

# KALAHARI CONNECTIONS: fostering long-term positive conservation behaviors in Botswana youth

Erin Stotz, MA<sup>1</sup>; Molly Maloy, MA<sup>2</sup>; Rebecca Garvoille, PhD<sup>3</sup>;  
Matthew Herbert<sup>4</sup>; Kgomotso Mothibi<sup>5</sup>

- 1 Community Conservation Coordinator, Conservation Biology Department, Denver Zoo;
- 2 Graduate Programs Coordinator, Education Department, Denver Zoo;
- 3 Postdoctoral Research Fellow, Conservation Biology Department, Denver Zoo;
- 4 Director of Conservation Education, Conservation Biology Department, Denver Zoo;
- 5 Conservation Education and Community Engagement Manager, Kalahari Research and Conservation

## **Abstract**

Botswana is characterized by low human density coupled with vast, remote areas containing an abundance of wildlife. In Botswana's Central Kalahari region, Denver Zoo implements a holistic wildlife conservation program based on three key elements: 1) sound science to understand the ecology and behavior of key wildlife species, and the social contexts that affect their conservation; 2) collaborations with local people to build local capacity to conduct conservation, and 3) culturally relevant conservation education programs to increase positive associations between people and wildlife. Denver Zoo's conservation education program in Botswana, "Kalahari Connections," engages local and global partners to create science-based opportunities for youth to connect to Botswana's rich natural heritage in order to foster wildlife stewardship. Kalahari Connections is an innovative inquiry-based and participatory conservation education program including field trips into Botswana's protected areas, teacher-training workshops, culturally appropriate interdisciplinary wildlife curriculum, literacy programs and hiring local partners to design and implement conservation education programming. Initial evaluation results from the program's pilot year in the community of Moreomaoto demonstrate a positive shift in thinking about wildlife for youth who participate in "Kalahari Connections."

Denver Zoo passionately dedicates expertise and resources to saving animals, conserving habitats and educating communities worldwide. Building on our mission, to "secure a better world for animals through human understanding," the Zoo implements holistic wildlife conservation programs in Botswana. Since 1996, Denver Zoo has specifically focused its efforts in and around the Central Kalahari Game Reserve and Makgadikgadi Pans National Park. Denver Zoo's conservation program is based on three key elements: 1) sound science to understand the ecology and behavior of key wildlife species, and the social contexts that affect their conservation; 2) collaborations with local people to build local capacity to conduct conservation, and 3) culturally relevant conservation education programs to increase positive associations between people and wildlife.

Research suggests that species populations are declining in Botswana, and merit conservation action. However, wildlife conservation and human livelihoods, especially livestock-ranching, often conflict in Botswana (Perkins, 1996). Human persecution has caused wildlife populations to decline, many of them dramatically (Frank et al., 2006).

Competition for resources and space creates friction between local communities and wildlife, which has fostered deep rooted feelings of fear and uncertainty towards Botswana's wildlife. Despite Botswana's

rich wildlife diversity and large protected areas, few Botswana residents can afford access to national parks and wildlife tourist camps, and often do not reap direct benefits from wildlife tourism (Moswete et al. 2008). Thus, children rarely experience wildlife in their own backyards in a natural setting (Mbaiwe 2003).

Denver Zoo (DZ) collaborates with Kalahari Research & Conservation (KRC), a non-profit wildlife organization based in Botswana, to save wildlife populations and associated ecosystems by changing people's understandings and perceptions of wildlife. Ultimately, DZ and KRC seek to encourage people to adopt behaviors that create a long-term, sustainable co-existence between people and wildlife.

In particular, DZ and KRC programming focuses on changing knowledge and behaviours in youth ages seven to fifteen in Moreomaoto and Gweta - gateway communities located along the western boundary of the Makgadikgadi Pans National Park. DZ and KRC build foundational support for wildlife conservation and non-lethal solutions to human-wildlife conflicts by creating opportunities for these youth to experience the wildlife around them in positive ways. As research elsewhere in Africa has demonstrated, a shift in culture and thinking around wildlife can directly impact human-wildlife conflicts and transform wildlife from something feared into

something deserving conservation (McDuff & Jacobson, 2001).

### **Is there a need?**

In 2014, with funding awarded from the Association of Zoos and Aquarium's (AZA) Conservation Grants Fund, DZ and KRC conducted an education needs assessment following Jacobson (1997), to identify gaps in wildlife conservation education programming that were potentially hindering wildlife conservation in and around protected areas in Botswana's Central Kalahari region.

Key findings from the needs assessment included:

- A lack of basic science-based content and resources to support local wildlife and environmental education
- A dearth of organizations focused on bringing conservation education to communities bordering the region's protected areas, and
- A strong desire from communities to bring conservation education programs to area youth.

### **Program Development**

The needs assessment strengthened DZ and KRC's commitment to conservation education in Botswana, and they jointly developed Kalahari Connections to address the identified educational gaps. Kalahari Connections targets youth ages seven to fifteen, and primary school teachers. Program goals were conceptualized using a backwards design approach. Backwards design is an established method of developing educational curriculum that involves setting goals before choosing instructional methods (Wiggins & McTighe 2005). Four program goals were defined:

- 1) Foster knowledge about and positive attitudes towards wildlife in primary school age youth living near protected areas,
- 2) Cultivate Botswanan wildlife conservation ambassadors through hands-on positive experiences with wildlife.
- 3) Increase science-based knowledge for youth through connections to researchers, and
- 4) Introduce youth to future career opportunities in the wildlife conservation and wildlife-related tourism sectors.

Using the goals created from the backwards design process, DZ and KRC developed a logic model to highlight specific short, medium and longer term desired outcomes for the Kalahari Connections program. Outcomes focused on changing participant knowledge, attitudes and long-term behaviors towards wildlife:

Knowledge: Participants will know: 1) The importance of wildlife to Botswana's ecosystem, 2) Resources available for teaching wildlife conservation education and 3) Career paths in Botswana linked to wildlife and conservation

Attitudes: Participants will feel: 1) Connected to Botswana wildlife, 2) More positive attitudes towards Botswana's wildlife and 3) Confident in teaching wildlife education.

Behaviors: Participants will: 1) Actively seek ways to protect Botswana's wildlife, 2) Serve as conservation ambassadors within their communities.

### **Share. Collaborate. Learn**

In order to accomplish these goals, DZ and KRC implemented various educational activities, such as teacher-training workshops, culturally appropriate interdisciplinary wildlife curriculum, field trips into Botswana's protected areas, and "conservation conversations" at local libraries in Gweta and Moreomaoto – the gateway communities selected for project start-up. DZ and KRC hired local partners to collaborate on the design and implementation of the conservation education programming.

### **Participatory Conservation Education**

In Gweta and Moreomaoto, meetings were held to gather valuable input from local educators on current teaching methods, conservation education knowledge, and interest in incorporating more inquiry-based activities into the classroom. It was important to give voice to local educators, and to provide an opportunity to have them actively participate in creating and shaping the Kalahari Connections conservation education program.

### **Designing Wildlife-Based Curriculum**

In order to increase science-based knowledge in youth, it was important to augment the primary school environmental education curricula required by Botswana's government. Using the input provided by local educators, DZ and KRC developed and provided teachers with instructional materials to support environmental education and wildlife ecology lessons. A comprehensive, interdisciplinary curriculum in both English and Setswana (Botswana's national language), the curriculum contains cultural and age appropriate instructional materials based on Botswana educator's recommendations, and aligns with Botswana's national curriculum. It also includes educational activities, service learning projects, and environmental education and pedagogy resources.

### **Teacher-Training Workshops**

After the curriculum was complete, DZ and KRC held four training workshops designed to provide instruction on how to implement the inquiry-based lessons. These workshops were attended by over 35 adults including educators and librarians. Research demonstrates the value of teacher workshops. Workshops effectively train educators to develop education programming, practice lesson presentation, and evaluate educational outcomes (Kuhar et al., 2007b). These workshops provided DZ and KRC with insight and feedback on

how participants were planning to use the inquiry-based educational curriculum. Moreover, bringing educators together for trainings served to build a support system among the trainees and cultivated a learning community based on peer collaboration, resource sharing, and the transfer of knowledge regarding educational programming and evaluation.

*Teachers from the community of Gweta who attended a teacher-training workshop aimed at providing culturally appropriate interdisciplinary wildlife curriculum training.*

### **Experience. Connect. Change.**



After gathering input from local educators, and designing curriculum that were culturally and age appropriate, DZ worked with its partners to implement program strategies to achieve Kalahari Connection program goals in Moreomaoto and Gweta. DZ and its partners followed the environmental education model of sequential experiences, as it can lead to positive and proactive behaviors and attitudes about the environment (Farmer, Knapp, and Benton, 2007).

### **Inquiry-Driven Field Trips**

Research on environmental education has demonstrated that a child's positive experiences with nature influences his or her affinity towards the natural world as an adult (Hungerford & Volk 1990; Chawla, 2006). DZ and KRC successfully led field trips with over 150 youth program participants into Makgadikgadi Pans National Park in order to foster positive experiences with wildlife (see Figure 3).

The objectives of the field trips included:

- Expose the youth to wildlife to provide an opportunity to see animals in their natural habitat.
- Create an experience that allows for interaction between the students, local Motswana safari guides and park rangers to help foster student knowledge of careers with wildlife.
- Allow an opportunity for the students to apply their scientific knowledge to real life experiences with wildlife.

Each field trip allowed the children and adults to see Botswana's wildlife in a safe, positive and educational setting. For many participants, this was

their first time in a national park.

### **“Conservation Conversations”**

To complement the field trips, monthly “Conservation Conversations,” a series of discussions on wildlife conservation, were hosted at the community libraries. The events provided an opportunity for local youth to connect with researchers, and wildlife professionals, especially people from Botswana, who have made a career working with wildlife, and learn about their scientific research.

Speakers included:

- Denver Zoo wildlife conservation biologists
- Birdlife Botswana staff
- Guides from area safari outfitters
- Independent conservation biologists working in the area
- Employees of Botswana's Department of Wildlife and National Parks

### **Evaluate. Learn. Grow.**

Successful cross-cultural conservation education is premised on effectively communicating and creating a shared understanding of conservation challenges. As Bettinger et al (2010) observe. “If our ultimate goal is to change behavior, our programs must effectively [and cross-culturally] communicate conservation challenges so in the end we are all talking the same language.”

Denver Zoo is evaluating the Kalahari Connections program in order to ensure DZ's programming is delivering educational content that DZ intends in culturally appropriate, socially relevant and effective ways (Bettinger et al., 2010). Moreover, in an international field setting like Botswana, testing evaluation methods is crucial so that DZ can understand if it is using the right tools for the socio-cultural context, and identify any unintended outcomes of DZ programming.

From September 2013 to September 2014, DZ conducted an initial one year formative evaluation of Kalahari Connections with participating youth in the gateway community of Moreomaoto. DZ is also conducting a formative evaluation of start-up programming in Gweta, which will conclude in October 2015. In Moreomaoto, DZ used a pre-post survey instrument to assess changes in participant knowledge and attitudes, modeled after Kuhar et al.'s (2011) design. Project staff administered the same pre-post survey questionnaire to a sample of 23 participating youth, ages seven to fifteen, at the beginning and the end of the program year. The questionnaire included open-ended and close-ended questions designed to assess changes in children's knowledge about, attitudes towards and understanding of the value of Botswanan wildlife.

An analysis of the pre-post survey results revealed



four key findings:

1. Children surveyed had a high level of recognition of several key wildlife species in the region, including elephants, lions, zebras and giraffes.
2. Denver Zoo did create greater awareness and understanding about the value of the carnivore species it seeks to conserve, especially vultures, among the children surveyed.
3. Denver Zoo broadened surveyed participants' perspectives about why wildlife is valuable, raising awareness about the ecological value of species, especially vultures (see Figure 4).
4. Denver Zoo created a greater recognition of conservation careers and ways to save animals among the children surveyed. However, all children may not have clearly understood what was being asked by the conservation careers survey question.

These preliminary evaluation results suggest that DZ and KRC are facilitating positive change in knowledge and attitudes among program participants. However, evaluation results also suggest that while participants are learning key concepts from DZ and KRC programs, participants may not always clearly understand the evaluation instrument. Going forward, program staff will redesign the survey so that it is more age appropriate and culturally responsive for future applications.

As with all conservation education programming,

pioneering significant social change in people' beliefs about and behaviors towards wildlife is a long-term project (Heberlein 2012, Lefebvre 2013). Thus, while a one-year evaluation provides a foundational snapshot of information for shaping program design, it does not provide the long-term data necessary to fully assess the rate and extent of social change in attitudes and behaviors towards wildlife among Botswana youth participants in Kalahari Connections. Denver Zoo will continue to evaluate Kalahari Connections to monitor program progress over the longer term.

### Next Steps

Initial evaluation results suggest that Denver Zoo programming is creating a positive shift in the ways youth think about and value wildlife in Botswana's Central Kalahari region. Due to the documented success of the Kalahari Connection's initial program year in Moreomaoto, and positive feedback gathered through informal evaluations in Gweta, DZ and KRC are expanding this model conservation education program to four new communities that border the Central Kalahari Game Reserve. Going forward, Denver Zoo will continue to work with partners on the ground to implement and evaluate conservation education programming that promotes positive attitudes towards wildlife, connects Botswana youth to their natural heritage and create a culture of wildlife stewardship.

#### PRE-Survey Overall Reasons for Valuing Wildlife

(Question 8: What are your three favorite animals, and why?)

Reasons	Frequency Count
Aesthetic	15
Safety	12
Physical Attributes	9
National Pride	7
Utilitarian	7
Emotional/Affective	6
Negativistic	4
Tourism	5
Economic	5
Ecological	4
Spiritual	2
Protected	1
Consumption	1

#### POST-Survey Overall Reasons for Valuing Wildlife

(Question 8: What are your three favorite animals, and why?)

Reasons	Frequency Count
Aesthetic	22
Ecological	15
Safety	12
Physical Attributes	11
National Pride	11
Negativistic	9
Utilitarian	6
Economic	2
Tourism	2
Consumption	2
Emotional/Affective	1



## Acknowledgements

“I am because you are” – African proverb

Denver Zoo continues to be deeply appreciative of the AZA -Conservation Endowment Fund support which has enabled the success of this program. Special thanks to Dr. Richard Reading, Dr. Glyn Maude, Dr. Lauren McCain, Kalahari Research and Conservation staff, and the communities of Gweta and Moreomaoto.

Above - coded participant responses to the pre and post survey question: what are your three favorite animals and why? Reasons written in by the children were inductively coded by the research team into different “themed” response categories based on prevalent value orientations towards wildlife identified in the literature (Corbin and Strauss 2008).

Safety, aesthetic and physical attributes were the top types of reasons attributed to favorite animals in the both the PRE and the POST surveys. In the POST surveys there was a notable rise in responses citing the ecologicistic value of animals. In fact, ecologicistic reasons were the second most popular rationale cited for valuing animals, and were mentioned 15 times in the POST surveys. The ecologicistic theme is modeled on Kellert’s 1996 list of key wildlife value types; it represents responses that demonstrated concern for the interactions between wildlife and natural habitats, and concern for the environment as a system (Kellert 1996, Clayton and Myers 2009, 17).

Thus, the data from the pre and post surveys suggests that Denver Zoo broadened children’s perspectives about why wildlife is valuable, raising awareness about the ecological value of Botswana wildlife.

## References

- Bettinger, T.L., C.W. Kuhar, K. Lehnhardt, D. Cox and D. Cress. 2010. Discovering the Unexpected: Lessons Learned from Evaluating Conservation Education Programs in Africa. *American Journal of Primatology* 72: 445-449.
- Chawla, L., & Cushing, D. F. (2007). Education for strategic environmental behavior. *Environmental Education Research*, 13(4), 437-452.
- Corbin J. and A. Strauss. 2008. *Basics of qualitative research: Techniques and procedures for developing grounded theory*. Thousand Oaks, CA: Sage.
- Farmer, J., Knapp, D., & Benton, G. M. (2007). An elementary school environmental education field trip: Long-term effects on ecological and environmental knowledge and attitude development. *The journal of environmental education*, 38(3), 33-42.
- Heberlein, Thomas. 2012. *Navigating Environmental Attitudes*. New York: Oxford University Press.
- Hungerford, H.R. and T.L. Volk. (1990). Changing learner behavior through environmental education. *Journal of Environmental Education*. 21(3): 8-21.
- Jacobsen, S.K. 1997. Rapid Assessment for Conservation Education (RACE). *Journal of Environmental Education*. 28(3): 10-19.
- Kuhar, C.W., T.L. Bettinger, K. Lehnhardt, S. Townsend and D. Cox. 2007. Evaluating the Impact of a Conservation Education Program in the Kalinzu Forest Reserve, Uganda. *IZE Journal NR* 43: 12-15.
- Lefebvre, R. Craig. 2013. *Social Marketing and Social Change: Strategies and Tools for Improving Health, Well-Being and the Environment*. San Francisco, CA: John Wiley and Sons.
- McDuff, M. D., & Jacobson, S. K. (2001). Participatory evaluation of environmental education: Stakeholder assessment of the Wildlife Clubs of Kenya. *International Research in Geographical and Environmental Education*, 10(2), 127-148.
- Mbaiwa, J.E. *Community-based tourism in Ngamiland District, Botswana: development impacts and challenges*. 2003. *The Human Impact on the Environment and Sustainable Development in Africa*. M. Darkoh and A. Rwomire (eds.). Hampshire, England: Ashgate Publishing Limited.
- Moswete, N., B. Thapa, E.N. Toteng, and J.E. Mbaiwa. 2008. Resident involvement and participation in urban tourism development: a comparative study in Maun and Gaborone Botswana. *Urban Forum*. 19(4): 381-394.
- Perkins J.S. (1996) Botswana: Fencing out the equity issue: Cattle post and cattle ranching in the Kalahari Desert. *Journal of Arid Environments*. Vol 33: 503-517.
- Wiggins, G. and J. McTighe. 2005. 2nd edition. *Understanding by Design*. Alexandria, VA: Association for Supervision and Curriculum Development.