

# WILD NATURE INSTITUTE

## 2018

ANNUAL REPORT



# From the Founders

In 2018, the Wild Nature Institute continued our long-term science, education, and advocacy work for wildlife in savannas of East Africa and forests of the western U.S.A. Both regions are biologically rich but threatened by human activities.

Highlights of this year's activities include publishing five new scientific papers, hiring a Tanzanian coordinator to direct our environmental education campaign in Tanzanian schools and communities, opening a new satellite office in Mtwambu, training Tanzanians to conduct giraffe research, and finishing two new children's story books.

In this report, you will learn more about the 2018 accomplishments in our four main program areas: Snag Forest Campaign, Masai Giraffe Conservation, Tarangire Ungulate Observatory, and Northern Plains Campaign.

**We could not have accomplished our goals without your support. As always, you have our deepest thanks.**

Dr. Derek E. Lee and Monica L. Bond  
Founders and Principal Scientists



# Snag Forest Campaign

**We study wildfire and wildlife to protect biodiversity in burned forest habitats.**

**Wild Nature Institute's research has revealed that forest fires usually do not harm Spotted Owls, and fires create more benefits than costs.**

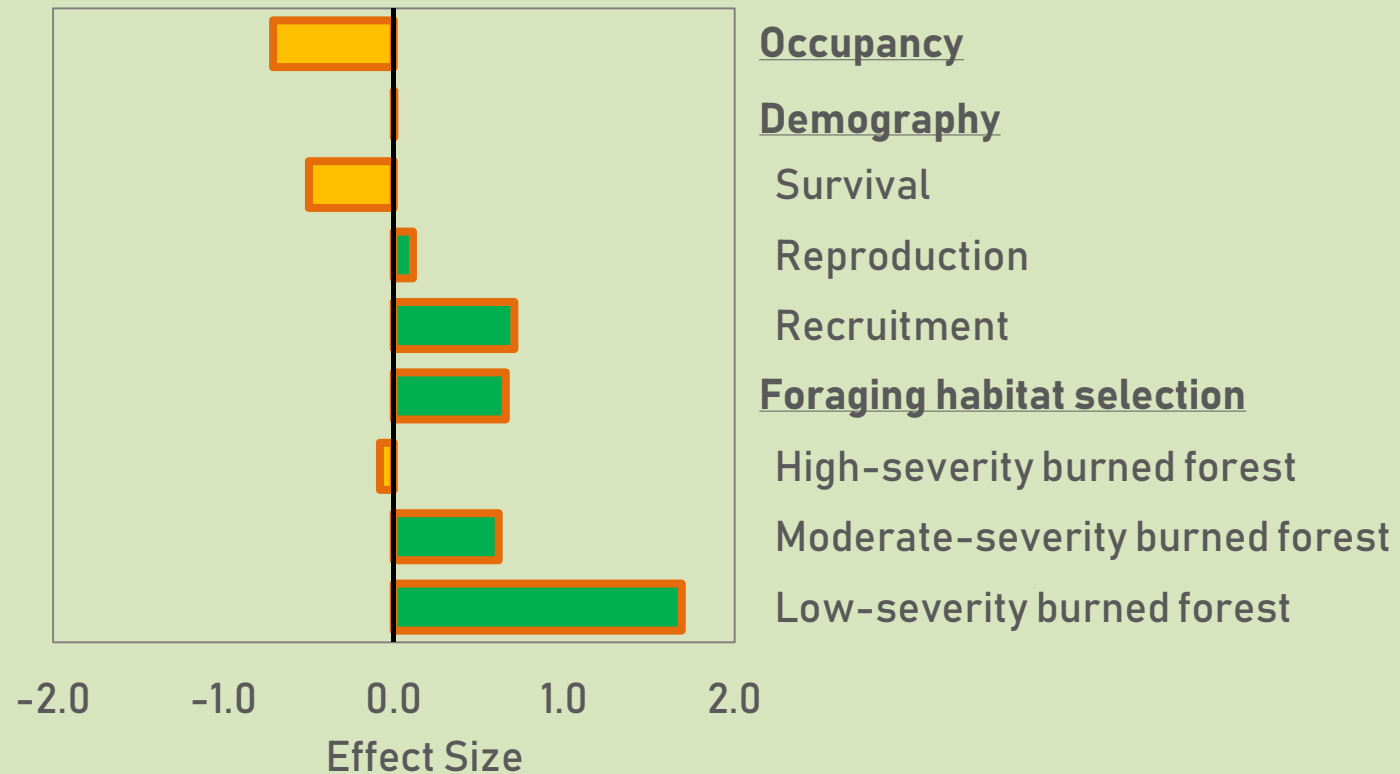
**Problems arise for the Spotted Owl when people cut down the trees, living or dead, that owls need for nesting, roosting, and perching while hunting.**



**In 2018, Wild Nature Institute scientists authored:**

- **Lee DE. 2018. Spotted owls and forest fire: a systematic review and meta-analysis of the evidence. *Ecosphere* 9:e02354. doi: 10.1002/ecs2.2354.**
- **Hanson CT, Bond ML, Lee DE. 2018. Effects of post-fire logging on California spotted owl occupancy. *Nature Conservation* 24: 93-105 doi: 10.3897/natureconservation24.20538.**

# Mixed Severity Forest Fires With Large Patches of High Severity Burn Create More Benefits than Costs for Spotted Owls



Our systematic review and meta-analysis summarizing every science paper ever published about Spotted Owls and fire, along with an accompanying article on The Conversation website, received widespread media coverage across the country (Lee 2018).

We also documented strong negative effects of post-fire logging on Spotted Owls (Hanson et al. 2018 & Lee 2018).

# Masai Giraffe Conservation

**The goal of our Masai giraffe conservation science is to understand where giraffes are doing well and where they are not, and why, and to protect and connect the places most important for giraffes.**



**Wild Nature Institute is conducting the world's largest individual-based study of giraffes. We use pattern-recognition software to track more than 3,000 individuals in a 4,000-square kilometer area to understand births, deaths, and movements in the fragmented Tarangire Ecosystem in northern Tanzania.**

This year marked seven years of continuously collected photographic data to monitor individual giraffes in the Tarangire Ecosystem. We also began a Serengeti giraffe research program to compare giraffe populations there with Tarangire.



← We use a pattern-recognition computer program to identify each giraffe.

## In 2018, we published these scientific articles about our Africa research:

- Lee DE, Cavener DR, Bond ML. 2018. Seeing spots: Quantifying mother-offspring similarity and assessing fitness consequences of coat pattern traits in a wild population of giraffes (*Giraffa camelopardalis*). PeerJ doi: 10.7717/peerj.5690.
- Lee DE. 2018. Evaluating Conservation Effectiveness in a Tanzanian Community Wildlife Management Area. *Journal of Wildlife Management* 82:1767–1774 doi: 10.1002/jwmg.21549.
- Lee DE, Bond ML. 2018. Quantifying the ecological success of a community-based wildlife conservation area in Tanzania. *Journal of Mammalogy* 99:459–464 doi: 10.1093/jmammal/gyy014.

**Our results inform conservation and land management, and help ensure a future for giraffes.**



# Giraffe Science: Media Highlights

Our article about giraffe spots received worldwide media coverage with dozens of stories published around the world.

Altmetrics indicated it received more attention than 95% of science articles published this year.

This infographic was widely circulated to help people understand our results and their implications.

# Why Do Giraffes Have Spots?

Giraffe coat patterns are complex and every animal is unique. Biologists think coat patterns may have evolved to hide newborn calves from predators like lions. Other theories about why animals have spots are communication, thermoregulation, and parasite avoidance.



Avoid Predators

Communication

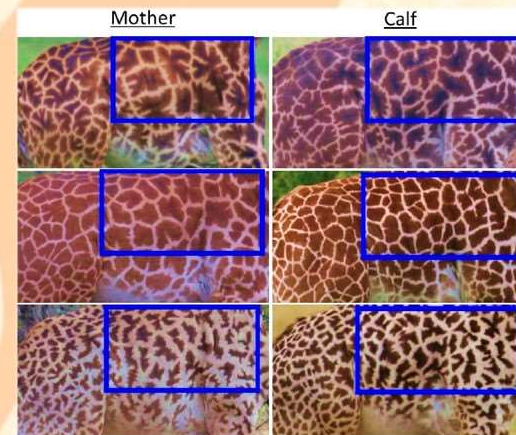
Temperature Control

Anti-Parasite

In 1968, Anne Innes Dagg presented the first evidence that the shape, size, and color of spots in giraffe coat patterns might be heritable. We measured and analyzed spot traits in wild giraffes to test her theory.

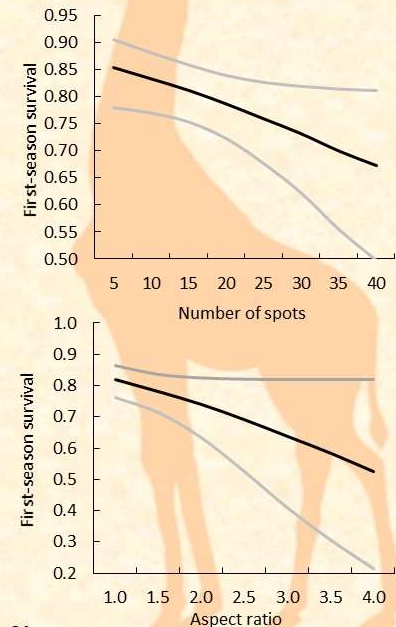


**Giraffe calves inherit their spots from their mom**



We used computer vision to extract patterns and measure 11 spot traits describing the shape, size, and color of giraffe spots. Two spot shape traits, circularity and solidity (how ruffled and uneven the spot edges were), had significant mother-offspring regression slope coefficients.

**Spot traits influence survival of newborn giraffes**



Source: Lee DE, Cavener DR, Bond ML. 2018. Seeing spots: Quantifying mother-offspring similarity and assessing fitness consequences of coat pattern traits in a wild population of giraffes (*Giraffa camelopardalis*). PeerJ. DOI: 10.7717/peerj.5690

We analyzed 31 mother-calf pairs & 258 newborn survival records



# Giraffe Science: Expanding our Scope

**In November and December we conducted three photographic surveys for giraffes in the Seronera area of Serengeti National Park. We also conducted a photographic survey for giraffes in the Ndutu region of Ngorongoro Conservation Area.**

**The first goal** of the Serengeti research is to compare population size, survival, and population growth rates of giraffes to a study conducted a decade ago by Dr. Megan Strauss, now a Wild Nature Institute Research and Education Associate.

**The second goal** is to compare demographic rates and sociality of giraffes in Serengeti with Tarangire.



# Giraffe Science: Building Collaborations

**This year we began collaborations with several institutions to improve and expand our research programs.**

- **We partnered with zoos:** In November we hosted Como Park Zoo's Jill Erzar, a giraffe zookeeper and scientist, who helped us process our data and is coordinating with U.S. zoos for our study of giraffe body growth rates.
- **We partnered with Nelson Mandela AIST:** Dr. Derek Lee is advising a Tanzanian master's student, Matana Levy, who is studying giraffe foraging ecology.
- **We partnered with Penn State University:** Dr. Derek Lee joined Penn State as an associate research professor. We published 'Seeing Spots' with renowned giraffe geneticist Dr. Douglas Cavener, and are collaborating with him and zoos on giraffe genomic research.
- **We partnered with University of Zürich:**
  - We worked with Professor Dr. Barbara König and undergraduate Mara Knüsel on a study of ecological correlates of giraffe home-range sizes. The study will be published next year in the science journal *Animal Behaviour*.
  - Professor Dr. Arpat Ozgul visited our Tarangire study area in September.
  - Monica Bond is advising a master's student Nick James, who is analyzing habitat selection by ungulates in Tarangire using our TUNGO data.



# Tarangire Ungulate Observatory “TUNGO”

**The Wild Nature Institute’s landscape-level population research program for 22 species of ungulates (hoofed mammals).**



Grant's gazelle



Kirk's dik-dik



Impala



Common waterbuck

**The savanna habitat of the Tarangire Ecosystem is one of the richest areas on the planet for large mammal diversity and abundance, and is a global hotspot for ungulates. TUNGO is monitoring all ungulate species in this ecosystem, and providing the scientific means to reverse population declines.**

**Our TUNGO surveys provide reliable data for scientific management, land-use planning, anti-poaching enforcement, and conservation.**

# Northern Plains Campaign

This year we published two studies using our TUNGO data describing how community conservation effectively preserves habitat and benefits wildlife, including the threatened long-distance Tarangire-Northern Plains wildebeest migration route. We met with land-use planning advocates to discuss protection of the wildebeest migration route using our data-based maps.

**The sustainability of the Tarangire wildebeest population is important to the ecological function and economic value of Tarangire National Park.**



# Capacity Building

In June, Dr. Derek Lee spent a stimulating day training Tanzanian university students and staff from the Tanzania Wildlife Research Institute (TAWIRI) and Tanzania National Parks (TANAPA) about techniques for monitoring giraffes. Derek discussed field study design, data collection methods, and how to use WildID software to create a database of individual giraffes.



In June, we hired James Madeli to be a full-time education coordinator facilitating the use of our Juma lessons and activities in schools around the Tarangire Ecosystem. James opened our satellite office in Mtowambu. Welcome, James!



In October, we put together a Tanzanian crew and trained them to conduct our giraffe photographic mark-recapture surveys in the field. In this way we are increasing the capacity of local Tanzanians to effectively study and conserve their national animal, and ensuring the long-term sustainability of our Masai Giraffe Research project.



Dr. Derek Lee is also co-supervising a Tanzanian master's student at Nelson Mandela African Institute for Science and Technology, Matana Levy, who is investigating giraffe foraging ecology around the Tarangire Ecosystem.

# Environmental Education

**Giraffes are inspiring the next generation of Tanzanian conservationists. In 2018, Wild Nature Institute distributed giraffe-themed educational materials to children and teachers throughout the Tarangire region of northern Tanzania, and also in schools near Katavi National Park in the south. The materials use the giraffe to teach biology, geography, science, math, and language skills.**

**A Giraffe Celebration Day in October had sports, drama, art, a Juma the Giraffe play, singing, a “Giraffe Bee,” and t-shirts for the children that say “We Protect Giraffes, The Pride of Tanzania.” These activities teach and inspire children, parents, and teachers to care for giraffes and other wildlife in fun, exciting, and innovative ways.**



***Very Special Thanks to Chris Barela, David Brown, Kayla Harren, Lise Levy, Megan Strauss, and Sophie Tremblay***

# Environmental Education

Wild Nature Institute's Education Consultant Lise Levy hosted 5 workshops for teachers to learn our lesson plans and practice the hands-on activities that they will use in the classroom to accompany the giraffe-themed books and posters.

In 2018, we distributed books and posters to 12 schools, an orphanage, and a community center reaching more than 7,000 children around Tarangire and Lake Manyara National Parks. We also distributed books and posters and trained 18 teachers from 9 schools near Katavi National Park, reaching thousands more.



# Environmental Education

## CELEBRATING AFRICA'S GIANTS

Our giraffe-themed educational program was so successful that we expanded to include Africa's other two giants: elephants and rhinoceroses.

Giraffes, elephants, and rhinoceroses are Africa's giants. These large mammals play critical ecological roles in the places where they live, but their numbers are plummeting because of conflicts with humans.

With our new "Celebrating Africa's Giants" project, our team of researchers, educators, illustrators, and designers has developed innovative educational materials and activities for Tanzanians and for zoo audiences in the U.S.A.



***Giraffes* teach about adaptations to the environment.**

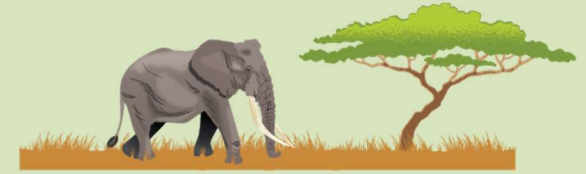
***Elephants* teach about ecology and social behavior.**

***Rhinoceroses* teach about wildlife conservation.**

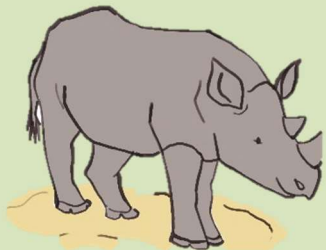


# Environmental Education

## CELEBRATING AFRICA'S GIANTS



- Full-color bi-lingual (Swahili and English) story books about giraffes, elephants, and rhinoceroses.
- Swahili Africa's Giants activity book.
- Giraffe, elephant, and rhinoceros educational posters.
- A conservation career guide, containing interviews and photographs of people involved in conservation-related work in Tanzania (e.g. researchers, safari guides, wildlife rangers, NGO staff, solar technicians, etc.).
- A website—[www.AfricasGiants.org](http://www.AfricasGiants.org)—where materials, lesson plans, and activities are freely available.
- Educator training on how to develop and implement innovative, effective, conservation-oriented teaching strategies.
- A mobile education program “Giraffe/Elephant/Rhinoceros in a Box” to implement the lesson plans and activities in the classroom, and provide the necessary supplies.



[www.AfricasGiants.org](http://www.AfricasGiants.org)



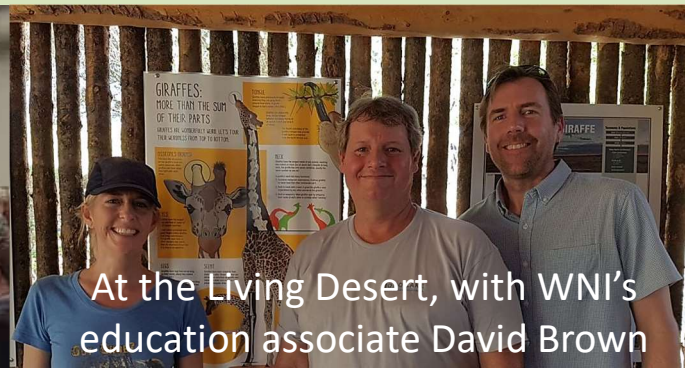
# Outreach and Advocacy

We presented our latest giraffe science findings at several venues this year.

- We discussed giraffe biology, ecology, conservation, and our research to 20 safari guides-in-training at Asilia's Oliver's Camp in Tarangire National Park.
- We gave two presentations at the North American Congress of the Society for Conservation Biology in Toronto during a special symposium on Giraffe Ecology, Demography, and Behavior.
- We presented to 85 members of the public and staff at The Living Desert in Palm Desert, California.
- We presented to 50 staff and docents at Sacramento Zoo in Sacramento, California.
- We presented to 30 staff and docents at Safari West, Inc. in Santa Rosa, California.
- We discussed our research and education program with 50 American students from the School for Field Studies in Rhotia, Tanzania.
- We presented to 12 students from Penn State University as part of their study abroad program in Tanzania.
- We spoke with 30 Tanzanian students at the Nelson Mandela African Institute for Science and Technology, and inspired Matana Levy to do his Master's project with us.
- We presented our research to 50 fellow scientists and students at the University of Glasgow.



At the Sacramento Zoo



At the Living Desert, with WNI's education associate David Brown



At Asilia's Oliver's Camp in Tarangire

# Our Major Donors

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**Sacramento Zoo · Columbus Zoo · Tierpark Berlin · The Living Desert**

**African Wildlife Foundation**

**Leonardo Di Caprio Foundation**

**Tulsa Zoo**

**Como Park Zoo**

**Save the Giraffes**

**Cincinnati Zoo**

**GreaterGood.org**

**Safari West**

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*Thanks also to all the additional wonderful donors who supported our work!*

# Our Partners

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**Penn State University**

**University of Zürich**

**Asilia Africa**

**Manyara Ranch Conservancy**

**Center for Biological Diversity**

**PAMS Foundation**

**Conservation Congress**

**Tanzania National Parks**

**Geos Institute**

**Tanzania Wildlife Research Institute**

**John Muir Project**

**Wasima Project Katavi**

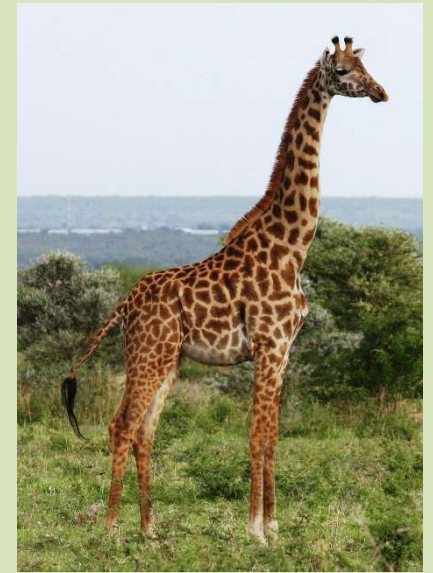
# Statement of Activities 2018

## INCOME

Grants from Foundations	\$98,765
Individual Donations/Family Trusts	\$16,730
<b>Total Income</b>	<b>\$115,495</b>

## EXPENSES

Field Research (Permits, Vehicle, Equipment, Food and Fuel, Tanzanian Field Assistants)	\$63,591
Travel (Including Conferences)	\$37,308
Conferences/Meetings/Membership Fees	\$3,730
Services (Educational Activities, Scientific Publication Costs, GIS and Statistical Analyses, Printing Books and Posters)	\$37,616
Mailing and Office Expenses (Rent, Phone, Utilities)	\$12,443
<b>Total Expenses</b>	<b>\$154,688</b>
Starting Balance (carryover from 2017)	\$ 69,420
Income - Expenses	(\$39,193)
Ending Balance	\$30,227



### Officers

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 Monica Bond, Secretary-Treasurer

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