Evaluate your Education Programs
Using Websites to Influence Visitor Behavior
Festivals as a Conservation Tool

Educating Interns
Exploring Socio-linguistic Contexts of Children’s Learning About Great Ape Conservation
Benchmarking Education
A Note from the IZE President

Kathy Lehnhardt  
Curator of Education | Disney’s Animal Kingdom

I recently returned from the PAAZAB Conference in Africa. As President of the IZE Association, I was asked to be the keynote speaker to support the conference theme of “Learning in Zoos and Aquariums.” I found it amazing to select learning as the central focus of a major conference. This would be like AZA, EAZA or even WAZA selecting “learning” as their primary conference theme. This focus certainly elevated conservation education as a critical field in zoos and aquariums.

In my presentation, I detailed my personal journey in the field of conservation education and how it has progressed over time. For those of us who have been in the field long enough, we have seen the start-up of new education departments and the hiring of professional educators, the rise of programming that caters to our daily visitor and, of course, the dawn of evaluation of exhibits and programs. If asked, does learning occur in zoos and aquariums? I would say yes, but only if there is evaluation data to back it up. I would ask you which statement is stronger?

We reach a lot of people with our education programs.

OR

Children who take our program have shown:

• A 57% increase in their knowledge of local environmental problems.
• A 65% shift toward a more positive attitude toward wildlife.

Clearly, the second statement is stronger with the inclusion of measured statistics. It “proves” that we have evaluated participants to our program and demonstrated that learning occurred.

The PAAZAB conference theme was selected by Dr. Cliff Nxomani, Director of the National Zoo in Pretoria and his committee members. For those who know him, Dr. Nxomani is quite a forward thinker and truly dedicated to promoting education in his facility and across Africa. He selected this theme, not without some resistance, because he wanted to move African zoos and aquariums forward as educational institutions. The line-up of speakers for the plenary sessions included professional educators from several African institutions, Kirsten Ellenbogen, President of the Visitor’s Studies Association and Evaluator at the Science Museum of Minnesota, and Ian Signer, International Trainer and Curriculum Specialist. These professionals truly demonstrated the depth of knowledge and understanding in our field. We need all these players—professional educators, evaluators and trainers—to ensure that learning happens.

One of the goals of the conference was to plant the seed of a multi-institutional project that uses evaluation as a tool to determine learning across African institutions. I wish them great success in this endeavor and look forward to publishing some of their findings in a future IZE Journal.

I am grateful to Dr. Nxomani for taking the risk to promote education and evaluation as a conference theme and I can only hope that other conference leaders in the future will follow in his footsteps.

Editorial

Loran Wlodarski  
Science Writer | SeaWorld Orlando

I cannot possibly express how honored I am to have been selected as the new IZE Editor. But as the saying goes, everything old is new again.

If you’ve been with IZE for a while now, you just might recognize this “blast from the past”...

Back in 1999, I designed, formatted and printed the IZE Newsletter—it was one of the earliest jobs I ever did as Science Writer for SeaWorld Orlando. Now, many years later, I’m back!

A lot has changed in that time but one thing hasn’t—the high educational value and quality of IZE articles, like the ones found in the 2011 IZE Journal.

I am excited to begin work again on the 2012 IZE Journal, so I look forward to reviewing articles for next year’s edition. Please begin considering your new article ideas and don’t hesitate to write with any questions or comments you may have.
Contents

2 A Note from the IZE President

3 Contents

4 10 Pain-free Ways to Evaluate Your Education Program

7 Educational Use of Elephant Dung

10 Exploring Socio-linguistic Contexts of Children’s Learning About Great Ape Conservation in a Zoo

16 Towards a Hand Print Zoo and Aquarium

24 Educating Interns

30 International Zoo Educators 21st Biennial Conference

32 Raising Awareness is a Walk in the Park

35 Benchmarking Education

38 Using Websites to Influence Visitor Behavior

42 Festivals as a Conservation Tool

46 Developing an In Situ Conservation Education Program in Rwanda

Mission
The IZE is an association dedicated to expanding the educational impact of zoos and aquariums worldwide. Its mission is to improve the education programs in the facilities of its members and to provide access to the latest thinking, techniques and information in conservation education. The Journal is a medium for promoting the IZE mission and highlighting conservation education trends, initiatives efforts and achievements of IZE members.

Subscriptions and Internet Access
This journal is made available online three months after publication. IZE members automatically receive a copy. Visit IZA.net for membership information and journal subscription.

Copyright
All copyright for material appearing in the IZE Journal belongs to the IZE and/or the individual contributors. No part of this journal may be reproduced without the written consent of the relevant author(s), photographer(s) and the IZE Editor. Text extracts of not more than 50 words may be used for quotation purposes, without prior permission, but the author, the journal name and the date of publication must be duly acknowledged.

Submissions
We all know we should evaluate our programs to improve visitor experience and to show our colleagues, management and funders how effective we are. But evaluation is often avoided or tacked on at the end because it is so unappealing. In 2010, Bristol Zoo’s education staff experimented with a variety of quantitative and qualitative evaluation methods. These methods were used to measure the success of “All Creatures Great and Small,” a temporary education program designed to celebrate the International Year of Biodiversity. Education staff met frequently throughout the program’s duration to share their experiences of using these methods. Here are the ten methods we trialled, with their advantages and disadvantages:

**QUALITATIVE METHODS**

1. ‘Post-it’ Notes
   - Ask visitors to write ideas in response to a question on a ‘Post-it’ note and add it to a display.
   - **Strengths:** Non-invasive. Instant feedback. Visitors contribute to the exhibition.
   - **Weaknesses:** Visitors may be influenced by previous comments. Offensive comments may be posted. Can be difficult to analyze.

2. Meaning Maps
   - Ask visitors to add ideas to a word or phrase to complete their own personal map.
   - **Strengths:** Ideal for pre- and post-program evaluation. Can measure extent, breadth and depth of understanding.
   - **Weaknesses:** Heavy burden for visitors. Analysis can be time consuming and difficult.

**3. Pre-program personal meaning map.**
3. Email Feedback
Invite visitors to send photos and accounts of conservation action after a park visit.

**Strengths:** Unique, personal accounts. Evidence of behavior change. Low effort for staff.

**Weaknesses:** Low return rate. Incentive (e.g. prize) usually needed. IT skills and hardware required. Permission required to use photos. Slow feedback.

4. Comment Book
Invite visitors to write their ideas with a focused question written at the top of each page.

**Strengths:** Non-invasive. Interesting for visitors to read comments. Not time-consuming. Quick feedback.

**Weaknesses:** Less attractive method to visitors. Response rate may be low. Visitors may copy other people’s comments. Offensive/unrelated comments may be posted.

5. Comment Cards
Encourage visitors to write comments on paper and place written views into a box.

**Strengths:** Not time-consuming. Non-invasive. Comments can be kept anonymous.

**Weaknesses:** Rate of response may be low. Dedicated space needed for box and cards.

Visitor using comment card.

6. Stickers
Give visitor a sticker to place on faces with different expressions that match how they feel about the program.

**Strengths:** Attractive for visitors. Easy to segment visitors with different color stickers. Quick feedback.

**Weaknesses:** Visitors influenced by previously placed stickers.

Visitor using sticker placement evaluation.

7. Pre- & Post-Questionnaires
Ask visitors a series of questions before or after a program.

**Strengths:** Collects large amounts of data. Recognizable format. Low burden if short and closed questions. Scope to collect a range of responses; from visitor understanding to enjoyment.

**Weaknesses:** Piloting is required. A valid and reliable questionnaire takes time and skill. Disrupts visitor experience. Visitors feel tested. Analysis of open-ended questions takes time. Not ideal for measuring behaviors.

8. Uptake
Calculate visitor percentage taking part in activity using counts; numbers of visitors, trail cards used, stickers claimed.

**Strengths:** Easy to obtain numbers and do the calculations. Quick.

**Weaknesses:** Validity may be low as not all visitors picking up educational resources use them. Resources need frequent monitoring and ‘topping up’.

Scratch card for the biodiversity trail.
Conclusion

Most methods are cheap, easy to prepare, carry out and interpret and are simple to integrate into everyday activities. Three different methods used together form a composite picture of visitor responses. This ‘methodological triangulation’ works best when you select three methods appropriate to your unique program.

Author Contact: Claudy Fox | cfox@bristolzoo.org.uk


Educational Use of Elephant Dung
A surprising tool for conservation education

by Jens Frederik Broch | Educator | Copenhagen Zoo | Denmark

Animal droppings may not be the first choice for a teaching material, but elephant dung has excellent qualities that make it suitable for creating fun, interactive activities. Elephant dung is practically odorless and safe to handle, once it has dried outdoors for a few days, and the rich content of energy and undigested fibers makes it ideal for a wide range of purposes. Copenhagen Zoo has had with “fun with dung” since the opening of our new elephant house in 2008. Here’s how:

Dung Detectives
To determine if elephants are in estrus, Copenhagen Zoo keepers collect and send off dung for analysis. Each female is given seeds in their morning feed (wheat, maize, oat or barley). Due to the relatively inefficient digestion of elephants, the seeds pass intact through their digestion system—dung can thusly be connected to an individual elephant by examining what type of seed it contains.

With zero expenses you can utilize elephant dung to create a workshop where kids can test their detective skills and incorporate learning about elephant feeding and digestion! Simply supply visitors with rubber gloves and let them have fun with the detective work of identifying the elephant dung.
Dung Paper

Elephant dung is full of undigested plant fibers and is an excellent substrate for paper production. Zoo staff prepare pulp in advance by boiling and blending the dung. At the workshop, guests are guided on how to sieve and press the dung into paper. After three minutes in a microwave oven, guests create their very own piece of homemade dung paper. Paper production is an excellent forum for learning a concrete method of recycling, as well as discussing the special dietary needs of megaherbivores.

The inexpensive but popular workshop allows guests to make and own a unique product. Outside the park, the story continues since kids show the paper to friends and family and even bring it to school for show and tell.

Dung Fire

Dry elephant dung is excellent firewood and a dung fire provides a spectacular beacon for a workshop. We let our guests prepare popcorn or pancakes over the fire, while we have a talk about why elephant dung is such an efficient fuel.
Biogas

Elephant dung works nicely as a biogas substrate. Even though your zoo may not have a large-scale biogas facility, you can still teach about recycling and methane production by creating a functional miniature biogas plant.

At Copenhagen Zoo, we’ve built a cheap, simple and functional miniature biogas plant, largely made of glass, so that guests can investigate the process at close hand. Education officers give demonstrations where children can learn about the biogas idea and see the actual use of it as we burn small quantities of methane at the end of each program in order to demonstrate the potency of methane as an energy source.

Get Started!

Combine hands-on experiences with fun items guests can take home and you are on your way to creating a successful workshop! Elephants provide an inexhaustible supply of a material that’s well suited for a wide range of activities. With minimal expense, guests learn about the feeding and digestion of megaherbivores and much more—plus, you will get them involved in recycling and production of paper and biogas.

Start your own unforgettable conservation program with the simple tools discussed here and give your guests a look behind the world of elephants like they’ve never seen before!

Author Contact: Jens Frederik Broch | jfb@zoo.dk
Exploring Socio-linguistic Contexts of Children’s Learning About Great Ape Conservation in a Zoo

through interpretation and displays, zoos and aquariums aim to educate visitors of all ages and to raise general awareness of conservation issues

Theory suggests that learning is a complex socio-linguistic process involving many contexts and tools. Using a multi-level methodology to explore learning contexts and tools in great ape conservation education, we found that zoos can empower adults with social and linguistic means to mediate conservation topics to children.

Theoretical Framework

The Contextual Model of Learning (CML) is presented within the field of informal science education as a theoretical construct for investigating learning within free-choice settings (Falk and Storksdieck, 2005). CML describes learning as a complex social process situated within three interacting contexts: the personal, the physical and the social. The personal context includes what a person carries into a learning situation, e.g. prior knowledge and ideas about learning. The physical context involves the environment that affects learning, e.g. the architectural design, climate, exhibitions and labeling. Finally, the social context captures myriad ways in which visitors are affected by interactions and collaborations with others, such as other members of their social group or zoo or aquarium staff members.

This model demonstrates learning as a product of the interaction between an individual’s personal, physical and social contexts over time.
Importantly, children’s learning involves mediated assistance in order to facilitate the internalization of physical and cognitive tools. The mediation takes place in the form of proximal development where children engage with parents, teachers and more capable peers (Vygotsky, 1978). In a free-choice, informal setting, children learn through social relationships facilitated by their company (typically parents) and guides. Physical and cognitive tools are important learning aids. Learning how to use instruments or other physical aids, and learning new concepts, themes, structures of argumentation and semantic innovations, are crucial to children’s cognitive development (Shepardson, 1999; Vygotsky, 1930). We therefore propose including such factors in the CML list.

### Methods and Materials

Inspired by the CML as well as the Vygotskian perspective on socio-linguistic learning, we designed a multilevel, mixed methodology for investigating visitors’ learning about the scientific idea of animal conservation at Colchester Zoo in Essex. Colchester is one of Britain’s, indeed Europe’s most recognized zoos, partly due to its commitment to conservation and education. Colchester is not only dedicated to assisting a wide variety of conservation projects worldwide, but also to education, research and the provision of financial and technical assistance to conservationists through Action for the Wild, its charitable arm. We chose to limit our investigation to the great ape conservation interpretation and displays in the zoo. We also made a choice to study families visiting Colchester Zoo with children.

Our research methodology is inspired by Falk and Storksdieck (2005), with the addition of particular attention to socio-linguistic mediation within the group and by other outside the group. The method includes:

**Contextual Model of Learning**

The Contextual Model of Learning (CML) provides a large-scale framework for conceptualizing learning, but also includes 12 key factors (Falk and Storksdieck, 2005). Each potentially shapes the learning process in free-choice, informal settings:

#### Personal Context

1. Visitor motivation and expectations
2. Prior knowledge
3. Prior experiences
4. Prior interests
5. Choice and control

#### Social Context

6. Within group mediation
7. Mediation by others outside the immediate social group

#### Physical Context

8. Advance organizers
9. Orientation to the physical space
10. Architecture and large-scale environment
11. Design and exposure to exhibits and programs
12. Subsequent reinforcing events and experiences outside the facility

Inspired by Vygotsky’s learning theory, we propose adding two factors:

13. Physical instruments
14. Cognitive tools
The pre-interviews were designed to probe the visitors’ knowledge about the great apes and their views on social learning processes. We asked one adult per family to do a PMM session on great ape conservation and to answer three multiple-choice questions about the great apes. In addition, the respondents rated on a six-point Likert scale statements about their general knowledge of biology, their impact as a parent on their children’s learning and the reasons for their visit to Colchester Zoo. In the post-interview, the respondents were provided with the option to modify their responses to the multiple-choice questions and the PMM. Finally, they were asked to rate on a six-point Likert scale statements about display visibility and readability, their level of interactions with staff and the extent to which they explained to their children about the endangered orangutans and chimpanzees.

Results

The research was conducted for four months and involved 56 respondents/families. The most encouraging result was that our respondents did exhibit learning about great ape conservation issues. We found that the proportion of correct answers to the multiple-choice questions about great apes rose from about 50% in the pre-interviews to more than two-thirds in the post-interviews.

Learning was highly specific to the information provided by the Zoo. For example, our third question mentioned the European Endangered Species Breeding Program, which coordinates species breeding between European zoos. In the post-interview, 53 respondents indicated knowledge about the program compared to 28 in the pre-interview. The increase in correct answers to our two questions about the biggest threat to the habitats of orangutans and the percentage of shared DNA between humans and the great apes was somewhat less, around 50 percent.
The PMMs indicated that most respondents also learned about great ape conservation issues from their visit. In general, respondents who exhibited learning on the multiple-choice questions did not seem to learn as much from the PMM exercise as other respondents. In other words, the 26 respondents who gave all the correct answers to the multiple-choice questions in the pre-interview were the only ones to exhibit PMM learning.

We tracked visitors throughout the course of their visit to observe what they did, how they interacted with family/group members and educational staff and how much time they spent at the two exhibits. We found that high scores in the multiple-choice questions and the PMM exercise were positively related to the length of visit: the higher the score, the longer time spent viewing the displays and studying the animals. We also observed that adults visited most displays (although the displays on conservation were among the least visited), spending a total on average of one and half minute on displays. Most families (about two-thirds) interacted with the educational staff at the exhibits.

To learn about the visitors’ conversations, we made every effort to get as close as possible without obstructing their free-choice visit. In particular, we were interested in finding out if parents discussed displays and exhibits with their children, and in what ways. The pre-interviews showed us that most agree with the statement that they, as parent or accompanying adult, have an impact on their children’s learning about great ape conservation.

Colchester Zoo’s new orangutan exhibit.
We observed that parents mostly used exhibits to encourage children to think about the great apes’ daily life. For example, we heard parents saying: “Look, the orangutans have carrots and broccoli for dinner, just like you.”

Children, for their part, noticed the concrete behavior of the great apes: “they’re eating,” “they’re playing” or “they’re sleeping.”

In post-interviews, we noted that all families agreed with the statement that interventions by staff encourage conversation and social interactions among family members. Most wanted more staff interaction: educational presentations and question-sessions with the keepers, as well as general guidance and storytelling about the animals in the exhibits.

**Discussion**

Prior investigations using the CML framework have indicated that factors within the personal, social and physical contexts all influence individual learning outcomes and that no single factor emerges as capable of explaining learning outcomes across all visitors (Falk and Storksdieck, 2005). Our research was based on the idea that the CML is a valuable framework for inquiries into families’ learning in a zoological park or aquarium setting.

We particularly stressed the need to add physical and cognitive learning tools to the factors that constitute the three contexts of learning. Vygotskian socio-cultural learning theory, which basically supports the idea that learning is contextually situated, provides theoretical support for the inclusion of tools, such as languages, into the model.

Despite an improved learning outcome on great ape conservation amongst adult respondents, our results suggest that parents did not share the knowledge that they had acquired with their children. Even though most respondents readily agreed that parent mediation is important to children’s learning in a zoo, they failed to live up to their own expectations. Or, rather, that is one explanation. Based on our field observations, we tend to attribute their somewhat counter-intuitive behavior to the fact that most parents find it difficult to conceptualize zoo conservation information to their children.

The park’s displays frame the topic of great ape conservation in terms of “habitat destruction”, “tree management”, “bush-meat”, “fair trade organizations” and “endangered species breeding programs.” Children, as well as adults talking to children about the great apes, took an immediate interest in the animals, their behavior and lives. Parents appear to be well aware that their children lack the socio-linguistic resources to cope with conservation issues in the way they are presented by Colchester Zoo and its educators.

**Conclusion**

The concept of scaffolding might be useful to understand the differentiated learning outcomes of families. Usually affiliated with Vygotskian learning theory, scaffolding refers to the way in which the learning process of children gradually proceeds via focused and positive interaction with adults. The scaffold is the physical and cognitive means by which the learner is able to “climb” the ladder of learning.

The children we observed simply had no scaffold for understanding great ape conservation. Their parents were unable to provide it, although they did exhibit learning from the visit. One of the reasons might be that the Zoo’s scaffolding assumes a higher level of learning. The latter claim is supported by the fact that the adult respondents who gave the correct answers to the pre-interview multiple-choice questions also exhibited the greatest learning outcome in the PMM exercise. They were the ones to benefit the most from the scaffolding provided by Colchester Zoo.
Our findings suggest that the cognitive level of the Zoo’s education effort is best suited for adults already knowledgeable about great ape conservation. In order to provide scaffolding for less informed adults and children, parks such as Colchester Zoo might simply begin altering the wording of its interpretation and displays, or lowering the scaffold so to speak. This could be done by changing the conservation messages to target children in such a way that their parents are able to act as active mediators of learning—something for which they appear to be highly motivated. Another idea is to make use of physical tools of learning. After the completion of this study, Colchester Zoo opened a new orangutan exhibit to its visitors (see photo spread to the right). One attraction proved very appealing to children; the donation machine. The machine allows children and adults to choose between ways in which to donate funds for the conservation of orangutans in Borneo. Using images to convey the dangers of extinction faced by orangutans, the machine not only provides simple messages about conservation but also facilitates social interactions and discussion among children and adults.

Acknowledgements
We would like to thank Colchester Zoo for helping Julie Louise Hørberg Kristensen in doing visitor research. Kristian H. Nielsen supervised Julie’s research and assisted in the writing of this article.

Author Contact: Julie Louise Hørberg Kristensen | julievonsuper@hotmail.com

REFERENCES
Towards a Hand Print Zoo and Aquarium

increase your Hand Print, decrease your footprint

by Kartikeya V. Sarabhai | Director | Centre for Environment Education | India and
Meena Nareshwar | Program Coordinator, Zoo Education and Interpretation Programs | Centre for Environment Education | India

“The best one can get with a footprint is no impact at all. The potential of a Hand Print is unlimited.”

John Biemer

Hand Print™
Action Towards Sustainability

In the 21st century, it is important to develop the educational role of zoos and aquariums so as to have an active, direct impact upon people’s attitudes and behavior. In this way, awareness will be converted into action that has positive benefits for wildlife, people and conservation.

What is an Ecological Hand Print?
An ecological footprint describes the impact you have on the planet, both positive and negative. An ecological Hand Print represents only the positive impact. The ecological Hand Print is a person’s contribution towards a sustainable future. It describes the good one has done for the world.

Today there is an urgent need to reduce our ecological footprints and a critical need to alter lifestyles and development models to ensure a sustainable future. Choices made now can shape opportunities for a better tomorrow and potentially change the lives of generations to come.

There is a definite need for positive action. The concept of a Hand Print is to decrease negative human footprints by taking more action towards education for sustainable development. According to the Hand Print concept, we need to shrink our ecological footprint so that it will have no negative impact on the environment. Plus, we need to start healing the planet, transforming our ecological footprints into ecological Hand Prints to increase the good we do for our world.
The Hand Print tool, developed by the Centre for Environmental Education (CEE), is an action and solution oriented tool designed for today’s and tomorrow’s leaders of sustainability. The Hand Print tool focuses on one’s positive impact and options to improve the condition of life on our planet rather than on the damage done by human activity. Thus, the Hand Print aims at seeding optimism and motivation. The application will help to evaluate one’s Hand Print including actions from daily behavior to global influence towards a sustainable future. The tool will also help improve one’s Hand Print by suggesting actions and linking one to organizations offering additional advice and cooperative options.

The Hand Print concept was launched by CEE at the 4th International Environment Education Conference held at Ahmedabad, Gujarat, India in November 2007. The Conference was organized by the United Nations Educational, Scientific and Cultural Organization and the United Nations Environmental Programs in partnership with the Government of India.

The Hand Print tool, at its preliminary stage, analyses an individual’s positive impact on three aspects of sustainability: environmental, societal and economical. Seven questions cover each aspect and are used to investigate the use of resources and awareness of sustainable investments. Additional questions concern personal, family/households, institutional, community, city, state, national and world levels of action. A person calculating his or her Hand Print collects more points for the personal sustainable level than actions on city, community, national or state level. The quantitative results will calculate an individual’s action towards sustainability.

A comprehensive evaluation technique will be developed for the Hand Print tool, which will include evaluation of the Hand Print for individual, organizational, community and national levels at www.handsforchange.org/

The Hand Print for Zoos and Aquariums

Zoos in India are viewed as not exciting for adults, child-centric and a place for animal displays and inexpensive entertainment. This opinion must be altered through interesting programs and activities for all audience levels. Creative marketing and intriguing public relations strategies, concentrating on a park’s conservation and education efforts, are needed to attract new visitors. A message of sustainable zoo and aquarium practices can make an impact on visitors’ attitudes and mindsets about conservation.

Need for Strategy

Zoos and aquariums are universal, inspirational, educational and caring places to learn about wildlife and conservation. However, these places should also be about having fun! This thought goes hand-in-hand with a strategy that needs to include networking and information sharing with other organizations (for marketing and benchmarking) and increasing staff professionalism and communication skills through training. Zoos and aquariums can use the full range of media available and recognize that staff and volunteers need to be well informed so they can act as message bearers to visitors at their parks, in their homes and in their communities. Zoos and aquariums should strive to become environmentally sustainable in all their activities by evolving policies, management styles and use of resources. Facilities can celebrate and share these activities with park visitors and non-visitors alike.

CEE has proposed to weave sustainable actions generated by park programs as a Hand Print. The key publication used to promote sustainable action would be a Hand Print poster. Such a poster will highlight a variety of action messages identified in line with the overall sustainability strategy of the facility. The poster, along side human Hand Prints, will also include the “paw prints” of zoo or aquarium animals.
WANT TO MAKE A DIFFERENCE? HERE’S HOW!

The Earth provides enough to satisfy every man’s need, but not for every man’s greed”- Mahatma Gandhi

Save electricity—

Electricity produced in India is mainly generated from coal based power plants so unnecessary use of electricity would mean more CO₂ being emitted.
- Turn off lights, TV, computer when not in use.
- Computers on standby mode would consume less energy than when on. Although, each varies widely in the amount of energy they consume in the stand by and screensaver mode.
- Use Compact Fluorescent Lamps (CFLs) instead of incandescent bulbs.

Cut down on Car use---

More cars on the road would mean burning more fossil fuels, thus more GHGs. Take a bus whenever possible. Try to car pool. Walk or use a cycle whenever possible.

Use resources efficiently—

Reduce, Reuse, Recycle.
- Reuse plastic bags. Reuse paper.
- Recycle kitchen waste, it’s the best compost material.
- Reduce use of artificial light during the day.
- Carry a cloth bag instead of plastic bags.

Buy food from local markets and buy in season—

Buy food from local vegetable vendors as no packing is required. The food does not need to be transported from long distances. Food not grown locally requires a lot of energy in transportation and packaging.

Plant Trees, Save Trees---

Trees are great for absorbing GHGs and Carbon Dioxide.

Become more aware of how your actions affect the environment and spread the word.

Buy wisely and become AWARE consumers---

Think about your needs and wants. Stick to what you actually need and not want. Everything you pick off shelves has a carbon footprint. Make sure you buy products that are more environment friendly and have less carbon footprint. Buy products specifying that they do not test on animals.
Zoos and Aquariums for Sustainability

Zoos and aquariums can be important agents of change in creating a sustainable future and ensuring the conservation of species and habitats on a global scale. A zoo or aquarium’s educational resources can be used to help people understand why changes are needed and what they can do personally to live in a more sustainable manner. Here are some topics and examples of how parks and people can achieve a more sustainable lifestyle:

Energy efficiency:
- Maximizing energy efficiency in all on-site and off-site operations.
- Reducing travel-related energy consumption.
- Efficiently maximize the use of energy which is produced and distributed, especially from renewable sources.
- Apply the three R’s—reduce, reuse and recycle whenever possible.
- Conduct and maintain energy audits.

Environmentally sound waste management:
- Minimize total waste production.
- Manage separation of waste at source to encourage maximum re-use and recycling.
- Minimize the risk of polluting.

Using natural resources responsibly:
- Use products that embody the most efficient and least environmentally damaging use of renewable and non-renewable natural resources.
- Applies to major construction materials and daily consumables.
- Should apply back along the entire supply chain to the original source.
- Apply the three R’s.
- Make sure that animal acquisitions and dispositions are not only sustainable environmentally but ethically as well.

Polluters should pay the cost:
- Support the principle that polluters should not pass on to others the cost of a clean-up.
- Apply this principle in your institution as a measure of good practice.
- Put local consumption first.
- Maximize the proportion of goods and services that come from local providers with acceptable environmental practices.
- Reduce the environmental impact of transportation when feasible.

Contribute to equitable, sustainable development:
- Conduct activities that contribute to a reduction in the differences of living conditions across the world.
- Support conservation projects that embody this principle by adjusting purchasing policies and company practices.
- Obtain and analyze as much information as possible before making a decision.
- When in doubt, put in place measures to reduce environmental impact.
- Use recycled and environment friendly materials in the construction of buildings.
- Set the example for other businesses through earth-friendly practices.

Possible Hand Print poster themes:
- Waste reduction.
- Efficient energy use.
- Consuming local products.
- Encouraging public participation and awareness.
- Contributing to sustainable development and conservation.
Encourage public awareness and participation of sustainable practices:
• Use educational resources to help people understand why changes are important and what they can do personally to live in a more sustainable manner.
• Set an example for other businesses in earth-friendly operations.
• Zoos and aquariums should embrace sustainable practices in every day operations.
• Demonstrate that use of sustainable resources can be convenient, fun, inexpensive and enriching.
• Conservation educators deliver sustainable actions with visitors to emphasize how we “walk the walk” when it comes to sustainable living.
• Facilities can live up to this “green” responsibility by substantially reducing their environmental footprint in the areas of waste, carbon emissions and energy consumption.
• All staff can be part of this endeavor and can inspire others to take action.

Train staff on choosing lifestyles that are low on consumerism:
• Set up model examples of recycling like compost pits.
• Display the amount of energy being used and saved and compare with levels of energy used in the past.
• Use educational resources to help people understand why changes are important and what they can do personally to live in a more sustainable manner.

Reduce energy use
• Use and promote fuel efficient vehicles.
• Reduce or replace use of fossil fuels (coal, oil, and natural gas) in facilities—this greatly reduces the amount of carbon dioxide released into the atmosphere, thereby reducing our “carbon footprint”.

Put “green” practices to work
• Develop an Environmental and Education policy and commitment to the international standard (ISO14001).
• Design animal enclosures that are not only animal-friendly but also eco-friendly.
• Design and develop all signs using environmentally-friendly materials and including messages.
• Use energy and water saving/efficiency devices in offices and animal enclosures.
• Recycle waste generated within the park, e.g. office paper, bottles, tins, organic waste from animals and restaurant, etc.
• Declare and maintain facility as a plastic free zone.

By reducing the amount of energy we use, changing the source of our energy and simultaneously removing CO₂ from the atmosphere through carbon sequestering, we can reduce the amount of CO₂ in the atmosphere and diminish its effects on ecosystems and wildlife around the world. Together, our collective efforts can make a big difference!

Going “Green”
Going green is about making choices in our daily lives that promote a healthy planet, from what we eat to what we wear to how we get from here to there. Going green is living sustainably so that future generations can enjoy the planet as well.

Centers that serve the public, such as the education departments found at most zoos and aquariums, are in a position to teach about sustainability to a large audience in meaningful ways. Through a combination of motivation and information, green facilities try to initiate changes in the behavior of people’s everyday lives. Green facilities lead by example and must explain to visitors their sustainable activities through park signage, educational programs and website information. The goal is that visitors will learn about sustainable practices at the facility and then be able to implement them at home.
CLIMATE CHANGE WILL AFFECT EVERY ASPECT OF LIFE

“The fluttering of a butterfly’s wings can effect climate changes on the other side of the planet” - Paul Erlich

BIODIVERSITY: 30 out of 100 species are likely to go extinct. Climate change could kill more than a third of the world’s plant and animal species by 2050.

Some have been already wiped out. The first victim was the Golden Toad.

WATER: Decreasing water availability. This will lead to irrigation problems and increasing droughts in areas like India, China, Australia, South America, Africa.

FOOD: Agriculture is dependent on water. Climate change will impact water more strongly decreasing the food availability. Cereal productivity will decrease in some regions.

HEALTH: Increasing rate of malnutrition and diarrhoeal and infectious diseases like malaria, cholera, bird flu. Increased number of deaths due to heat waves, floods and droughts.

COASTS: There will be more powerful floods and storms. A number of global wetlands could be lost. Ice caps are melting and as a result sea levels are also rising. The oceans will get warmer, its water will expand and sea level will rise. Places like Maldives, Bangladesh, Indonesia, Netherlands will need its large populations to be evacuated due to flooding or submersion of the entire islands.

There has been a rise of 0.4°C over the last 35 years. If the temperatures continue to rise at this rate then it is predicted that it will rise by about 1-3.5°C by 2100.
“Climate is what you expect, weather is what you get”

Climate tells us what it’s usually like in any place you live. Weather can change over a short time, it could be sunny for an hour and then it might rain.

Climate Change is something we have been hearing quite often lately!

Climate Change is natural. Earth’s climate has been changing. Scientists say human beings that are responsible for this current change in climate.

Climate Change is due to global warming. How fast the Earth is warming is still not known, but there has been a considerable warming over the years. About 0.4°C of this warming occurred in the last 35 years.

Small variations in temperature could have big impacts. Every aspect of life on Earth will be affected directly or indirectly by this warming.

The Greenhouse Effect, what is that?

Greenhouse gases like carbon dioxide (CO₂), methane (CH₄), nitrogen oxide (N₂O) present in the atmosphere absorb some of the sunlight and trap the heat near the Earth’s surface, so that the Earth is warm enough for life to exist; without this the Earth would be freezing cold. This natural mechanism is known as the Greenhouse Effect and this causes global warming.

Global Warming

As the quantity of GHGs increases in the atmosphere, more heat is retained on the Earth’s surface resulting in the increase in the earth’s average temperature. This phenomenon is known as Global Warming.

All of us contribute to global warming by sending out GHGs. Do you know when? Whenever you...

- Watch TV
- Use the Air Conditioner
- Turn on a Light
- Use a Hair Dryer
- Ride in a Car
- Play a Video Game
- Listen to a Stereo
- Wash or Dry Clothes
- Use a Dish Washer
- Microwave a Meal

Green House Gases (GHGs)
- CO₂ Using fossil fuels, burning biomass
- CH₄ Rice fields, livestock
- N₂O Farming, industrial activities

If you picture the Earth as a soccer ball, the bulk of atmosphere would be no thicker than a sheet of paper wrapped around that ball. The amount of carbon dioxide we add to this thin layer is about 2600000000000 kg (26 billion metric tones per year)!

This would mean that each of us is adding more than 4000 kg (4 metric tones) per year to this shallow atmosphere!
Social Responsibility

“Zoos and aquariums can play a critical role in moving the communities they serve towards a more sustainable future. Aligning their missions and programs with sustainability principles... ...will recalibrate their own daily practices as well as awaken their community to the array of choices perhaps otherwise invisible to them” (Link, 2006).

In recent years, calls for zoos and aquariums to become sustainable institutions have come from within the field as a way to achieve social responsibility and civic engagement. Sustainability is an opportunity for proactive, thoughtful environmental work. Zoos and aquariums have been successful in increasing public awareness about climate change and the loss of biodiversity around the world. Unfortunately, increasing numbers of species are threatened by extinction and many habitats are being lost at an alarming rate. Not only are many species now more vulnerable, so may be our own way of life.

To promote sustainability, zoos and aquariums are in an exciting position to exhibit effective citizenship through recycling, renewable energy use, water and energy conservation and the purchase of earth-friendly foods and merchandise. Importantly, zoos and aquariums should share with the public their own work, in situ, and their efforts to save endangered wildlife.

There is a growing responsibility for zoos and aquariums to act as agents of conservation. A vital goal in this process is to provide as many educational opportunities for visitors as possible.

About CEE

India’s Centre for Environmental Education is a national institution engaged in developing programs and material to increase environmental awareness and sustainable practices. CEE was established in 1984 as a Centre of Excellence in Environmental Education, supported by the Ministry of Environment and Forests (MoEF), Government of India. It is affiliated with the Nehru Foundation for Development.

CEE’s primary objective is to improve public awareness and understanding of the environment with a view to promoting the conservation and sustainable use of nature and natural resources, leading to a better environment and a better quality of life. To this end, CEE develops innovative programs and educational materials and builds capacity in the field of Education for Sustainable Development (ESD). To test the validity and effectiveness of its programs and materials, CEE undertakes demonstration projects in education, communication and development that endorse attitudes, strategies and technologies which are environmentally sustainable. CEE is committed to ensuring that due recognition is given to the role of education in the promotion of sustainable development.

To learn more about CEE and our programs, please visit www.ceeindia.org

Author Contact: Meena Nareshwar | meena.nareshwar@ceeindia.org

REFERENCES

Centre for Environment Education, India http://www.handsforchange.org/


National Zoo, Smithsonian institution, USA nationalzoo.si.edu

World Association of Zoos and Aquariums www.WAZA.org
Investing in a good intern program has both short-term and long-term benefits. Properly trained interns can allow an organization to extend resources, expand programs that might otherwise be left undeveloped and supplement husbandry practices. More importantly, a well-structured training program is an excellent educational opportunity, one designed to meet the needs of interns and produce excited, experienced and dedicated future zoo employees.

Education is a key mission statement component of many zoos and aquariums. We connect visitors with wildlife and inspire our audiences to make a difference in conservation efforts. A recent multi-institutional research program conducted by the Association of Zoos and Aquariums found that a majority of park visitors leave feeling a connection with environmental and conservational issues (Association of Zoos and Aquariums, 2007). While most zoo and aquarium education programs are aimed at elementary-aged children and their parents, we often overlook an important audience: young adults embarking on their collegiate and professional journeys.

Over the past several decades, aquariums and zoos have evolved in mission and action (Tribe and Booth, 2003). Currently, national and international accreditation standards exist to ensure high quality education, research and animal care programs. At the Oregon Zoo, we believe it is our responsibility to ensure the industry continues to raise the standards for animal care and conservation. To that end, we have chosen to focus on educational opportunities for interns. These high school and college students represent potential future park employees and may ultimately influence the future of worldwide conservation efforts.

Before starting an intern program, it’s important to note the difference between interns and volunteers. Although both may be unpaid positions, the goals of participants in these programs are quite different. In fact, internships run by most private organizations in the United State are governed by the Fair Labor Standards Act (FLSA) and must follow strict guidelines (U.S. Department of Labor, 2010). Legally, most non-profit organizations may offer positions for interns to volunteer for charitable reasons. However, for-profit internships are guided by criteria that focus on these opportunities as learning experiences. Indeed, this is the primary factor for most interns, who are typically looking for hands-on experience or want to enhance their resumes.
The recruitment and interview process for an intern program should attract candidates from a broad geographical range. It’s essential to have clear application requirements, so decide in advance the type of experiences and skills you require as prerequisites for candidates. This should assist in focusing the creation of application fields or supplemental questions. However do not just rely on the application; be sure to interview candidates to ensure their goals align with that of your institution. Proper placement is critical to their success, and thus the success of your program. Much of the internship should involve mentoring and support from the lead staff, so it is essential to have them participate in the screening process. Finally, interviewing all prospective interns on the phone, including local candidates, will help keep the selection process unbiased.

Once interns are selected, they should go through the same administrative process as volunteers (if the interns are unpaid). Set up a system to track their hours in a database, and also consider creating an orientation to ensure they have a basic understanding of policies and expectations. Design the internship orientation as you would for an interpretive program, addressing Maslow’s theory of basic needs (1943). Creating a simple welcoming packet, including a map of your facility, will help interns adjust quickly.

While the application and orientation process might be the same for all interns at your institution, it is important to remember that internship positions can be as varied as the skills required to run a zoo or aquarium. Some examples include animal care, marketing, conservation research, facilities maintenance and volunteer management. However, the majority of a zoo or aquarium’s internships are typically designed to provide participants with practical knowledge and learning experience in animal husbandry, conservation and education. In order to ensure animal and human safety, as well as allow interns the opportunity to learn hands-on animal and/or park-related skills, internships should have a structured training program.

To help maximize learning opportunities, interns should commit a minimum of 20 hours per week to the program. You may even consider increasing this time to 32 hours per week (four 8-hour days).
for a total of 12 weeks. This increased obligation will ensure candidates are committed to capitalizing on their experiences. Remember that when creating an internship schedule, it is also important to consider current resources, including staff availability for training and project needs. One enhancement to any internship is a training manual. Consider creating a manual that includes park protocols and basic information that applies to all internships. Individual departments may then wish to add supplemental reading materials specific to each area. With an eye towards environmental responsibility, the manual can also be offered on a flash drive to reduce paper waste. You can also email a PDF of the manual so interns can familiarize themselves with basic procedures, such as important safety information, in advance. Clearly outlining expectations of preparedness will allow everyone to make the most of an internship.

A manual can be a great tool for staff as well, helping keep an internship program organized. A solid internship should be structured to build on skills and information over the course of the program. For example, keeper interns may begin by focusing on basic husbandry tasks, such as cleaning, diets and enrichment. Once these skills have been mastered, they can go on to learn about animal behavior, handling or training. An education internship might first focus on interpretive skills before moving on to curriculum design or creation of thematic programming. Providing information in the manual in a logical and progressive manner will keep both interns and staff on track.

While a manual can help interns develop a solid foundation in their chosen area, one way to evaluate an intern’s comprehension is through periodic testing. Many interns are students, often looking to gain college credits for their participation. Interns can be given regular written or oral exams that cover information found in the training manual.

In some cases, it may be beneficial for interns to pass a hands-on exam, to demonstrate their practical application of skills. For example, an education intern might be asked to present a short thematic talk to demonstrate their understanding of basic interpretive skills. Requiring interns to pass these exams ensures they are equipped to move on to the next topic in the internship.

Beyond demonstrating competency in zoo and aquarium research, education or animal care, interns can also gain life experiences. Incorporate opportunities for interns to participate in exercises to improve their job skills. Near the end of the program, ask them to submit an updated resume and cover letter, which can then be reviewed by staff. Interns may even be asked to participate in mock interviews, to help them gain real-world experience. These interviews can be conducted by employees from the intern’s area, who can give feedback on how the intern candidate answered questions and offer tips for improving.
Alternatively, you can allow them to assist with screening the next set of interns, taking time to discuss the strengths presented by another candidate’s application. This ensures interns will finish the program with the skills to secure the job they have been trained to do.

One of the challenges any institution may face when adding a newly-developed intern program depends on the existence of an established volunteer program. If your zoo or aquarium has a large, dedicated volunteer base, you will want to be sure to continue to recognize their commitment. However, in the beginning you may find some volunteers are uncomfortable with how interns gain responsibilities. It is important that volunteers understand the different demands placed on interns, including the exams and time commitment. One solution is to incorporate skills that your volunteers possess into the intern training program. For example, the intern is interested in exhibit design, pair that individual with a volunteer that enjoys construction or maintenance projects. This ensures that the educational aspect of the internship remains central in the program, while building relationships between volunteers and interns. Volunteers can then look forward to mentoring interns, and both groups respect the others’ contributions.

Interns that complete an intensive training program will likely find success when they enter the competitive job market. At the Oregon Zoo, many interns in the Living Collections department go on to be hired as temporary keepers, at our institution or even other facilities. Since the adoption of a more structured, education-based approach, 70% of graduates from the wildlife show internship program have gained employment at zoological or aquarium institutions.
While the interns benefit from such a rigorous program, they are also giving back to the facility. Over the course of the average Oregon Zoo internship, each intern contributes around 300 hours. Even with the focus on educating the intern, about half of a participant’s time is a net contribution for the organization. This time allows the staff to invest in developing and implementing the program. The structure of the internship, including the participatory, hands-on nature of the curriculum, allows interns to pursue independent project hours, completing tasks that may otherwise need staff supervision. The hours that are gained from work completed by interns may be re-invested into the program.

Aside from the hours our interns give, staff gains from the experience as well. Employees that otherwise do not have managerial duties are able to take the lead on an internship. The highly-structured internship makes it easy for staff with little or no management experience to administer the program. Once they receive their supervisor’s approval, Oregon Zoo employees may choose to mentor one intern per quarter. They screen resumes, interview and choose their own interns. They may be responsible for the majority of training, scheduling testing and completing evaluations. This is a great opportunity for staff (perhaps even temporary or seasonal employees) to gain experience in a supervisory capacity.

An intern assists a visitor donating to a hooded vulture (*Necrosyrtes monachus*).
Running a quality internship program can require more energy than the interns offer in return. There is no doubt that we benefit from our interns putting in a lot of hard work, but there are many hours spent mentoring and educating them as well. Our staff gets to refine their teaching, delegating and supervising skills and the zoo and aquarium community ends up with an experienced member of the next generation of keepers and educators. Finally, the interns benefit from a one-of-a-kind learning experience that will help them in their professional endeavors. Developing and implementing a structured internship program is truly an investment in our future.

**Author Contact:** Tanya Paul | Tanya.paul@oregonzoo.org

**REFERENCES**


Come and be inspired and share your thoughts, ideas and experiences with educators from around the world at IZE’s 21st Biennial Conference from August 28 through September 01, 2012.

Agenda 21, the protocol that emerged from the Rio Earth Summit in 1992, identified zoos as education providers for “Think Globally, Act Locally”, the mantra that urged every citizen to take responsibility for their lifestyle and the resultant environmental impact.

The 2005 World Zoo and Aquarium Conservation Strategy clearly defines the outcome of zoo education as being to inspire visitors to change behavior and live more sustainably.

Environmental education initiatives that aim to change human behavior provide the focus of many field projects where our activity impacts negatively on fragile habitats and threatened species.
The 2005 World Zoo and Aquarium Conservation Strategy clearly defines the outcome of park education as being to inspire visitors to change behavior and live more sustainably.

Environmental education initiatives that aim to change human behavior provide the focus of many field projects where human activity impacts negatively on fragile habitats and threatened species. Facilitating change is one challenge zoo, aquarium and field educators face; another is devising monitoring and evaluation techniques that evidence success and increasingly we are asked to demonstrate that our education programs are effective.

How can we as a global zoo, aquarium and park community address this dual challenge in a meaningful way? Come and be inspired and share your thoughts, ideas and experiences with educators from around the world at IZE’s 21st Biennial Conference in Chester, United Kingdom, from August 28 through September 01, 2012.

The conference will be held at the world-famous Chester Racecourse on the banks of the River Dee just outside the city walls. Although it first opened in 1539, the facilities have been considerably upgraded since then and we will have the full use of the excellently-equipped Leverhulme Stand for the duration of the conference. Literally next door is the Holiday Inn Express who are offering excellent rates to conference delegates. The hotel is a five minute walk from Chester’s historic center with the most complete Roman amphitheatre in the UK, the famous city walls and its stunning 1000 year old Norman cathedral. Of course, we will be spending time in Chester Zoo, a ten minute drive away. We’re busy finalizing the conference fee and some other details and will be launching a conference website very soon. Online booking will be available before the end of the year. We’re looking forward to welcoming you to Chester!

**Author Contact:** Stephen McKeown | s.mckeown@chesterzoo.org

The beautiful Chester Racecourse eagerly awaits IZE participants this August 28 through September 01, 2012.
Raising Awareness is a Walk in the Park

a conservation journey of a lifetime begins with a single step

by Louise Gordon | Executive Manager Marketing and Education | Johannesburg Zoo | South Africa

Walking for conservation is a new approach by the Johannesburg Zoo to raise awareness and funds for threatened species. The Zoo is involved with wattled crane, ground hornbill, vulture and frog conservation projects and also assists with chimpanzee rescue operations in conjunction with the Jane Goodall Institute.

The Johannesburg Zoo is better known as a recreational facility, according to guest surveys—only 1% of visitors surveyed see the Zoo as a conservation body. In this regard it is obvious that people are unaware of our conservation programs. Media releases are compiled on a regular basis and the website contains our conservation project information. School programs focus on conservation efforts as well as staff talks, and animal exhibits list the conservation status of displayed species. These communication tools have not been fully successful in educating our visiting public or our staff.

New avenues have been investigated to enhance our conservation education efforts, such as utilizing the monthly walks we offer. The Johannesburg Zoo has offered fitness walks since the early 1990s. The participants change as years go by but the enthusiasm has remained. These walks have always been popular with families and even serious fitness trainers. The walk/run is a 5km loop inside the Zoo and is offered once a month. It is supported by visitors we believe because the environment is lovely; the money raised supports the zoo operation; it is safe; it is fun exercising with other friendly people; it is accessible to babies in prams, people in wheelchairs; and also because one becomes more familiar with the antics of animals as observed whilst traveling the Zoo. Suddenly the participants have expert opinions on what the elephants do at 7:30 a.m. on a Sunday. This indicates yet again that the Zoo is used as a recreational facility. The trick is how to induce conservation awareness.

We decided on hosting five additional walks during the year, with 100% of the income dedicated to conservation projects. The walks were advertised to the current participants and to a wider audience through various databases, our staff and the media. The messaging was changed from:
“Support your zoo and exercise in a fun, safe environment” to, for example, “we have 230 wattled cranes left in South Africa—

join our walk to support these critically endangered birds and 100% of your contribution will be dedicated to our conservation project.”

The walk was essentially the same as all the others but an addition was that the crane staff maintained a small information exhibit. They demonstrated the feeding of hand-raised chicks using the crane costume and puppet, which encouraged people to ask questions about the animals and project. The Bird Curator welcomed all the walkers before the start and thanked them for their support, stressing the importance of the project. These activities re-enforced our invitation to all that this walk was dedicated to conservation.
The first walk was undertaken in February, 2011. We raised 12,840 rands (more than $1,600 U. S. dollars) and had a total of 321 participants. Although satisfying, the best part was to hear the conversations amongst the participants. Parents were explaining to their children why they were walking and why they were not receiving a medal as the money was going to save the birds. Also, parents pointed out to their children what the actual bird looked like. More engagement followed on their return from their walk.

Staff members were keen to get involved—to do the demonstrations, talk about the wattled cranes, take photos and assist with fundraising all at 7:00 a.m. on their free time during the weekend.

Building upon this success, the Zoo is expanding walks that will feature other threatened species including frogs, ground hornbills and vultures.

Author Contact: Louise Gordon | louise@jhbzoo.org.za
The NVD Education Screening Program (NESP) is based on the premise that a park’s educational profile is to some extent indicative of the quality of education. But, how can you measure educational input and output at a zoological park or aquarium? Within the NVD community there is no unambiguous way of fulfilling educational goals.

To overcome this obstacle, a gauging point or standard is needed. In 2009 an NVD educational working group consisting of three individuals developed, discussed and drafted an NVD educational standard. This standard is made up of seven interrelated domains:

1. Policy and organization
2. Educational employment
3. Target groups
4. Thematic design
5. Animals, enclosures and information
6. Products and activities
7. Conservation exposure

It was generally agreed on that the aforementioned domains are the building blocks or predictors of sound zoo or aquarium education. Within each domain a norm is laid down, describing why and how education should be practiced (Patrick et al., 2007) in order to contribute to the overarching NVD goal of stimulating a positive attitude towards nature conservation and wildlife. Each NVD zoo has an institution-specific educational goal which can be lined up with the NVD educational mission. Parallel with the educational standard the working group developed a third document: a standardized educational checklist. This checklist is a spreadsheet totaling 59 questions which are unevenly distributed among the previously mentioned domains. Per domain, several content-specific questions must be completed in order to rate the sub-conclusion with either a: 1 = weak score, 2 = moderate score or 3 = acceptable/good score.

Upon completion of the sub-conclusions the final question must be answered: “Is education (within this institution) compliant with the NVD Education

Assessing the impact of educational activities can be difficult and very comprehensive (Clayton et al., 2008; Bartos and Kelly, 1998; Marino et al., 2010). Instead of focusing on impact and visitors, the NVD (Dutch Zoo Association) implemented an educational screening program that emphasizes a zoo or aquarium’s contribution to education.
Standard?” This depends on the total score, when a facility scores a minimum of 14 points (i.e. 2 points per domain = moderate) the park’s education profile meets the NVD Education Standard. The points system is an easy-to-administer way of quantifying the educational profile of a park.

Results
In 2010, 15 NVD member facilities were reviewed by the education screening committee consisting of three persons: an experienced educator, an NVD Executive Office employee (the person responsible for the coordination of the actual screening) and an educator from the previously screened park (in this way each park is represented in NESP). A day of education screening consists of a theoretical part during which the completed pre-screening questions are discussed and reviewed. The second (practical) part consists of the commission walking through the park, under guidance of the host educator. Thereby focusing on educational output such as the display and contents of information panels, brochures and leaflets, the way the park and enclosures are structured and designed, the exposure of the park’s conservation efforts, the condition of the displayed animals and so forth. Afterwards the commission completes the post-screening questions, in the absence of the host educator, and attributes scores to the sub-conclusions. By totaling the scores of all 15 parks for each specific domain, some patterns become visible. It became evident that ‘educational employment’ and ‘products and activities’ scored highest, closely followed by ‘policy and organization’. On the contrary, ‘conservation exposure’ scored lowest, indicating that more effort is needed in the exposure of conservation efforts at NVD facilities. On an average NVD zoos scored 17.9 points, in a range from 14 to 21 (whereby 14 is the minimum according to NVD standards). The commission drafted 93 recommendations—the most cited recommendation is to write an (annual) educational master plan, including target groups, goals and milestones. Regular recommendations also include evaluating (both process and product evaluation) educational activities and volunteers, renewing the lay-out and contents of information panels and reinforcing thematic designs.

Evaluation
A follow-up education screening is scheduled in 2013. Educators provided suggestions in order to further improve NESP. NESP is a dynamic program and will always be subject to revising and editing. Educators recommended reducing the number of commission members and, in order to reduce subjectivity, to employ the same members throughout the entire program. Also, education screenings should be carried out multiple times.
throughout a screening year. Another interesting recommendation is including weighing factors to the different domains. One park might place more emphasis on a certain aspect contrary to another one. By applying park-specific weighing variables a more balanced and situation-specific screening will become available. Other suggestions included the inclusion and exclusion of several items and domains on the checklist, more emphasis on keepers talks and animal feedings and greater focus on screening the educational content of a park’s website.

Benefits
Many NVD educators consider NESP to be valuable; constructive criticism of fellow colleagues improves work and serves as an eye-opening experience. While preparing for a screening you become automatically involved in a self-reflection process. In a few cases recommendations formulated by the commission might stimulate the prioritization of educational topics of concern; this could be extremely helpful in relation to the park’s board of directors. The major benefits of NESP are twofold. NESP stimulates collaboration between educators at fellow institutions. Collaboration by actively sharing knowledge, skills and expertise in the field of education is promoted throughout the program. Secondly, evaluating the status of education contributes to the ongoing development of professional education. This will ultimately contribute to the overarching NVD goal of stimulating a positive attitude towards wildlife and conservation efforts.

Evaluation practices should be ongoing and methods and results should be shared with the institution and then with the whole community. The World Zoo and Aquarium Conservation Strategy (2005) emphasizes that evaluation in zoos and aquariums is vital. By sharing the story of NESP, it is hoped other institutions are inspired to develop similar educational evaluation programs. For more information on our programs, please visit www.nvddierentuinen.nl

Author Contact: Mirko Marseille | MMarseille@nvddierentuinen.nl

REFERENCES
Research shows that, although visitors often leave zoos, aquariums, marine parks and ecotourism sites with a heightened awareness of environmental issues and positive behavioral intentions, only a small minority follow through with actual behavior changes (Ballantyne et al., 2010; Ballantyne et al., in press; Smith et al., 2008; Adelman et al., 2000; Dierking et al., 2004). Ideally, visitors need to be encouraged to translate their good intentions into real actions. Indeed, several researchers have suggested that post-visit reinforcement may be a way to influence visitor behavior (Ballantyne and Packer, in press; Broad and Smith, 2008; Adelman et al., 2000).

This raises the question: what can be done off-site to reinforce a park’s on-site behavioral messages and help visitors translate their good intentions into pro-wildlife behavior? Recent research (Ballantyne and Packer, in press) into zoo/aquarium visitors’ attitudes toward conservation education has shown that the majority felt it was very important for these facilities to encourage visitors to reflect on, and take action in relation to conservation and environmental issues. Almost half the visitors felt it was very important for zoos and aquariums to provide post-visit materials to encourage continued learning about environmental issues after their visit. Visitors reported that a website they could access from home would be the most helpful way of providing such follow-up information.

This study presents preliminary results from a “first attempt” website-based post-visit engagement designed to influence park visitors’ behavior after a visit to Taronga Zoo in Sydney, Australia.

The Fish4Life Challenge

Taronga Zoo overlooks Sydney Harbor and receives about 1 million annual zoo visitors. Partly because of the zoos’ proximity to water and partly because of the number of marine species in the collection, staff at Taronga Zoo formed a desire to influence zoo visitors to make more sustainable seafood purchasing decisions. To facilitate this, Taronga Zoo trialled a program called Fish4Life where visitors signed up during a public seal show to receive four emails after their visit (one per week). To join, visitors were asked...
to send their email address during the show to which the emails and associated content could be sent. Clicking on the link took visitors to a website, the content of which can be categorized into six parts. The first was text outlining a key issue surrounding one or several marine species. Embedded in this text was a three minute video, delivered by a keeper, outlining details on the issue and what behaviors individuals can undertake to help address the issue. The three behaviors in focus were printing and using a wallet guide for fish to buy and fish to avoid, purchasing Marine Stewardship Council (MSC) certified tinned tuna and asking for more information about fish labelled as “flake”. This was followed by actions visitors can take. There were also links to “Four Fishy Facts” and to sustainable seafood recipes. The final element was a short quiz based on the content of the video, text, facts, actions and recipes.

At the end of the four weeks, participants were asked to complete a questionnaire about their experience during the Fish4Life Challenge. The results are reported here.

<table>
<thead>
<tr>
<th>Type of fish/seafood</th>
<th>N</th>
<th>Average monthly seafood meals before challenge</th>
<th>Standard deviation</th>
<th>N</th>
<th>Average monthly meals during challenge</th>
<th>Standard deviation</th>
<th>Average change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Orange roughy</td>
<td>231</td>
<td>.07</td>
<td>.42</td>
<td>166</td>
<td>.13</td>
<td>.790</td>
<td>+</td>
</tr>
<tr>
<td>Squid/calamari</td>
<td>183</td>
<td>1.42</td>
<td>1.58</td>
<td>182</td>
<td>1.65</td>
<td>2.03</td>
<td>+</td>
</tr>
<tr>
<td>Swordfish</td>
<td>160</td>
<td>.17</td>
<td>.71</td>
<td>155</td>
<td>.11</td>
<td>.71</td>
<td>–</td>
</tr>
<tr>
<td>Bream</td>
<td>165</td>
<td>.42</td>
<td>.91</td>
<td>166</td>
<td>.71</td>
<td>1.38</td>
<td>+</td>
</tr>
<tr>
<td>Shark (flake)</td>
<td>170</td>
<td>.69</td>
<td>1.23</td>
<td>165</td>
<td>.32</td>
<td>.70</td>
<td>–</td>
</tr>
<tr>
<td>Barramundi</td>
<td>176</td>
<td>.73</td>
<td>1.14</td>
<td>165</td>
<td>.50</td>
<td>.99</td>
<td>–</td>
</tr>
<tr>
<td>Whiting</td>
<td>169</td>
<td>.53</td>
<td>1.34</td>
<td>182</td>
<td>1.00</td>
<td>1.54</td>
<td>+</td>
</tr>
<tr>
<td>Eastern gemfish</td>
<td>156</td>
<td>.06</td>
<td>.50</td>
<td>155</td>
<td>.07</td>
<td>.59</td>
<td>+</td>
</tr>
<tr>
<td>Prawns</td>
<td>195</td>
<td>1.93</td>
<td>2.64</td>
<td>181</td>
<td>1.89</td>
<td>2.69</td>
<td>–</td>
</tr>
<tr>
<td>Flathead</td>
<td>163</td>
<td>.60</td>
<td>1.57</td>
<td>159</td>
<td>.41</td>
<td>1.03</td>
<td>–</td>
</tr>
<tr>
<td>Snapper</td>
<td>167</td>
<td>.50</td>
<td>.86</td>
<td>164</td>
<td>.34</td>
<td>.94</td>
<td>–</td>
</tr>
<tr>
<td>Trout</td>
<td>159</td>
<td>.38</td>
<td>1.15</td>
<td>157</td>
<td>.33</td>
<td>1.19</td>
<td>–</td>
</tr>
<tr>
<td>Leatherjacket</td>
<td>156</td>
<td>.09</td>
<td>.50</td>
<td>158</td>
<td>.09</td>
<td>.35</td>
<td>0</td>
</tr>
<tr>
<td>Fresh sardines</td>
<td>156</td>
<td>.12</td>
<td>.85</td>
<td>161</td>
<td>.34</td>
<td>1.17</td>
<td>+</td>
</tr>
<tr>
<td>Tinned sardines</td>
<td>163</td>
<td>.50</td>
<td>1.67</td>
<td>162</td>
<td>.77</td>
<td>1.95</td>
<td>+</td>
</tr>
<tr>
<td>Fresh tuna</td>
<td>164</td>
<td>.63</td>
<td>1.60</td>
<td>157</td>
<td>.43</td>
<td>1.63</td>
<td>–</td>
</tr>
<tr>
<td>Tinned tuna</td>
<td>197</td>
<td>3.68</td>
<td>4.75</td>
<td>188</td>
<td>2.40</td>
<td>3.73</td>
<td>–</td>
</tr>
<tr>
<td>Fresh salmon</td>
<td>184</td>
<td>1.91</td>
<td>3.21</td>
<td>176</td>
<td>1.45</td>
<td>2.57</td>
<td>–</td>
</tr>
<tr>
<td>Tinned salmon</td>
<td>169</td>
<td>1.31</td>
<td>3.13</td>
<td>167</td>
<td>.91</td>
<td>2.32</td>
<td>–</td>
</tr>
<tr>
<td>Oysters</td>
<td>163</td>
<td>.47</td>
<td>.98</td>
<td>156</td>
<td>.38</td>
<td>.85</td>
<td>–</td>
</tr>
<tr>
<td>TOTAL</td>
<td>16.25</td>
<td>14.23</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 1: Monthly fish and seafood consumption before and during the Fish4Life Challenge.
Respondents were asked about their average monthly consumption of 20 different seafood species before and during the Fish4Life Challenge. Average consumption responses are shown here, as well as whether average responses changed positively or negatively and whether the fish was identified as one that is sustainable (shaded green) or not sustainable (shaded red) during the challenge. Note that tinned tuna and salmon have been shaded yellow because it isn’t known (from this question) whether respondents purchased MSC certified products.
Sample
Over 2000 people/groups signed up to the four week Fish4Life Challenge during a four week recruitment period. Attrition was experienced throughout the challenge and 247 participants fully or partially completed the questionnaire. Of those who responded to demographic questions (n=199), most were Australian residents (99%) and female (74%). About half (48%) of those who completed the Fish4Life Challenge and the questionnaire did so by themselves. Those who completed the Challenge and the questionnaire in groups did so, most commonly, with one other family adult members (65%) and either one (37%) or two (44%) children. Most respondents were in the age bracket 35-44.

<table>
<thead>
<tr>
<th>Because of the Fish4Life Challenge...</th>
<th>N</th>
<th>Mean</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>I now try to choose more sustainable fresh fish</td>
<td>205</td>
<td>4.41</td>
<td>.640</td>
</tr>
<tr>
<td>I have changed the way I buy fresh fish</td>
<td>203</td>
<td>4.16</td>
<td>.757</td>
</tr>
<tr>
<td>I have changed the way I buy tinned tuna</td>
<td>176</td>
<td>4.13</td>
<td>.875</td>
</tr>
<tr>
<td>I have changed the way I buy frozen fish</td>
<td>121</td>
<td>4.13</td>
<td>.816</td>
</tr>
<tr>
<td>I look for Marine Stewardship Council (MSC) certified frozen fish</td>
<td>120</td>
<td>4.09</td>
<td>.860</td>
</tr>
<tr>
<td>I look for Marine Stewardship Council (MSC) certified tinned tuna</td>
<td>173</td>
<td>4.06</td>
<td>.969</td>
</tr>
<tr>
<td>I now use the Taronga Wallet Guide to choose my fresh fish</td>
<td>195</td>
<td>3.69</td>
<td>1.000</td>
</tr>
<tr>
<td>I now use the Greenpeace Guide to choosing tinned tuna</td>
<td>171</td>
<td>3.61</td>
<td>1.070</td>
</tr>
<tr>
<td>I only eat Marine Stewardship Council (MSC) certified frozen fish</td>
<td>115</td>
<td>3.60</td>
<td>1.033</td>
</tr>
<tr>
<td>I only eat Marine Stewardship Council (MSC) certified tinned tuna</td>
<td>169</td>
<td>3.56</td>
<td>1.112</td>
</tr>
<tr>
<td>I now use the Australian Marine Conservation Society (AMCS) Guide to choose my fresh fish</td>
<td>193</td>
<td>3.42</td>
<td>1.034</td>
</tr>
<tr>
<td>I now eat less tinned tuna</td>
<td>177</td>
<td>3.52</td>
<td>1.144</td>
</tr>
<tr>
<td>I have stopped eating tinned tuna</td>
<td>173</td>
<td>2.36</td>
<td>1.057</td>
</tr>
</tbody>
</table>

Table 2: Level of agreement with statements about the impact of the Fish4Life Challenge.
Using 1-5 Likert agreement scales (where 1 = strongly disagree and 5 = strongly agree), respondents were asked to respond to a series of statements about the impact of the Fish4Life Challenge. These results are summarized in Table 2 where they are ordered from greatest perceived impact to least perceived impact.

<table>
<thead>
<tr>
<th>Because of the Fish4Life Challenge...</th>
<th>N</th>
<th>Mean</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>It was easy to find the recommended fish</td>
<td>196</td>
<td>3.76</td>
<td>.911</td>
</tr>
<tr>
<td>It was easy to interest other family members</td>
<td>191</td>
<td>3.72</td>
<td>.871</td>
</tr>
<tr>
<td>It was easy to follow the recommendations</td>
<td>200</td>
<td>3.99</td>
<td>.760</td>
</tr>
<tr>
<td>It was easy to afford the recommendations</td>
<td>196</td>
<td>3.80</td>
<td>.822</td>
</tr>
<tr>
<td>It was easy to keep up my enthusiasm</td>
<td>202</td>
<td>3.87</td>
<td>.900</td>
</tr>
<tr>
<td>It was easy to access material on line</td>
<td>193</td>
<td>4.15</td>
<td>.714</td>
</tr>
<tr>
<td>I found the Fish4Life recipes easy to cook</td>
<td>133</td>
<td>4.17</td>
<td>.669</td>
</tr>
<tr>
<td>I found the Fish4Life recipe ingredients easy to find</td>
<td>133</td>
<td>4.07</td>
<td>.741</td>
</tr>
<tr>
<td>I found the Fish4Life recipes tasty</td>
<td>131</td>
<td>4.21</td>
<td>.709</td>
</tr>
</tbody>
</table>

Table 3: Level of agreement with statements about the experience of doing the Fish4Life Challenge.
Respondents were asked about their experience of doing the Challenge. The results in Table 3 show generalized support for Fish4Life Challenge content. Note also strong agreement with the statement that the online material was easy to access. This is consistent with the findings of Ballantyne and Packer (in press) who suggest that visitors supported websites as a tool for post-visit communication.
Results
The average reported time spent each week learning about sustainable seafood was 13 minutes, although this was skewed by three respondents who indicated that they spent two hours learning about sustainable seafood. The median was 10 minutes.

Finally, two more measures evaluating the Fish4Life Challenge were included. The first was whether respondents would talk to friends about sustainable seafood. Of the 199 responses, 138 (69%) indicated that they would, 54 (27%) said maybe and 7 (4%) said that they would not talk to their friends about sustainable seafood. The second measure was whether respondents would be happy to stay on an email list which would update them on future campaigns. Of the 198 who responded, 163 (82%) stated that they would like to receive future emails.

Conclusions
Preliminary data supports the notion that websites can be effective tools for engaging visitors post-visit. Clearly there was interest in sustainable seafood consumerism at the time of the seal show and the Fish4Life Challenge recruitment methods capitalized on this interest by providing a simple way for visitors to sign up to learn more. The results from the Fish4Life Challenge itself are also encouraging with average reductions in reported consumption of many of the fish deemed unsustainable and increases in consumption of some of the seafood choices deemed sustainable. There was general agreement with most of the statements suggesting changes in purchase behavior and most of the evaluation of website content itself was positive.

Future Research
TCSA is a leading zoo in attempting to use websites to influence visitor behavior, but there are still many lessons to learn on how websites can be used to influence behavior. The results of this study provide an important baseline understanding on visitor preferences for content. The authors intend to pursue funding to rigorously research how websites can be used as tools for post-visit influence.

Author Contact: Dr. Liam Smith | liam.smith@monash.edu


Festivals as a Conservation Tool

to prevent illegal trading of wild fauna

by Sandra Milena Correa Montoya | Head of Education and Conservation | Matecaña Zoo Pereira | Colombia

Creating a community festival to teach citizens about local environmental concerns may take between three to six months time, but the rewards can last a lifetime. The following steps are vital when developing such festivals:

1 Location information
Research the municipality where the festival will be held and also study the cultural and economic dynamics of the area. The city or municipality’s archives is a good place to begin searching for such general information.

2 Identify participants
Key participants include teachers, students, community leaders, shopkeepers, farmers, ranchers, hunters, employees of private and public institutions, tourists, environmental agencies, policing authorities and animal protection groups.
**Create strategies**

Once participants are identified, their relationship to the existing problem must be examined and understood. This process helps to create the best strategies to involve all the participants into the festival. With nearly eight years of experience, the Matecaña Zoo has designed various educational strategies for diverse groups of participants. See **Table 1** for examples.

**Select theme & begin training**

After contact is made with participants, volunteer teams can then be established with each group and a theme chosen. The theme is related to the species or ecosystem that best fits the environmental concerns of the community. Teams will be asked to network and discuss ways they can eradicate illegal wildlife trading within their area.

<table>
<thead>
<tr>
<th>PARTICIPANTS</th>
<th>STRATEGY</th>
<th>EDUCATIONAL ELEMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teachers</td>
<td>Training workshop</td>
<td>Manual of games and conservation actions</td>
</tr>
<tr>
<td>Preschool students</td>
<td>Identification workshop</td>
<td>Drawings of animals, coloring, Animal Tales and animal costuming</td>
</tr>
<tr>
<td>Elementary students</td>
<td>Scenario workshop</td>
<td>Wonderful world of animals slide show, puppet show, memory game and animal identification chips</td>
</tr>
<tr>
<td>High school students</td>
<td>Scenario workshop</td>
<td>Slide show of the importance of animals, videos on illegal animal trading and challenge games</td>
</tr>
<tr>
<td>Stores</td>
<td>Establish dialogue from store to store</td>
<td>Promotional posters</td>
</tr>
<tr>
<td>Cattle ranchers</td>
<td>Informative workshop on benefits of conserving the species and the forest</td>
<td>Folding conservation strategies</td>
</tr>
<tr>
<td>Farmers</td>
<td>Rural parent briefings</td>
<td></td>
</tr>
<tr>
<td>Tourists</td>
<td>Training of hotels/resorts, support for road checkpoints</td>
<td>Poster, zip control (Environmental Authority)</td>
</tr>
<tr>
<td>Police, Environmental Authorities</td>
<td>Wildlife handling skills, legislation</td>
<td>First aid in wildlife care</td>
</tr>
<tr>
<td>Conveyors</td>
<td>Training workshop</td>
<td>&quot;I Don’t Trade with Wild Animals&quot; sticker distribution (Environmental Authority)</td>
</tr>
<tr>
<td>General community</td>
<td>Poll community to learn about the use and perception of wildlife, distribute materials that the community can view or listen to through advertising and media</td>
<td>3 x 3 meter banners, videos and business involvement, polls</td>
</tr>
<tr>
<td>Public and private institutions</td>
<td>Training workshop</td>
<td>Slide shows and videos</td>
</tr>
<tr>
<td>Hunters</td>
<td>Meeting Mayor and municipal inspector, legislation</td>
<td>Decree brochure by Environmental Authority, &quot;Why you don’t have to hunt?&quot; program</td>
</tr>
</tbody>
</table>

**Finalize specifics**

Working with government authorities for required permits and permission, festival dates and locations are selected and agreed upon by the participants. When communities are close to rural areas, country walks are made to identify other opportunities for involvement.

**Establish support networks**

Festivals should be designed to empower groups to remain responsible for conservation efforts after the start up process is completed. A network of participating community leaders can continue the educational process throughout the year.
Festival time!

Leaders encourage the entire community to join in. Children can dress up as part of the theme and parade through the village, ending in a square where they invite the community to join in through cultural dances, poems, songs and other activities connected to the chosen area and theme.
Conclusion
Wildlife trading is considered the third largest worldwide illegal business after drugs and arms trading. In Colombia, the environmental authorities create strategies to combat this problem. The Matecaña Zoo supports these strategies through education and development of festivals where the illegal possession and sale of animals usually begins. Festivals are an educational tool that allows communities to learn about their relationships with the environment and to change perceptions about a species or ecosystem. Festival events also empower people to establish a strategy to promote their own conservation ideas, raises awareness and allows the communities to take pride in an environmental theme that is unique to their area.

Acknowledgements
The Matecaña Zoo of Pereira’s education and conservation departments, Quindio (CRQ), Regional Autonomous Corporations of Risaralda (CARDER), Caldas (CORPOCALDAS), ACOPAZOA, EAZA and the Silvery-Brown Tamarin International Conservation Program.

Author Contact: Sandra Milena Correa Montoya | sandraeduzoo@yahoo.com
Developing an In Situ Conservation Education Program in Rwanda

a case study of the Dian Fossey Fund’s Primary School Program around Volcanoes National Park

by Joseph Karama | Conservation Education Manager | Karisoke Research Center, Dian Fossey Gorilla Fund International | Rwanda

Disney and other conservation-minded organizations around the world, including the Fossey Fund in Rwanda, strive to build awareness of the vital connection between humans and nature.
Conservation education is the process of engaging people and positively influencing their knowledge, attitudes and behaviors about wildlife and wild places. Disney’s Animal Kingdom® and other conservation-minded organizations across the world, including the Dian Fossey Gorilla Fund International (DFGFI) in Rwanda, strive to build awareness of the vital connection between humans and nature. This relationship between human survival and nature bears a distinctive characteristic: the more difficult human livelihood (survival) is, the more likely that the humans will turn to nature, compromising its integrity in the process. This explains why it is critical that the human populations living in closest proximity with ‘nature’ (near natural reserves) understand and value this connection.

Volcanoes National Park (Rwanda), Virunga National Park (Democratic Republic of the Congo) and Bwindi Impenetrable National Park (Uganda) make up the Virunga Massive Mountain Range, famous for being the only habitat of the mountain gorilla. Rwanda already has the highest population density in Africa (exceeding 500 people per km²), but the figure reaches an astonishing 1,028 people per km² in some sectors near Volcanoes National Park (Bush et al., 2009), making it worthy of intensive conservation focus. This high population density is translated on the ground as a strong pressure of anthropogenic activities, such as an increase in demand of forest resources (bamboo cutting for building and crafts making, firewood and water, hunting for meat, medicinal plants, etc.) and human-animal conflict mainly due to crop raiding. Making matters worse is the lack of education on the part of the communities living near the park, which leads to a lack of appreciation for the true value of the forest that is the park. What locals know is that the forest has the gorillas that attract tourists who bring money, but that money goes to the government. Locals see no direct benefits to themselves, especially since their crops are raided by buffaloes and monkeys and they receive no governmental compensation (Sabuhoro, 2007) for the damages. This situation calls for an innovative conservation education strategy that appeals to people’s sense of goodwill and responsibility to understand the magnitude of what is at stake.
In 2009, the DFGFI collaborated with educators from Disney’s Animal Kingdom® to develop a conservation education program that targets children within schools around the park. The mission of these programs is to nurture a generation of children who understand the critical link between humans and nature and are therefore more willing to care for wildlife and natural ecosystems such as the Virungas and the gorillas who call the park home. The program was based on a model that had been implemented and received positive evaluation for the promotion of awareness of threats to chimpanzees in Uganda. The program aims to address the information gaps on:

(a) the importance of conserving the forest and its biodiversity (how animals depend on the forest to survive and vice versa)
(b) the dependence of human livelihoods on a healthy ecosystem (ecosystem services)
(c) the human threats to the forest and its biodiversity and
(d) the actions that we all can take to mitigate the negative human impact

Methods and Content

Two curricula were developed: one for Primary 3 and one for Primary 5 children. Primary 3, ages 8-9 represents the really young children with little or no notion of ecology and environmental issues. Primary 5, ages 11-12, comprises relatively older children who have started learning about ecology and the environment in other subjects such as “Elementary Science and Technology”.

In the Primary 3 curriculum, children are introduced to different animal species in the forest/park. They learn about what these animals need in order to survive and the difficulties they face. They also participate in guided nature walks around the school and nearby environs and are taken through a list of possible actions they can take to conserve forest habitats. All the while, emphasis is on delivering interactive lessons that allows for participation and self-discovery. It also provides a better understanding and retention of the content and messages. In the Primary 5 curriculum, more information is given on how different animal species benefit the forest and vice versa, and the
children are called upon to learn more about the diverse wildlife in the forest through participating in a guided forest walk to allow them to experience the amazing forest habitat of the animals. There is also a broader discussion of threats to wildlife and what the children can do to help. In both the P3 and P5 curricula, it is emphasized that children have the responsibility to help protect wildlife. There’s also frequent use of visual aids and fun games to hold the students’ attention and allow them to learn in different ways.

A typical Primary 3 class in this area has about 300 children, and Primary 5 has about 200. The children are divided into groups so that a teacher instructs 40 children at a time. To deliver the conservation education program, the DFGFI conservation education officer visits schools and delivers lessons with each 40-student group in Primary 3 and Primary 5. Training on how to teach these programs was provided by a workshop through Disney’s Animal Kingdom®. Each class lasted an hour-and-a-half and included a pre- and post-lesson conservation knowledge survey, as well as lessons conducted inside and a nature walk around the school grounds.

Evaluation and Results

There is increasing consensus that any conservation effort, including conservation education, requires evaluation to determine whether it is positively contributing to conservation efforts. As Ferraro and Pattanayak (2006) in Kuhar et al. (2010) argue, evaluation data not only influences funding, but can also influence public policy. According to Bettinger et al. (2010), the true effectiveness of a conservation initiative may not be measurable for many years, but there are short range techniques of assessing certain components of the work, such as (1) is your audience receiving the intended message, (2) does the message change their attitudes towards the environment and (3) does your audience understand what they can do to help conservation.

Both the Primary 3 and Primary 5 students were asked to answer questions prior to the lessons, and the same questions were asked again after the conservation education lessons to assess knowledge gained as a result of participating in the program. The evaluation of the first two years of implementing these conservation education curricula shows a general increase in knowledge as result of participation, and demonstrates the need to continue to expand and to refine the program in order to successfully engage the students.

In the Primary 3 program for example, over the two years of implementation there was an average increase of 13% of students per class who correctly identified the survival needs of animals, as well as what they could do in order to help wildlife conservation after participation. However, another question asking the students whose responsibility it is to protect the forest produced rather surprising results. In 2009, the number of students who gave the correct response (“it is my responsibility”), and those who responded incorrectly after participation was even. A closer look at why (by interviewing some of the students that had chosen the incorrect answer)
revealed that many children confused the image of the building (one of the multi-choice images that were used to make it easy for this young audience to participate) to mean a classroom, which the children identified with, and since they had been taught that it is their responsibility, they chose the ‘classroom’ (building). In the following year (2010), the image was not changed but emphasis was put on explaining the images and the post-evaluation for the same question revealed a 24% increase in the correct response. Perhaps changing the image to make it clearer would improve comprehension even more.

In the Primary 5 program, over the two years most students (97%) were able name two animals that live in the forest (not necessarily from the Volcanoes National Park) even before participating in the program. This shows that this question is perhaps too easy at this level and moving forward we will change it and ask them to name two animals that live in Volcanoes National Park.

Another question testing the knowledge of environmental problems facing the forest increased significantly (36%) between pre- and post-tests in 2009, but in 2010, the increase was only a modest 6%. This was the same for the question on how they can help (30% knowledge increase in 2009 compared to only 9% in 2010). A possible explanation would be the quality of delivery of the lessons. While the entire 2009 program was delivered by a person trained by Disney’s Animal Kingdom® staff, in 2010 this person trained and was helped by two assistants in order to cover more schools (three schools and 745 children in 2009; four schools and 1,378 children in 2010). Therefore, while coverage of the program almost doubled, the level of comprehension seems to have been negatively affected.
Recommendations

Bettinger et al. (2010) argue that the success of an educational program depends on the effectiveness of its delivery and that in turn depends on the training of those delivering it. Innovative teaching that employs hands-on materials and interactive techniques requires adequate training which up until now has been afforded only to one person, the DFGFI education officer. However, given the need to expand and reach out to more children, it is important that more people get the training to effectively deliver the programs. One way to achieve that would be to hold workshops and train local teachers in how to use the teaching materials to interactively deliver conservation education lessons. This would involve additional costs to duplicate the teaching materials but it would be a valuable investment because it will ensure that the program reaches more children in a timely manner, and will provide teachers with examples of innovative interactive lesson plans that can be applied in other areas. Such an approach would also ensure that the teachers provide sustainable support to behavior change and adaptations by students as a result of participating in the program, something the teachers have not been doing perhaps because they regarded the whole program as something being promoted from outside.

The evaluation also demonstrated a large gap in ecological knowledge on the part of the students. The results showed, for example, that not only did the students have low prior knowledge of environmental problems (45% in 2010) but that the increase was minimal even after participation (51%). Although the increase after participation was better in 2009 (from 40%-76%), it should be noted that prior knowledge on this question was clearly low for both years (40% and 45% in 2009 and 2010 respectively). This statistic and other interactions during the course of delivering the program showed the students lacked knowledge of basic ecological principles such as the interconnections between different elements of the ecosystem. It is important to take all necessary measures to boost this critical aspect of science education at this formative stage for the children if we want a future generation that cares to maintain healthy ecosystems and a healthy planet.

One recommended way of supplementing the national education curriculum in the realm of conservation education would be the introduction of conservation storybooks and posters (Dolins et al., 2010). By creating age-appropriate storybooks and posters, with interesting, informative and colorful pictures, students can learn about the flora and fauna of Rwanda, about the habitats, ecosystems and ecosystem services, and how we all (humans, plants and animals) are linked together in a single web of life.

Author Contact: Joseph Karama
karamajoseph@gmail.com

References


Discover what an IZE membership can do for you.

For more information, contact your Regional Representative:

Africa
Jone Porter
jporter@seaworld.org.za

Australia/New Zealand
Sean Coleman
scoleman@zoo.org.au

North & South East Asia
Isabel Li
isabel.li@oceanpark.com.hk

Europe/Middle East
Stephanie Randegger
stephanie.randegger@tierpark.ch

South Asia
Meena Nareshwar
meena.nareshwar@ceeindia.org

Latin America
Sandra Gomez
sgomez@zoosantacruz.org

North America
Bill Street
william.street@buschgardens.com

Membership in The International Zoo Educators’ Association (IZE) facilitates communication and professional development among educators in zoos, aquariums, wildlife centres and nature reserves.

Membership gives you the opportunity of joining this global network and advancing conservation education at your facility.

Join the International Zoo Educators’ Association today to access the latest thinking, techniques and information on conservation education worldwide.

www.IZEA.net