of four, all of which hatched, and a clutch of three that produced a single offspring). In the last week of my project, an adult female and the juvenile female died, as well as three of the chicks from the clutch of four, all under a week old.

Throughout July and the first few weeks of August, the partridges were separated into two groups, each with a single female. Figure 1 shows the birds in each group, marked with their gender, and with their bands and accession numbers listed below. Throughout this paper, the number or letters inside the gender symbol next to each picture will be used to refer to individual birds.

Group 1 was comprised of 87, 77 and Lb. Birds 87 and 77 were a mating pair and Lb was a less integral member, usually keeping watch over the rest of the group. Mating pairs were made evident by occasional hostility within a group, marginalizing the male who was not mating with the female. This happened with enough regularity (the same male was always marginalized) that it could be used to clearly indicate group hierarchy.

Group 2 was more dominant than Group 1 since it was larger and contained the dominant mating pair (28 and 75/51). RB was also in Group 2, but he was very peripheral, and usually assisted in caring for the juveniles while 28 and 75/51 searched for food.

TERRITORIAL BEHAVIOR AND GROUP DYNAMICS

The two groups remained fixed throughout July, and members were very hostile towards those from the opposite group. Territories became apparent (see Figure 3), and individuals



would often attack intruders. Group 2 would usually win, although not due to increased size (RB and the juveniles were rarely involved) but because 28 and 75/51 were aggressive in maintaining their dominance. In early July, it became apparent that Group 1 occupied the periphery of exhibit 55, mainly the lower part of the exhibit below the pools. The partridges seem to prefer the terrain half way up the path in exhibit 55, and that is where Group 2 was typically spotted.

In late July, both groups became increasingly territorial, with 28 in particular becoming hostile to all partridges except 75/51. This increased hostility culminated on the 23rd of July, when Group 1 was in the vestibule and 28 approached alone. It appeared at first that she would mix with Group 1, but 77, the dominant male of Group 1, chased her away, making a loud pitched call that lasted for about 30 seconds. 28 fled back to Group 2, where she and 75/51 made the same shrill call back at Group 1. Group 2 approached minutes later in full force, and 28 and 75/51 evicted Group 1 from the vestibule. Group 1 scattered and failed to regroup. Then 28 and 75/51 called out the same shrill cry and chased away RB and the remaining chicks until they were alone at the vestibule.

Soon after, it was discovered that both 28 and 87 were sitting on eggs, suggesting that the territorial hostility was due in part to the nesting of the females. At this point the decision was made to relocate the juvenile partridges, which were experiencing the greatest hostility from 28, to the holding exhibit 44D.

Interestingly, both females made their nests far out of their normal range, deep in the territories of the other group. In the wild, this may be a method to expand territory or the females may have been trying to nest in seclusion away from the rest of their groups.

With both females relatively incapacitated on nests, the territory lines began to waver, though group distinctions remained strong. Once the babies were born however, new battles over control arose.

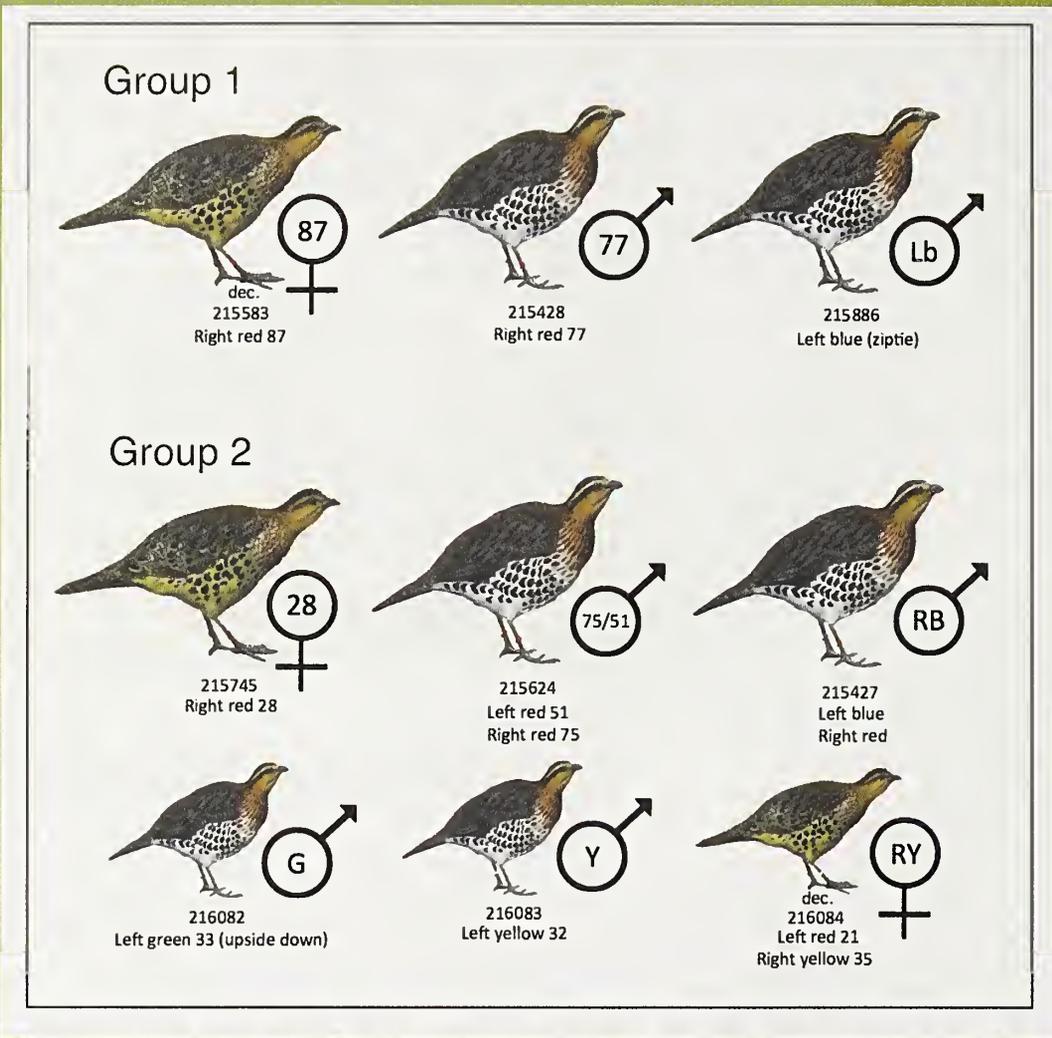


Figure 1: Mountain Bamboo Partridges of the Smithsonian National Zoo. Two distinct groups formed in July and were very territorial towards each other. Above are the groups, with information about each individual bird such as gender, band color and accession number. Throughout this paper, the number or letters inside the gender symbol next to each picture will refer to the individual birds.

**MAY AND AUGUST CHICKS:
TWO GENERATIONS OF PARTRIDGES**

While doing my project, I was fortunate enough to observe the stages of the life cycle of the Bamboo Partridge by observing multiple generations of chicks. When I started in July, there were three young juvenile partridges that had been born in May. These chicks still depended on the care of adults in Group 2, relying on 28, 75/51 and RB to feed them. All three of the adults were involved in parenting, but the males seem to be more involved, with one always near the chicks. 75/51 was usually found with two of the juveniles while RB seemed to have an affinity for the third, which appeared to be the runt of the three. The three juveniles began to become more self-sufficient towards the end of the month, straying more often from the caregiving males. This was fortunate, since the hostility of 28 necessitated the move of

the three juveniles to exhibit 44D. The juveniles were moved out on the 30th of July to make way for the eventual arrival of the new chicks.

Both 87 and 28 started nesting around the same time (28 exhibited hostility on the 23rd to indicate nesting and 87 was discovered on her nest on the 25th). Whether one nested in response to the other is unclear, but with both females incapacitated, the territorial boundaries began to blur. Gestation was three weeks for both clutches of eggs, and the clutches hatched two days apart. 28 laid three eggs, two of which were fertile. Only one chick hatched, and at this point the groups dissolved; 28 and 75/51 cared for the chick without any other males and exhibited heightened aggression to any other partridges. During this time, 87 stayed on her nest without any contact from the other males, while 77, Lb and RB all stayed together in one group.

Two days later, all four of 87's eggs hatched. During gestation, 87 stayed almost exclusively on her nest while 28 was often spotted around exhibit 55 (to the point that we did not realize she was nesting until she was spotted with the chick on the 12th of August). It is possible that the higher survival of 87's clutch was a result of her increased maternal attentiveness. At noon on the 14th, 87 was spotted off her nest for the first time in weeks, and the chicks were nowhere to be found. Two hours later, all five chicks were spotted with the dominant mating pair (28 and 75/51). Soon after, 87 approached along with the other three males and were chased away by both 28 and 75/51. The males scattered, and 87 stayed close by and called out in distress for fifteen minutes. This abduction of 87's chicks illustrates the dominance of the pair. In the days that followed, chicks continued to shuffle between 28 and 87.

Figure 2: Map of exhibit 55, an outdoor aviary. The blue represents the three pools, and the brown rectangles represent the hollow fake logs, which many of the birds hid in. The dark path that cut through the exhibit had a railing on both sides, which the birds could cross under or over. Retaining walls and rocks are also shown.



Figure 3: Partridge sightings in July superimposed over a map of exhibit 55. Red X's represent group 1, Blue X's represent group 2. The dotted line through the exhibit represents a rough territorial boundary between the two groups.



While doing my project I was fortunate enough to observe the stages of the life cycle of the Bamboo Partridge by observing multiple generations of chicks.



Figure 4: Partridge sightings in August superimposed over a map of exhibit 55. The gradient represents sighting frequency (the darker the purple, the more frequent the sightings)





After a few days, the old groups reformed, with Group 2 having two chicks (one of 87's and 28's only chick) and Group 1 having the remaining three.

As with the chicks born in May, both parents in each group looked after the chicks, although it was always the father that was closest. The fathers in both groups would ruffle their feathers and sit with the chicks concealed underneath their plumage, giving off the appearance of a sunning partridge. Often, the surrounding males would take the same position, presumably as decoys for the safety of the chicks. In addition, the partridges would stay concealed in brush and were difficult to lure with training exercises in the week immediately following the birth of the new chicks. The partridges also stayed farther away from the visitors and remained in an especially sheltered part of exhibit 55 (see Figure 4).

In the week that followed, 87 and the three chicks in her possession went missing. A snakeskin was found in exhibit 55 as well, and since no bodies were found, the theory was that a snake killed 87 and then ate the babies, which were fairly helpless without the adult partridges. The female juvenile in exhibit 44D, RY, also died during the same weekend, presumably from West Nile Virus infection.

With these deaths, all identifiable females excluding 28 have died, creating an unfortunate lack of gender diversity among the Bamboo Partridge collection at the Zoo. However, almost immediately after 87's disappearance, all the partridges converged into one group, with RB taking over primary parental tasks and 28, 75/51 maintaining dominance. The reconfiguration of males around one female suggests that Mountain Bamboo Partridges are a matriarchal species, also evidenced by the two groups prior to nesting, which had one female each (not including the juvenile female). Indeed, when both females were nesting and removed from the rest of the partridges, territories blurred and group boundaries dissipated. It would

have been interesting to see if a third female was introduced, or if the juvenile female had not died, if three groups would have eventually developed.

Since there is only a single group now and the two juveniles in exhibit 44D are male, I recommend reintroducing them back into exhibit 55, especially since they appeared stressed due to the larger birds in that enclosure (two adult Tragopans (*Tragopan temminckii*)). It would be surprising if they did not successfully integrate into the current group in exhibit 55.

TRAINING, TRAPPING AND TAGGING

The main focus of my project was training the Bamboo Partridges to respond to a specific noise. The desired response was the approach of the Bamboo Partridges towards the noise, which was accomplished by feeding mealworms to the individuals that approached. The noise was made by three taps of a pencil on a foodpan in quick succession. The daily routine for training involved finding a group of partridges in exhibit 55 (I focused my efforts on Group 2 since an ultimate goal of the project was to tag the juvenile chicks). Upon finding a group, I would lead them up the path or through the brush towards the top of the exhibit where the vestibule was using the sound and mealworms. The best time for the training was when the birds were hungriest, and I found that two half-hour sessions a day worked better than an hour-long session. I found the birds were most receptive upon my arrival to the Zoo at 0630 hours, and just before their afternoon feeding at 1400 hours. The training was slightly more difficult in the afternoon due to public access to exhibit 55 and the noise and distractions this created for the birds.

It did not take long for the partridges to internalize the noise and the meaning of the sound, and after a few weeks I was able to draw the partridges out of the brush with the noise upon entering exhibit 55 instead of having to find them. They also had the capacity to remember the sound and its meaning; I was

absent for several weeks during July and when I returned, their responsiveness to the sound had not noticeably decreased. I attribute the quick response and internalization of training to the multiple short sessions each day, which affirmed the routine for the birds. In general, the juveniles were more inquisitive

One must be careful since their primary defense tactic is to fly into the face of the attacker, screeching and loudly beating their wings

then the adults, responding more readily to the food pan noise. However, they seemed to have a shorter attention span, and were harder to lure to the vestibule than the adults. Overall, 28 and 75/51 (28 principally) were the most responsive to the noise and seemed to internalize the training the most.

Initially, luring the birds past the uppermost pool posed difficulties due to the high volume of ducks and other birds, which are larger than the Bamboo Partridges and would often scare them away or make them hesitant to follow. This problem was overcome by placing myself in-between the pool and the path, keeping the ducks by the pool and partridges by the path. In other parts of the exhibit, notably by the vestibule, the peacocks would pose similar problems, so I would routinely inspect the path I planned on taking the partridges on first to scare away any large birds that could impede the partridges.

While the partridges would readily follow me up to the vestibule, I had my greatest difficulties getting them to go inside. My suspicion is that they were wary of entering a confined space while I blocked the exit. I tried installing a plywood ramp, since there was a foot-high step that may have been impeding them as well, but they never used the ramp since it was a foreign object that they did not recognize. This same problem occurred when I tried to scale train them. Adding a permanent fake scale

under their foodpan seemed to be the best course of action, although this was tried soon before I left so the tactic has yet to yield results.

On the 30th of July, shortly after 28 began displaying heightened aggression, I was able to lure the three juveniles along with RB into the back of the vestibule. There is a door to the edge of the vestibule that swings inward to block the escape of any captured partridges, so the ultimate goal was to get them to the very back of the vestibule. Upon closing the vestibule door, I was able to trap the two male juveniles, but RB and the other juvenile escaped through the door. In capturing the partridges, one must be careful since their primary defense tactic is to fly into the face of the attacker, screeching and loudly beating their wings. Using a net is advised and caution should be taken in the back vestibule area, since it is a fairly small space.

After capturing the birds and crating them, we weighed them, tagged them and moved them to exhibit 44D. Another keeper later captured the remaining juvenile, and Lb was captured and banded in August using the same vestibule capture method.

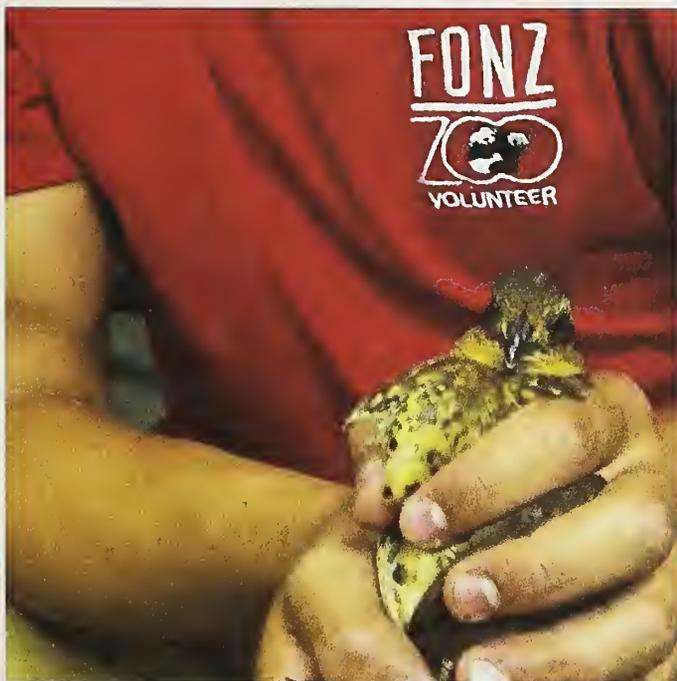
FINDINGS

The Mountain Bamboo Partridge appears to be a matriarchal species that fractures into territorial groups, each comprising a single female. When females are nesting or removed, territory and group distinctions blur or falter. Males seem to hold the primary caregiving role, though both parents are involved, and the more dominant members of the group have less parental involvement. They are a food-motivated species, and will venture, albeit hesitantly, into unfamiliar or confined areas if they are enticed with food.

The project goal of making a sound synonymous with food for the partridges was successful for 28 and 75/51, and was achieving success with the other partridges. The approach can be applied to other birds as well; the peacocks in particular seem susceptible to this type of training, since they are closely related to the partridges and are also a food motivated species. The white-faced ibis in Exhibit 55 would also benefit from this training since their seasonal relocation to an indoor enclosure necessitates their eventual capture. I recommend the training methods be perfected, tweaked and applied across many species of birds to ultimately foster cooperation between birds and keepers in achieving general welfare of collection birds at the National Zoo. 🐘

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Where you can share your training experiences!

TRAINING TALES EDITORS

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Kim Kezer, Zoo New England

Beth Stark-Posta, Toledo Zoo

Sandhill Crane Behavioral Modification

Mindy Rabideau, Primary Aviculturist

Tracy Aviary, Salt Lake City, Utah

In spring 2009, the Tracy Aviary received a male Greater Sandhill Crane (*Grus canadensis tabida*) to be paired with our lone female. Previously, this male had been housed at Willow Park Zoo in Logan, UT in a large mixed-species exhibit with hoofstock. Prior to coming into captivity, he had been a wild bird brought into a rehabilitation facility with a wing injury that made him non-releasable. Upon arriving at the aviary, the male was quarantined in the smaller, off-exhibit holding yard of the crane exhibit. This yard shared a fence line with the female, so the birds had auditory contact and some visual contact through a gap in the netting put up to give him some privacy during his quarantine period. During his quarantine period, whenever a keeper would enter the yard, the bird would flee to the corner of the enclosure and pace the fence until the keeper left.

In June 2009, the male crane cleared quarantine and was introduced to the female. The introduction went surprisingly well. It went so well that we didn't have to separate them when keepers weren't present or feed them separately as is often the case. The female walked right up to the male and spent all day following him around. There was no aggression seen from either bird and they seemed to form a good pair right off the bat.

Due to a previous training program, the female crane is tolerant of keepers in the exhibit and approaches within a few feet of keepers in hopes of receiving a treat. The male, however, continued to flee across the exhibit and be nervous when keepers were in

the exhibit. This is when I decided to use the super mealworms that the cranes were receiving each day to try to get the male to associate keepers with food and exhibit a calmer, more confident attitude. When I began the training, I would enter the yard with the cranes and alternately toss the cranes worms, one at a time. Relief keepers and interns would also do the training so that the male would be comfortable with any keeper that needed to go in the yard.

When training first started, the male would still flee to the corner of the exhibit and have no interest in the worms. After a few days of this behavior, I decided to try doing the training from the holding yard, thinking that the male may be more comfortable with my presence if there was a fence separating us. At first the male was still very nervous, but became interested in the worms. He would watch where the worms thrown to him would land and go over to eat them after I left the yard. Over time he got more and more confident and would come over about half way across the yard where his worms were landing. Once he was reliably coming over for his worms, I began throwing them closer to the dividing fence. It took a few months from when I started, but he became comfortable being about ten feet away from the fence during the training.

Now that the male was comfortable being in close proximity to keepers on the other side of the fence, I decided to start going in the yard with them to train. At the beginning, he was still nervous of keepers being in the yard, but would only retreat halfway across the yard and would still eat the worms tossed to him. From this point, the daily training was used to try to get him closer to keepers and more comfortable around us. After a few more months of training, the male was comfortable with keepers being about ten feet away from him. He was no longer

fleeing when keepers entered the yard, but coming closer when keepers entered to receive his worms. At this point, the male was exhibiting the behavior I wanted, so now the daily worms are used to maintain this behavior. Being able to have the cranes in close proximity and be comfortable eating mealworms from a keeper opens the door to being able to medicate them without catching them, if necessary. It also allows for new behaviors to be trained, such as shift training them to go in their barn or scale training them to give voluntary weights.

This training takes about two minutes extra a day, so it easily fits into the daily routine. In total, it took about 4-5 months for the male to exhibit the behavior I was looking for, but with the continuation of the training I am still seeing new improvements. Last spring the cranes' exhibit underwent construction and the



birds were moved to their holding yard. Even while they were in the smaller holding space, the male was comfortable with keepers being in the yard and still participated in training. I had expected him to be more nervous in that smaller yard, but there was only a small setback and he was back to where he had been in the big yard in a week or so. This spring the cranes nested, so while they were incubating training was put on hold as the female was very defensive of her nest. The day after the eggs were pulled due to being overdue, both cranes participated in training as if they had been doing it the entire time. Another thing that would set training back was handling the male. Whenever he had to be handled, it would usually take him about three days to start participating in training again. Now he participates the next day. He's even begun being the first bird over to train when it had always been the female. This quick daily training has resulted in a bird that is comfortable being near a keeper instead of fleeing to the corner and being stressed. A complete turnaround since he arrived at the aviary. 🐾



Greater Sandhill Crane. Photo Credit: Author



Training both cranes in holding yard.
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This article addresses a very simple, yet VERY common issue that trainers face all of the time. We have a new animal, or one that we are implementing a new training program with, that is fearful of us. The author has clearly identified the issue, found appropriate and enticing rewards, and set up a plan (and modified it) to set the male crane up for success. By associating their presence with a positive reinforcer, the author is building trust and making keepers an anticipated part of the routine. While this seems a straightforward concept, often keepers allow this fear/avoidance to exist. By NOT building this trusting relationship, an animal may perceive keepers as an aversive stimulus and be rewarded for going away from the trainer (Negative reinforcement) OR worse, would feel trapped and continue to panic, turning the trainer into an actual punishing stimulus (Positive punishment).

It can also be helpful in these scenarios to introduce a "window of opportunity", where the animal only has a chance to receive favored rewards during a specific time frame. Keeper enters, leaves treats, and returns fifteen minutes later, when any leftover treats are removed. As animals learn they need to get treats in the window, the period is shortened a few minutes at a time. Then trainers work towards being able to be in visual range, yet distant enough not to trigger a flight response, just as the author illustrated. Incremental approaches are then well rewarded, and eventually with patience and perseverance you accomplish your goal as the author did.

The author also addressed regression issues that would occur when the birds were moved or caught up. Any animal is going to backslide a bit in their training periodically. Like the author, we need to be prepared for this and back up a few steps, rewarding at a lower threshold of expectation until confidence and trust return to previous levels. Great work and as always, thanks for sharing your Training Tale!

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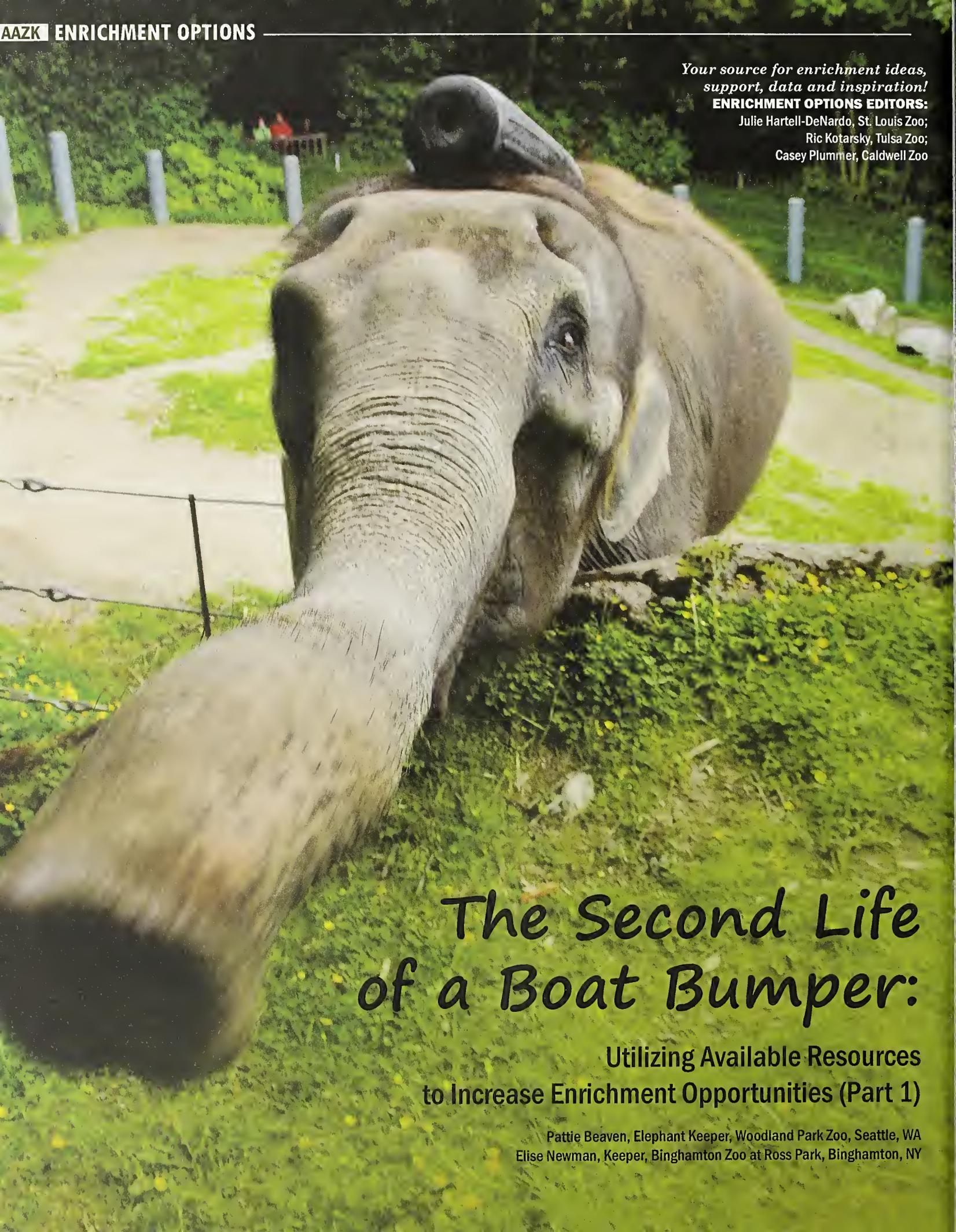
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support, data and inspiration!*

ENRICHMENT OPTIONS EDITORS:

Julie Hartell-DeNardo, St. Louis Zoo;

Ric Kotarsky, Tulsa Zoo;

Casey Plummer, Caldwell Zoo



The Second Life of a Boat Bumper:

Utilizing Available Resources
to Increase Enrichment Opportunities (Part 1)

Pattie Beaven, Elephant Keeper, Woodland Park Zoo, Seattle, WA
Elise Newman, Keeper, Binghamton Zoo at Ross Park, Binghamton, NY

One of the most challenging (and rewarding) aspects of a zoo keeper's job is developing new enrichment for her animals. This can be challenging because enrichment must be durable, efficient, and economical. Keepers tap into every conceivable resource to come up with mentally stimulating and novel items the animals will enjoy. Woodland Park Zoo's favorite resource has become the zoo community, and its keepers thrive on not only implementing ideas, but sharing them as well.

only did the manager have a couple to spare, but that in the summertime, they often receive dozens each week. Finding a new and revitalized way to keep them out of the landfill was a relief to the manager, and getting free toys for the animals was exhilarating for the zoo!

Pattie first tested the boat bumpers on Bamboo. She's the oldest and most mischievous elephant at Woodland Park Zoo. She's a good problem-solver, and she's the zoo's best product tester - if any

EEO ENRICHMENT OPTIONS



The elephants at Woodland Park Zoo have a number of EEDs that are designed to promote instinctual behaviors. One of their favorites is a boomer ball filled with treats. As many keepers know, an animal the size and strength of an elephant can be a bit destructive to toys. The boomer balls are protected however possible, but constantly purchasing more boomer balls can be costly. So, what's a zoo keeper to do? Think outside the box... or ball.

With a marine mammal background, Pattie thought back to her days of training dolphins. She would throw boat bumpers and buoys in with the 800-pound critters and play endless games with them. So, how would an 8,000-pound animal react to one?

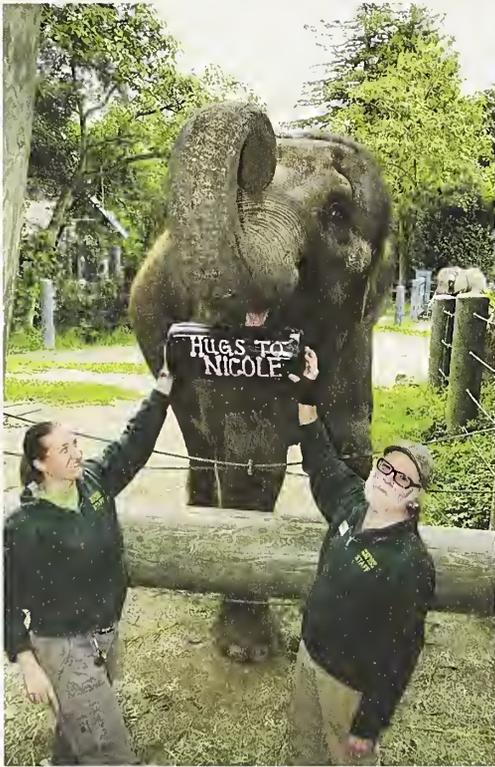
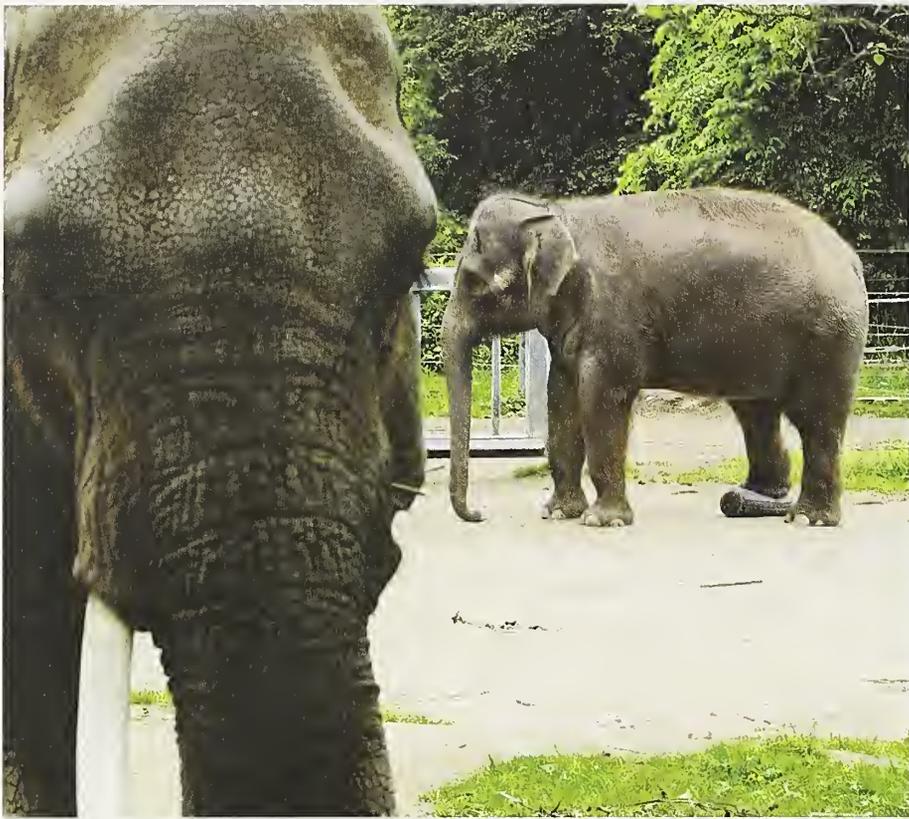
Pattie ventured to West Marine to see if she could acquire a couple of boat bumpers to test out on these playful pachyderms. Lo and behold, she discovered that not

of the girls are going to figure out how to destroy, dismantle, or break something, it's going to be Bamboo. The keepers hung a boat bumper in the barn, and put another in a container to protect it from getting squashed too soon. It didn't take Bamboo long to figure out where the hole in the bumper was located so she could get the treats out. It took a little encouragement from Pattie for Bamboo to notice the hanging bumper, but once she realized it held treats it was "game on." she batted it non-stop until she was certain every morsel was out.

Next in line was Chai. Chai was so intrigued by the texture of the bumper, she pulled it out of the protective device so she could rub her mouth and trunk all over it. Keepers started hanging the bumpers lower, and Chai would drain them of their treats and then continue to rub the toy with her trunk and along her jaw. After a little hesitation on Pattie's end (in fear

Chai would completely destroy it within seconds), she finally caved and gave Chai the whole boat bumper, without a hole drilled or treats inside. Pattie was certain Chai wouldn't want anything to do with it, but she was wrong. Chai stepped on it, and tried to pop it in her mouth, and then started tossing it in

Finding a new and revitalized way to keep them out of the landfill was a relief to the manager, and getting free toys for the animals was exhilarating for the zoo!



the air. She started playing with Pattie, handing Pattie the bumper with her trunk and darting after it when Pattie threw it back. Chai seems very attached to the boat bumpers, and they are definitely a favorite item. Watching her play with these toys is enjoyable for everyone.

Even though Chai loves the boat bumpers, it seems Watoto is convinced they are out to get her, and she must assert her dominance over each new toy. When the keepers first hung the bumpers for Watoto, she tusked them over and over. Only when treats dropped out onto the floor did she stop suddenly, as if to say "Oh, treats!" When she sees a boat bumper hanging in the corner as she enters the barn, her ears go out, her head goes up, and her pace quickens. But, these bumpers aren't her enemy; she may assert her dominance over them, but in Pattie's two years working with these girls, she has never seen Watoto as playful with an object as she is with the boat bumpers.

Since the bumpers were such a hit with the elephants, the keepers began experimenting with different ways to utilize them. They hung them vertically and horizontally. They squished them into feed barrels and other enrichment devices. They played around with placement of the hole in each boat bumper, putting some in the center and

others on the very ends. They received many different shapes and sizes of bumpers, so they had variety and novelty within their stash of devices.

The bumpers are mobile so they can be used anywhere, and they are adaptable, so they can be used often. The elephants pull and toss them like they would with logs and branches in their natural environments. More importantly, the bumpers encourage playful behavior in older animals. These boat bumpers keep the elephants mentally stimulated, but they have done more than Pattie ever imagined.

After seeing the elephant department's success, other units at Woodland Park Zoo have shown interest in trying them with their animals. If these devices withstand being stomped, crunched, flung, and squashed by elephants, they should survive abuse by other animals. The Family Farm has requested some boat fenders for their goats and donkey. A couple of boat bumpers were also given to the zoo's geriatric tiger. There has also been interest in using them for tapirs, warty pigs, anoa, keas, and macropods.

This was an exciting breakthrough for Pattie. As a zoo keeper she loves finding something that interests and appropriately challenges her animals, and after discovering the boat bumpers'

potential with other animals, she decided to share this idea with the zoo community at large. At the 2012 AAZK National Conference in Syracuse, she made a presentation on reusing everyday items as enrichment for elephants.

(to be continued next month)

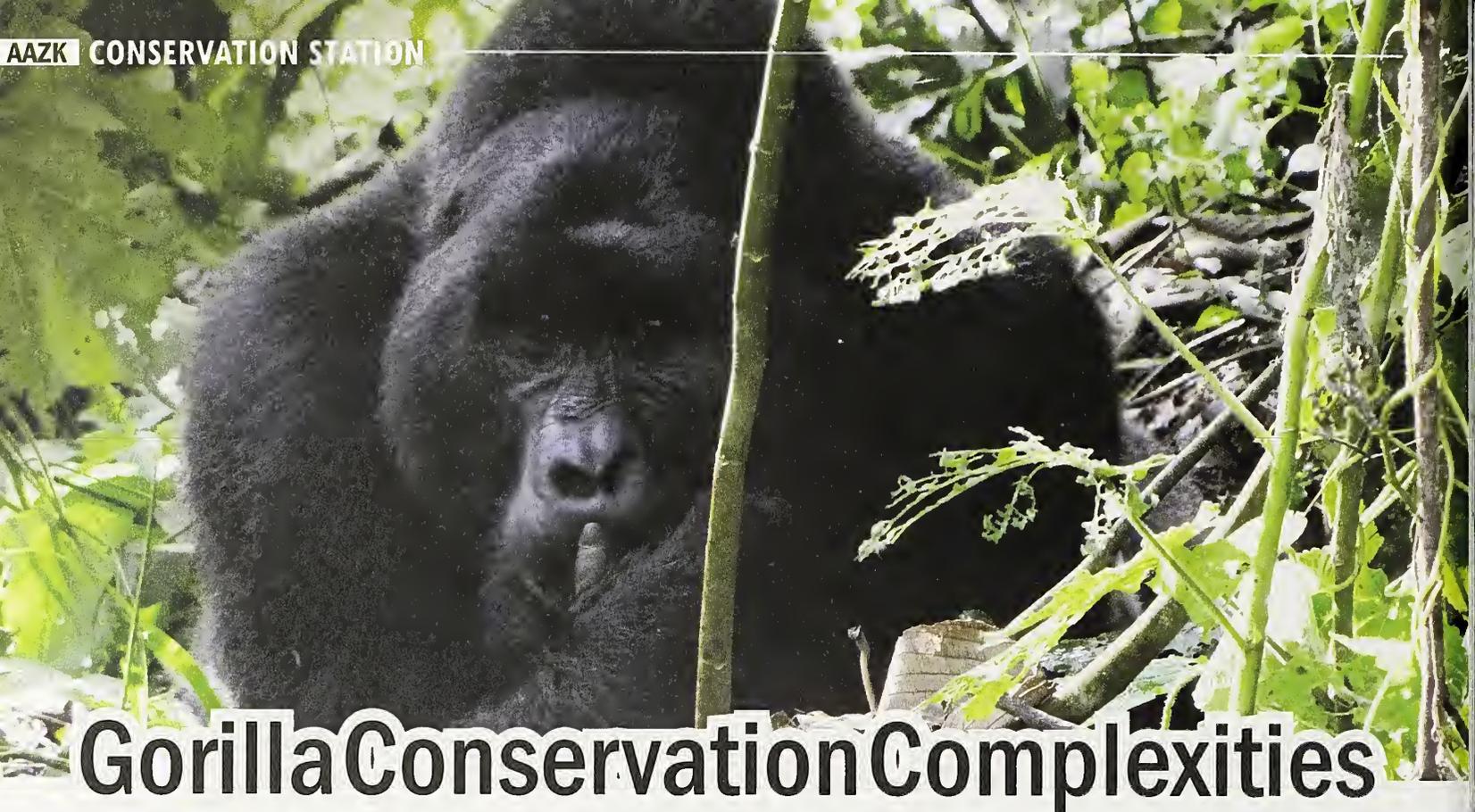
EO Editor's Comments by Julie Hartell-DeNardo:

Be sure to check out next months Enrichment Options Column for Part 2 of this great article. You'll find out how Pattie's conference presentation not only facilitated professional networking and making new zoological contacts but also created the opportunity for her boat bumper idea to enrich many more diverse species and animals all the way on the other side of the country. Elise from the Binghamton Zoo at Ross Park will share how she was able to implement and expand on versatility of Pattie's idea at her institution. More information and fantastic photos next month.



"OH, TREATS!"





Gorilla Conservation Complexities

In the interest of complete transparency I feel it important to mention upfront that I am not a gorilla expert. In fact, I don't even work directly with gorillas. However, because of my job I have been able to work on conservation education projects with two great gorilla researchers—Dr. Richard Bergl at the North Carolina Zoo, who has devoted his career to the plight of the Cross River gorilla and Dr. Martha Robbins at the Max Planck Institute for Evolutionary Anthropology, who has devoted her career to the world's last remaining Mountain gorillas.

For the past four years I have worked for the North Carolina Zoo's UNITE for the Environment Program (UNITE) in Uganda. I work with devoted colleagues and community members to protect chimpanzees in Kibale National Park through a conservation education program that targets teachers and students. It's comprehensive, it's thorough and it focuses on communities around the park. Someday, we hope to one day work in gorilla territory, until then, we work with our partners who do. Partners like the Max Planck Institute, who we work with on the Great Ape Education Project, designed to use great ape films shot on location in Uganda to teach students about the importance of gorillas and chimpanzees. For the past two years, I have had the incredible good fortune to be able to learn more about gorillas at the Gorillas Across Africa Workshops held in Ruhija, Uganda and Musanze, Rwanda respectively. It has been at these workshops where I have learned about the four subspecies of gorillas (Figure 1), the delicacy involved in gorilla conservation and the great lengths that gorilla researchers and conservationists go to in order to ensure viable gorilla populations remain.

Gorilla conservation is complex—the obstacles facing gorillas in Africa are enormous. Habitat loss and the bushmeat trade/snaring are probably two of the greatest conservation issues for gorillas, but the drivers behind them are many.

Habitat loss is an easy answer for many to recite when explaining

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Bigodi, Kamwenge District, Uganda*

why we are losing so many gorillas. In the past 20 years Cross River gorillas have lost nearly 60% of suitable environmental conditions, Grauer's gorillas 52% and Western lowland gorillas 32%. It's not all doom and gloom though, Mountain gorillas have not lost any habitat loss in the past 20 years. Habitat loss is what many Americans can relate to but the "why" of habitat loss is what becomes increasingly difficult to explain. Gorillas are found in ten African nations—most of whose population live on less than a dollar a day. In the face of such poverty many communities believe they have no option other than to degrade the environment through subsistence farming, logging for commercial use, disposing of waste (there aren't many recycling programs here!), mining for minerals and more. In some cases, these communities may actually not have other options. But in many more instances there are options available that they are unaware of due to communication issues or lack of collaboration between NGOs and government offices there to help.

Then there is the bushmeat trade and poaching which are closely linked. Without money to purchase more sustainable and healthy meat, some community members poach. In West and Central Africa it tends to be done with guns and in East Africa with spears and snares. Culturally, some people do eat primates, but many do not and gorillas become a by-product of snaring for antelope, buffalo and elephant. Some poaching is done for personal use, to provide the poachers family with a protein source. Some poaching is done to meet the demand in cities and abroad for bushmeat and trophies such as hides and skulls. There are the hidden costs of bushmeat as well—it isn't just the loss of gorillas and other species, it's the potential illnesses and diseases people can contract from eating gorillas.

Political instability is another cause for concern. The most obvious case for this is the Democratic Republic of Congo (DRC) where both the Grauer's and Mountain gorilla are found. The country has been wracked by intermittent war for over 20 years which has resulted in the inability of conservationists to monitor the gorillas during especially violent times, pillaging of natural resources and the demand for food by soldiers and rebel groups that results in poaching as well as deforestation for agriculture uses. I met a Congolese gorilla researcher/conservationist a few years ago who referred to gorilla conservation as "adaptive management", in the sense that he and his colleagues had to adapt to whichever political party or rebel group they happened to find themselves working alongside.

Within the realm of politics, corruption is also a problem. Many of the countries in which gorillas are found have become corrupt after many years of poor leadership. In the presence of corruption, police forces, wildlife authorities and even NGOs often have very few resources with which to enforce laws (if there are laws) that protect gorillas. It can also be very dangerous for these individuals to enforce laws.

Lack of education exacerbates the already huge problem. With high levels of poverty many children, especially girls, are forced to drop out of school at an early age to work on farms or in mines or to poach. Without an education these children are less likely to make good, informed choices regarding environmental issues. Even with people who have completed their education they may not understand the importance of conserving gorillas and often this is where conservation organizations and governments fail:

between 2006 and 2011, Mountain gorilla numbers in Bwindi Impenetrable National Park in Uganda, increased from 302 to 400 individuals. When describing gorilla conservation in terms of the political situation in the DRC, one Congolese staff member of the International Gorilla Conservation Program (IGCP) said, "The next for us is the hope. The peace will come." If conservationists working in the DRC have hope, how can the rest of us not?

How does one turn this hope into action from a world away? Find an area within gorilla conservation that you are interested in and explore the opportunities available to you. If education is something you feel passionate about collaborate with an organization like UNITE or Art of Conservation in Rwanda—you can arrange Skype calls or pen pals between US and African students or help build schools to draw attention to the plight of the gorillas. If you are interested in the poverty component of gorilla conservation you can contact organizations like IGCP who work with local communities to encourage alternative income generating projects. If you are you a skilled veterinarian—donate your energy to the Mountain Gorilla Veterinarian Program (MGVP), which operates in all three Mountain gorilla countries. If the political side of gorilla conservation interests you educate yourself about the mineral coltan, its use in technology and its role in the ongoing fighting in DRC. There is also fundraising—all conservation organizations and zoos need funds: the North Carolina Zoo works closely with the Wildlife Conservation Society in Cameroon and Nigeria to help protect the few remaining Cross River gorillas and in Central Africa Republic the World Wildlife Fund for Nature is working to habituate

Figure 1: Gorilla Overview

Species/Subspecies	Countries Found	Area of Habitat (Km ²)	Estimated Population Size
Eastern gorilla (<i>Gorilla beringei</i>)			
Mountain gorilla (<i>Gorilla beringei beringei</i>)	Rwanda, Uganda, Democratic Republic of Congo	700	880
Grauer's gorilla (<i>Gorilla beringei graueri</i>)	Democratic Republic of Congo	21,000	5,000 – 28,000
Western gorilla (<i>Gorilla gorilla</i>)			
Cross River gorilla (<i>Gorilla gorilla diehli</i>)	Nigeria, Cameroon	<6,0000	200 – 250
Western lowland gorilla (<i>Gorilla gorilla gorilla</i>)	Gabon, Cameroon, Equatorial Guinea, Central African Republic, Angola, Republic of Congo	445,000	<200,000

we should not be asking people to conserve the gorillas if they do not understand why it is important to do so and what benefits they will obtain from doing so.

Finally, population growth in Africa also contributes to gorilla conservation. Between cultural traditions and without access, or sometimes even knowledge of, family planning methods, families often have many, many children. Uganda has one of the highest population growth rates in the world and Rwanda has one of the highest rural population densities in the world. Higher populations result in a greater need for social services as well as land in order to make a living and feed families. This can in turn increase the number of human-wildlife conflicts in areas surrounding gorilla habitat.

This just scratches the surface of the complexities of gorilla conservation and each African country has its own specific issues that are far too great to go into detail here. While daunting, it isn't all bad news for all the gorillas. For instance,

Western lowland gorillas for tourism. You can hold a 5k or 10k Gorilla Run at your zoo, sell handicrafts from gorilla countries at your zoo store or participate in fundraising campaigns run by conservation organizations. Even looking for funds through your zoo or zoo society to come visit an organization working in a gorilla country can create a bond between you and field conservation: next Fall, a zookeeper from the North Carolina Zoo will be coming to Uganda to volunteer with UNITE. Collaboration is one of the best ways to get involved with gorilla conservation in the field—protecting the gorillas takes many approaches and a committed group of people from all over the world. Finally, do what you can to be a voice for the gorilla researchers and conservationists working on the ground. Be a voice for the gorillas.

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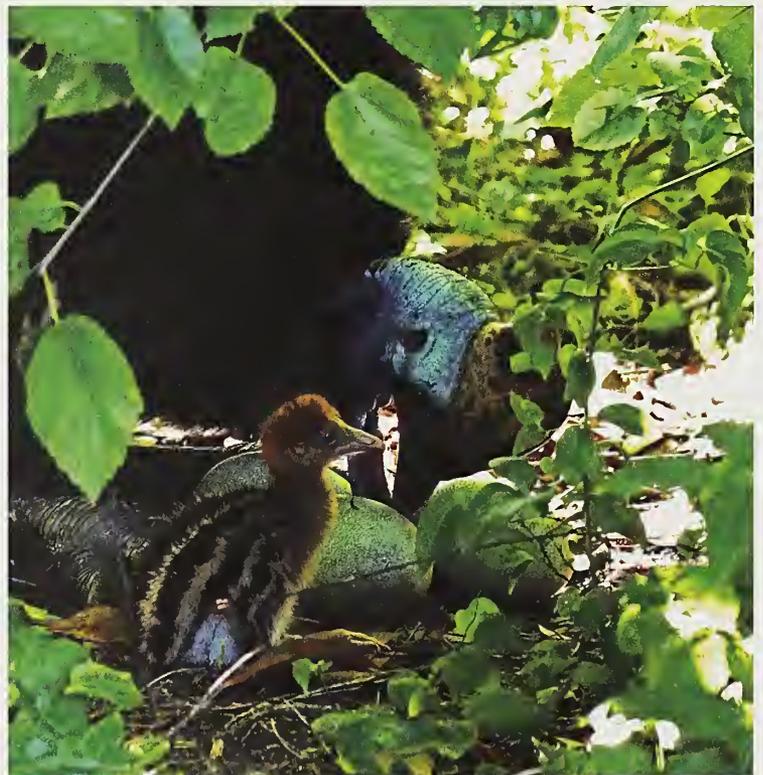
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The AAZK Administrative Office has moved to Tucson, AZ. You can find our CEO's contact information on P. 369. Barbara Manspeaker can still be reached at the AAZK Topeka Office at: aazkoffice@zk.kscoxmail.com

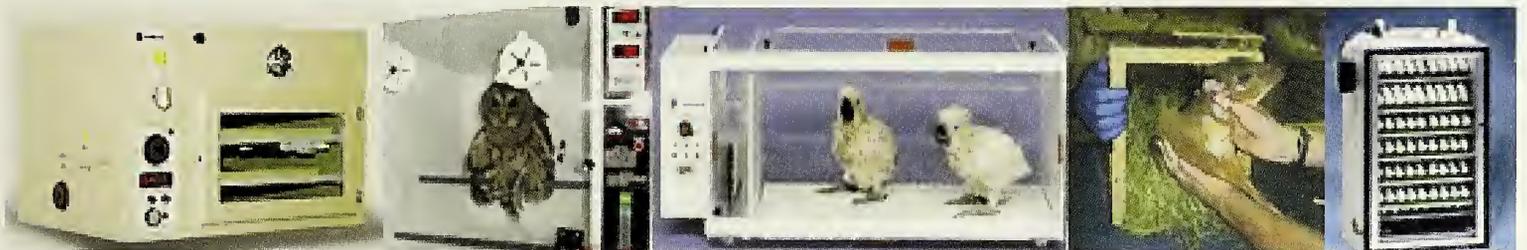


Double-wattled cassowary (*Casuarius casuarius*). Photo by Alexandra Zelazo-Kessler, Lead Keeper of Birds at the Virginia Zoo.



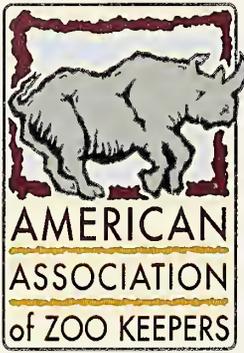
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