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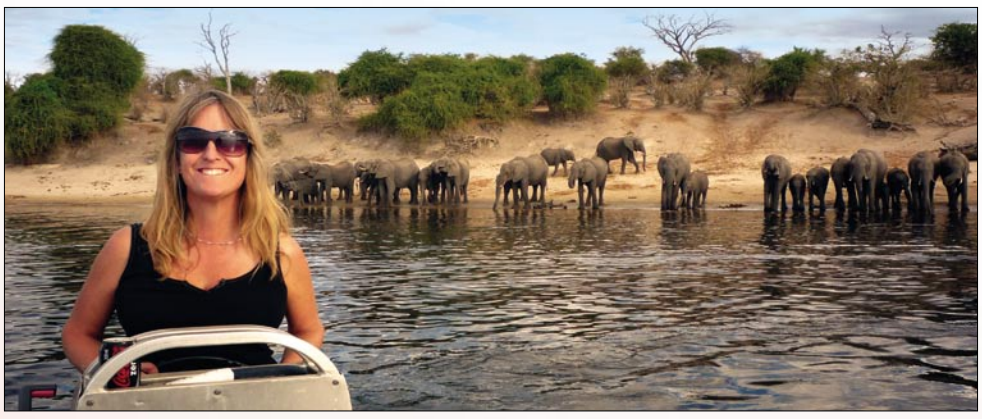
# KATHLEEN ALEXANDER'S DIVERSE RESEARCH BRINGS SUSTAINABILITY TO BOTSWANA

Associate Professor Kathleen Alexander commutes from Virginia Tech to her research projects in Botswana twice a year. The wildlife ecologist and veterinarian lived in the African nation most of her adult life, focusing on infectious disease, natural resources sustainability, human-wildlife conflict, and water quality. In the past year, her activities have been particularly fruitful. "It is a privilege to work for an institution such as Virginia Tech where I can see a need and have my scientific work be of service," Alexander said. "Nothing is more compelling than a problem that truly needs to be solved."



*Kathy Alexander returns to Botswana each year to continue work on her research projects and sustainability efforts.*

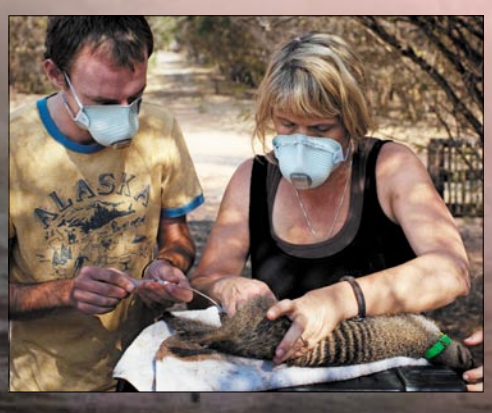
In November, U.S. Ambassador to Botswana Michelle Gavin visited a tangible result of Alexander's efforts — a craft center that will help impoverished rural women earn money to feed their families. A craft center may not seem like part of a strategy to conserve wildlife, but Alexander learned years ago that scientists must factor in the needs of human communities or their objectives for an ecosystem would fail.

This insight led her to co-found the nonprofit Conservation of African Resources: Animals, Communities, and Land Use (CARACAL), which was instrumental in paving the way for an ongoing $2.6-million grant to help rural Botswana residents develop strategies to coexist with wild animals. "With wildlife conflicts on the rise, we must find ways other than agriculture to help people escape poverty," Alexander said. "The craft center will be the first outlet to allow local people to benefit directly from tourists coming to see their wildlife."

Hunting is one of the many ways the people of Botswana interact with wildlife. Wild buffalo is the bushmeat of choice, but it could be making people sick. Alexander found that wild buffalo harbor the pathogen that causes brucellosis, a disease that appears to have been largely eradicated in Botswana livestock.

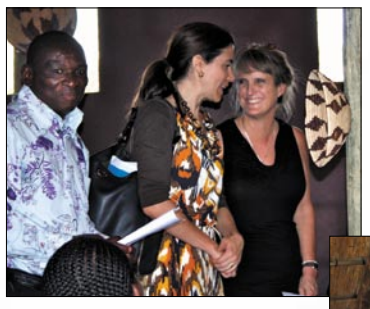
For her recently published retrospective study, Alexander sampled more than 1,000 large wild mammals, including buffalo, over 15 years. Alexander and her co-authors found evidence that a small but persistent percentage of the buffalo population carries the pathogen, putting all who handle the meat — not just the hunters and butchers, but also family members who prepare and consume it — at risk for infection. "Brucellosis spreads from animals to humans, and the buffalo bears further study in order to understand the ecology of the pathogen," Alexander said. "We need to understand how humans are interacting with the animals they share their environment with and the health threats this may pose."

Alexander received a $250,000 National Science Foundation grant last year to investigate the links between humans and animals as they influence water quality and, in turn, how water quality affects their health. Her research focuses on the Chobe River region of northern Botswana, where she noticed that the residents often sicken with diarrhea two times each year, and that these peaks appear to coincide with environmental changes in the region and with river flow.



*Alexander conducts a health examination on a banded mongoose, taking samples for later study. A few years ago, Alexander discovered a new tuberculosis pathogen that is threatening banded mongoose populations in Botswana.* ***Photo by Matt Eich***

*Graduate student Risa Pesapane (L) gathers samples of animal droppings for future analysis under Alexander's watchful eye.*



*U.S. Ambassador to Botswana Michelle Gavin (C) attended the opening of the craft center in November.*

*Alexander helped established a craft center where women can create and market handicrafts to tourists, providing a much-needed source of income.*

Alexander and her team use *Escherichia coli* (commonly referred to as *E. coli*) to track the transmission of microbes through river water, wildlife, domestic animals, and humans. "We are changing our world rapidly with little understanding of the long-term consequences," Alexander said. "We need to understand where and how these systems are coupled and how they influence water quality and environmental health."

In addition, Alexander is leading a team to study the management and control of water-borne diseases, such as cholera, through a National Institutes of Health grant. The team is evaluating the effectiveness of non-pharmaceutical interventions, such as providing clean water to at-risk populations in Haiti. Instead of incorporating the more commonly used person-to-person model of disease transmission, Alexander and her colleagues are examining the spread of disease through contaminated water sources and the influence of other ecological interactions.

These efforts and accomplishments are evidence of Alexander's dedication to the people of Botswana and elsewhere, and to the sustainability of both residents and their environment. Her goal is to give the local communities the tools they need to find and act on their own solutions to environmental challenges. For Alexander, sustainability and social justice are inextricably linked, yet sustainability comes at a cost. "We have to balance that cost," she explains, "so that humanity and ecosystems can both move forward positively."

*Alexander's work includes educating schoolchildren about the importance of their local wildlife.*

Find out more about Alexander's efforts in Botswana online.

Conservation of African Resources, Animals, Communities, and Land Use (CARACAL)
www.caracal.info/CARACAL/Welcome.html

Water Quality and Health in Botswana blog
www.healthbotswana.blogspot.com