Wild Nature Institute

2016

ANNUAL REPORT

Cover: Lion chasing wildebeests in Tarangire National Park, Tanzania/ Inside cover: Dr. Derek Lee on the job at Manyara Ranch, Tanzania

From the Founders

In 2016, Wild Nature Institute scientists continued our long-term research and conservation of wildlife in savannas of East Africa and conifer forests of the western U.S.A. Both regions are biologically rich but threatened by people. We are implementing effective conservation actions that protect wild nature and the life that depends upon it.

This year, we published five scientific papers about our giraffe research and presented our research at an international giraffe conference. We also published a study showing Spotted Owls forage in intensely burned forests in southern California, summarized the scientific literature about Spotted Owls and forest fire, and spoke with local communities throughout California on the value of forest fire for wildlife. Finally, we produced our second children's book, *Juma the Giraffe*, and distributed this book and other giraffe-themed educational materials to thousands of Tanzanian schoolchildren.

Read on to learn more about our 2016 accomplishments in our four main program areas: Masai Giraffe Conservation, Tarangire Ungulate Observatory (TUNGO), Northern Plains Campaign, and Snag Forest Campaign.

We could not have accomplished our goals without your support. You have our deepest thanks.

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

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 Masai giraffes. We use pattern-recognition software to track >2,100 individuals in a 1,500-km^2 area to understand births, deaths, and movements in the fragmented Tarangire Ecosystem. Our results inform conservation and land management, and help ensure a future for giraffes.

This year marked five continuous years of intensively collected photographic data to recognize and monitor individual giraffes.

⬅ We use a state-of-the-art computer program to identify each giraffe.

In 2016, we published these scientific articles about our giraffe research:

· Lee, DE, Strauss MKL. 2016. Giraffe demography and population ecology. Reference Module in Earth Sciences and Environmental Studies. DOI: 10.1016/B978-0-12-409548-9.09721-9.

· Lee DE, Bond ML. 2016. The occurrence and prevalence of Giraffe Skin Disease in protected areas of northern Tanzania. Journal of Wildlife Diseases 52:753-755.

· Bond ML, Strauss MKL, Lee DE. 2016. Soil correlates and mortality of Giraffe Skin Disease in Tanzania. Journal of Wildlife Diseases 52:953-958

· Lee DE, Bond ML. 2016. Precision, accuracy, and costs of survey methods for giraffe *Giraffa camelopardalis*. Journal of Mammalogy 97:940-948.

· Lee DE, Bond ML, Kissui BM, Kiwango YA, Bolger DT. 2016. Spatial variation in giraffe demography: a test of 2 paradigms. Journal of Mammalogy 97:1015-1025.

· Lee DE, Kissui BM, Kiwango YA, Bond ML. 2016. Migratory herds of wildebeest and zebra indirectly affect juvenile survival of giraffes. Ecology and Evolution DOI: 10.1002/ece3.2561.

Giraffe Science Summary

Human population, agricultural development, and illegal killing for meat have caused wildlife populations, including giraffes, to decline. Our research has revealed:

- The giraffe population in the Tarangire Ecosystem is declining, most likely from people illegally killing adult giraffes for their meat.
- Subpopulations of giraffes in the Tarangire Ecosystem are still connected by movements of adult giraffes, including crossing busy tarmac roads and farmlands.
- Aerial surveys to monitor giraffes are undercounting, so we presented a correction factor to make population estimates from aerial surveys more accurate.
- Migratory herds of wildebeests and zebras deflect lion predation away from giraffe calves, thus helping giraffe populations.
- Giraffe Skin Disease is associated with infertile soils, but is not causing mortality of giraffes.

Our results underscore the critical importance of maintaining habitat linkages between protected areas for giraffes and for migratory species, while simultaneously reducing poaching.

We are continuing our work on land-use planning and anti-poaching to protect wildlife and habitat linkages for wildlife movement.

We presented our giraffe conservation science at the 2016 International Giraffid Conference in Chicago, Illinois.

At the conference we were thrilled to meet one of our heroes, Dr. Anne Innes Dagg, who pioneered giraffe research—not an easy task for a woman scientist living in Africa in the 1960s! We are grateful for her work, as we stand upon the shoulders of those who came before us.

Tarangire Ungulate Observatory "TUNGO"

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




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. The goal of TUNGO is to monitor all ungulate species in this ecosystem, and to provide the scientific means to reverse population declines.

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

We used our TUNGO data to measure the effectiveness of community conservation in Tanzania.

In Tanzania, community-based management of wildlife occurs through Wildlife Management Areas (WMAs). WMAs are multiple villages designating land for wildlife conservation, and sharing tourism revenues. Nineteen WMAs are currently operating, encompassing 7% of Tanzania's land area, with 19 more planned. This year we partnered with PAMS Foundation to measure the effectiveness of anti-poaching and resource protection in WMAs.

Dr. Derek Lee ready to survey for ungulates in the Burunge WMA, with ranger Florian. The rangers and scouts work in partnership with PAMS Foundation, who provide training.

We quantified wildlife and livestock density before and after WMA establishment relative to adjacent unprotected land with similar vegetation.

We documented significantly higher resident wildlife densities (giraffe and dik-dik) and lower cattle densities in the WMA, relative to unprotected land, indicating short-term ecological success.

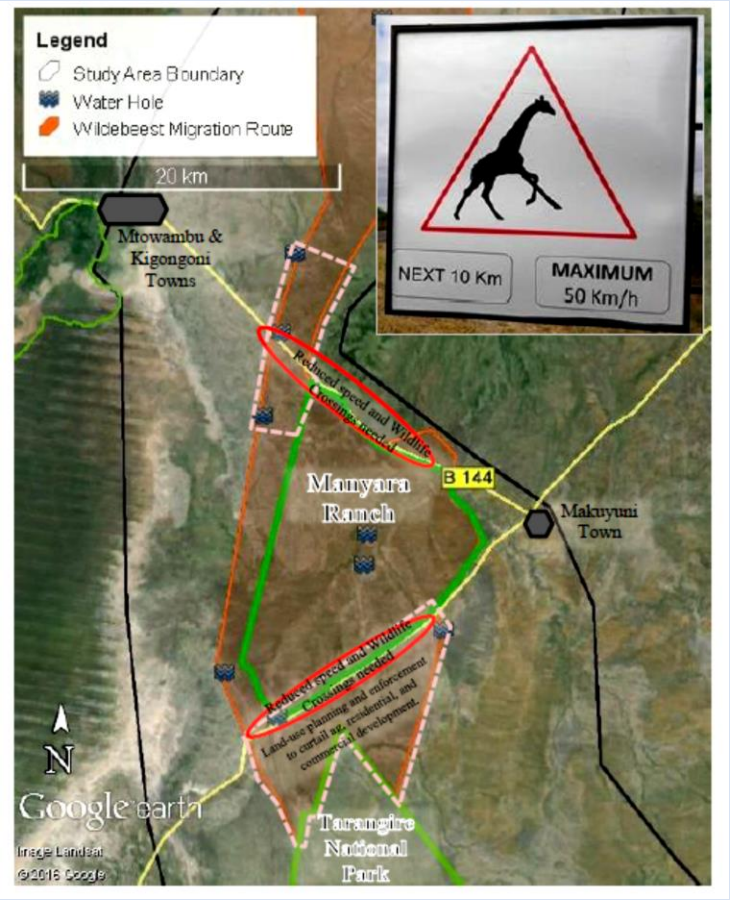
Northern Plains Campaign

The Wild Nature Institute is putting our science into action to conserve savanna wildlife. Our Northern Plains Campaign is an integrated research, education, and advocacy initiative to catalyze community conservation of threatened wildlife in the fragmented Tarangire Ecosystem.

Illegal hunting and lack of land management in the Tarangire Ecosystem has reduced wildlife populations and eliminated eight migratory corridors for wildebeest, zebra, gazelle, eland, and oryx. Only two corridors remain and neither are protected. A timely intervention over the next few years will save Tarangire's genetically unique population of wildebeest and other savanna wildlife, and will allow Masai pastoralists to maintain their traditional lifestyles.

Land-Use Planning

This year we completed a two-year study documenting priority areas to conserve landscape-scale mobility for migratory wildlife and traditional pastoralists. We submitted our maps and recommendations to our Tanzanian partners who have expertise in local land-use planning.



This map shows bottlenecks where mobility is at greatest risk between Tarangire National Park and Manyara Ranch, and between Manyara Ranch and Selela village (indicated by two pink dashed polygons).

Land-use planning and enforcement must restrict agricultural, residential, and commercial development. Road speed controls and Wildlife Crossing Areas demarcated by warning signs should be placed in the areas marked by red ovals.

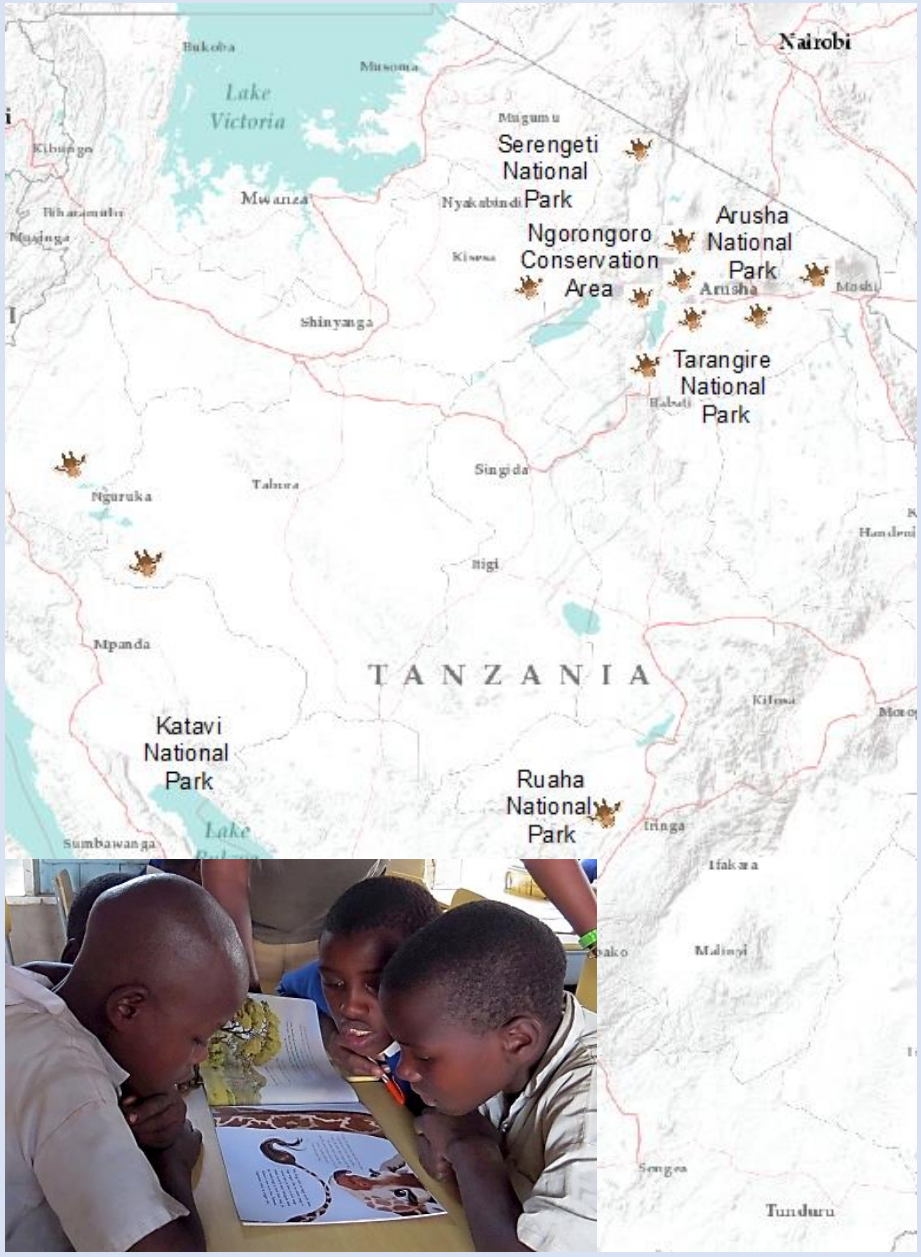
Environmental Education in Tanzania

Giraffes are inspiring the next generation of Tanzanian conservationists. This year, Wild Nature Institute and our partners developed giraffe-themed educational materials for children and teachers. The materials teach biology, geography, science, math, and language skills.

We created a storybook *Juma the Giraffe*, an activity book *Giraffe and Friends*, a poster describing the anatomy and behavior of giraffes, and lesson plans and activity guides for parents and teachers. These materials help teachers meet the Tanzanian government mandate for environmental education in primary and secondary schools.

Very Special Thanks to Chris Barela, David Brown, Kayla Harren, and Megan Strauss

Environmental Education



The giraffe books and posters are being shared with 6,000 school children from 50 schools all over Tanzania, with a focus on areas where giraffes live.

The giraffe icons on the map show locations materials are being distributed.

Environmental Education in Tanzania

In 2016 Wild Nature Institute hosted two workshops for teachers, led by Lise Levy, a retired high school biology teacher with 32 years of experience in education. Teachers had a wonderful time learning the lesson plans and practicing the hands-on activities that they will use in the classroom to accompany the giraffe-themed books and posters.

The workshops included 34 teachers from 16 primary and 14 secondary schools representing 5,500 children in villages near Tarangire, Lake Manyara, and Ruaha national parks in Tanzania.

Workshop in Makuyuni near Tarangire and Lake Manyara national parks

Workshop in Tungamalenga near Ruaha National Park

Environmental Education in Tanzania

We also turned our *Lucky the Wildebeest* and *Juma the Giraffe* children's books into video storybooks.

The conservation and social lessons in Juma and Lucky are now accessible to every Tanzanian in English, Swahili, and Masai.

Maajabu ya Uhamaji wa Mtoto wa Nyumbu Anayeitwa Bahati
Kwa Kiswahili bila Maandishi

Juma Twiga
Kwa Kiswahili bila Maandishi

The video storybooks are part of our Sinema Leo Campaign in rural villages. Sinema Leo is building pride in Tanzania's wildlife resources among an audience that has no access to national parks, very low literacy, and little access to outside entertainment. The videobooks are also available on YouTube.

Environmental Education in Tanzania

Wild Nature Institute had an unexpected opportunity to raise awareness around the world about the plight of giraffes.

In January, we posted a blog about **Omo, the leucistic giraffe** in Tarangire National Park. The blog post went viral and the story was shared by hundreds of media outlets across the globe.

Environmental Education in Tanzania

In 2016 we partnered with PAMS Foundation and the Interpretive Guides Society to create the first-ever training manuals for Tanzanian safari guides so they can develop a deeper knowledge of ecology, wildlife conservation, botany, and other subjects.

The goal is to establish standards and certifications for Tanzanian guides, and ensure a high-quality experience for tourists in one of the most spectacularly wildlife-rich countries on the planet.

Our involvement in creating the training manuals bridges science and public outreach, promotes science-based conservation values in guides and their local communities, and spreads a conservation message to tourists from across the globe.

Monica Bond (bottom left) with Tanzanian safari guides at a training session in Lake Manyara National Park

Giraffe Day Honors Tanzania's National Animal

Students and teachers at Nkaiti Secondary School in Tanzania celebrated the first-ever Giraffe Day on July 24, 2016 to honor their national animal.

This region is part of a village Wildlife Management Area that provides important linkage habitat between Lake Manyara and Tarangire national parks that ensures the freedom to roam for giraffes and other wildlife.

Giraffe Day—sponsored by PAMS Foundation and Wild Nature Institute–included fun environmental education activities, sports, a school clean-up, arts and crafts, a giraffe quiz, and dramatic performances about giraffes.

This the first of more community conservation celebrations highlighting the importance of giraffes and other wildlife to the economy, culture, and ecology of Tanzania.

Snag Forest Campaign

We are studying wildfire and wildlife in California, and applying our findings to protect habitat.

Wild Nature Institute's research has revealed that intense fire usually does not cause California Spotted Owls to abandon their territories or reduce their reproduction as previously believed, and owls hunt in severely burned forests when it is available.

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.

We provide scientific data to help scientists, land managers, the media, and the public to embrace the ecological value and necessity of severely burned forests. In 2016, Wild Nature Institute scientists authored :

- Bond ML. 2016. The Heat is On: Spotted Owls and Wildfire. Online Reference Module in Earth Systems and Environmental Sciences. Elsevier Press, Amsterdam.
- Bond ML, Bradley C, Lee DE. 2016. Foraging habitat selection by California spotted owls after fire. Journal of Wildlife Management 80:1290-1300.
- An expert declaration to help stop logging of Northern Spotted Owl habitat in the Mendocino National Forest in northern California, for Conservation Congress (who won a temporary reprieve from logging for a year).
- Scientific comments on the Draft Land Management Plans for three national forests in the Sierra Nevada.

Snag Forest Education

In 2016 we continued our work educating the public about the ecological value and naturalness of high-severity fire.

During March and April 2016, we conducted four public presentations about Spotted Owls and fire in California, including one to the Sacramento Chapter of the Society of American Foresters.

Monica Bond and Christy Sherr

Drs. Derek Lee and Chad Hanson

We also visited the Rim Fire site with Wild Nature Institute board member and fire ecologist Dr. Chad Hanson, and met with the Stanislaus National Forest Supervisor to advocate against additional postfire logging in this ecological treasure trove.

Snag Forest Education

Dr. Derek Lee wrote a story on Mongabay profiling Monica Bond's Spotted Owl research and forest protection work.

MONGABAY

RAINFORESTS OCEANS ANIMALS & ENVIRONMENT FOR KIDS PHOTOGRAPHY WILDTECH MORE

The biologist terrifying the US Forest Service and the timber and forest fire-fighting industries

29 August 2016 / Commentary by **Derek E. Lee**

The U.S. Forest Service, which manages 11 million acres of public forest land in California's Sierra Nevada, is publishing a new California spotted owl conservation strategy and also revising its forest management plans for Sierra Nevada national forests. These documents will influence how all National Forests are managed for the coming decades, and they are dangerously misguided about wildfire, Derek E. Lee writes in this Mongabay op-ed

- *In 1993, the Forest Service began managing for spotted owl habitat, implementing standards intended to reduce logging in owl territories, though cutting trees was still allowed. Since then, populations of spotted owls have crashed all across Forest Service lands in California.*
- *Monica Bond is a wildlife biologist who has spent the past 15 years becoming an expert on spotted owls and forest fires. Earlier this month, she published a paper summarizing all existing science about what happens to spotted owls when forests burn, in the hope of averting a major US forest management policy mistake.*
- *"Everyone expected fire to be bad for owls, but the data showed no effect on survival, reproduction, or site occupancy," Bond said. "Our data showed fire wasn't the owl-eating monster we had all believed it to be."*

Snag Forest Education

Owl Eye News featured us in their September 2016 issue.

Owl News

Owl the News that fit to Print!

Wild Nature Institute:

New Research on the Spotted Owl's habitat and Old Growth Fires

Information and Research by Monica Bond

The spotted owl has been a big topic in owl news of late. It has been previously thought that the wildfires of the old growth forests in the Pacific Northwest have been devistating the species' population. The old growth forests consist of old trees, large canopy coverage and fallen logs - thus giving the owl places to nest. Wildfires destroy all of this nesting real estate which is why such great efforts have been put forth to put them out or stop them from happenening all together.

Recent studies by Monica Bond of the Wild Nature Institute, an organization started by Bond more than a decade ago, dedicated to studying owls and fire, has discovered that the wildfires have not been the reason for the declining spotted owl population. Her studies show that the wildfires, which have been naturally occuring for thousands of years, don't disturb the reproduction of the owls. What they found was is that contunious logging practices in the old growth areas of California and the Pacific Northwest have had the most impact on the spotted owl.

The spotted owl is the main species that the Forest Service watches to indicate whether or not they are doing a good job at managing the area's forests. If the spotted owl's populations declines than a good job has not been done. Both Forest Service and National Park lands have spotted owl populations. The only difference is that logging, while reduced is still permitted on Forest Service lands while it's strictly prohibited on Park Service lands. Bond found that both areas had wildfires, but only in the Forest Service lands were the owls suffering.

Bond's summary paper discribes that the effects of forest fires do not interefere with owl life. This is bad news for the Forest Service since billions are spent trying to prevent fires as well as monitoring logging in these areas to reduce fire risk.

information from MongaBay and Wild Nature Institute

Research from the Wild Nature Institute has found:

Several studies have now demonstrated that spotted owls can survive and thrive (successfully reproduce) within territories that have experienced moderate- and high-severity fire. Research published by Wild Nature Institute's scientists and others have found the following:

- Spotted owls generally survive and continue to reproduce in territories that experienced severe fire.
- Only marginal sites (often vacant and non-reproductive) have lower occupancy after severe fire.
- Spotted owls nest and roost in stands with high canopy cover (unburned/low burned) even in burned landscapes.
- Spotted owls forage in severely burned stands.
- Home-range sizes are similar in burned and unburned landscapes.
- Post-fire logging causes territory abandonment and reduces survival.

Fires where tress maybe burned but are still standing still provide the forest wildlife, including the spotted owl, with all that they need to survive. When logging fires occur and trees are down, this is when the populations suffer.

Spotted Owl territory in the Red Star Fire, Eldorado National Forest.

Post-fire logging on private lands after the Red Star Fire, Eldorado National Forest.

Scientific publications by Wild Nature Institute scientists about Spotted Owls and Forest Fire:

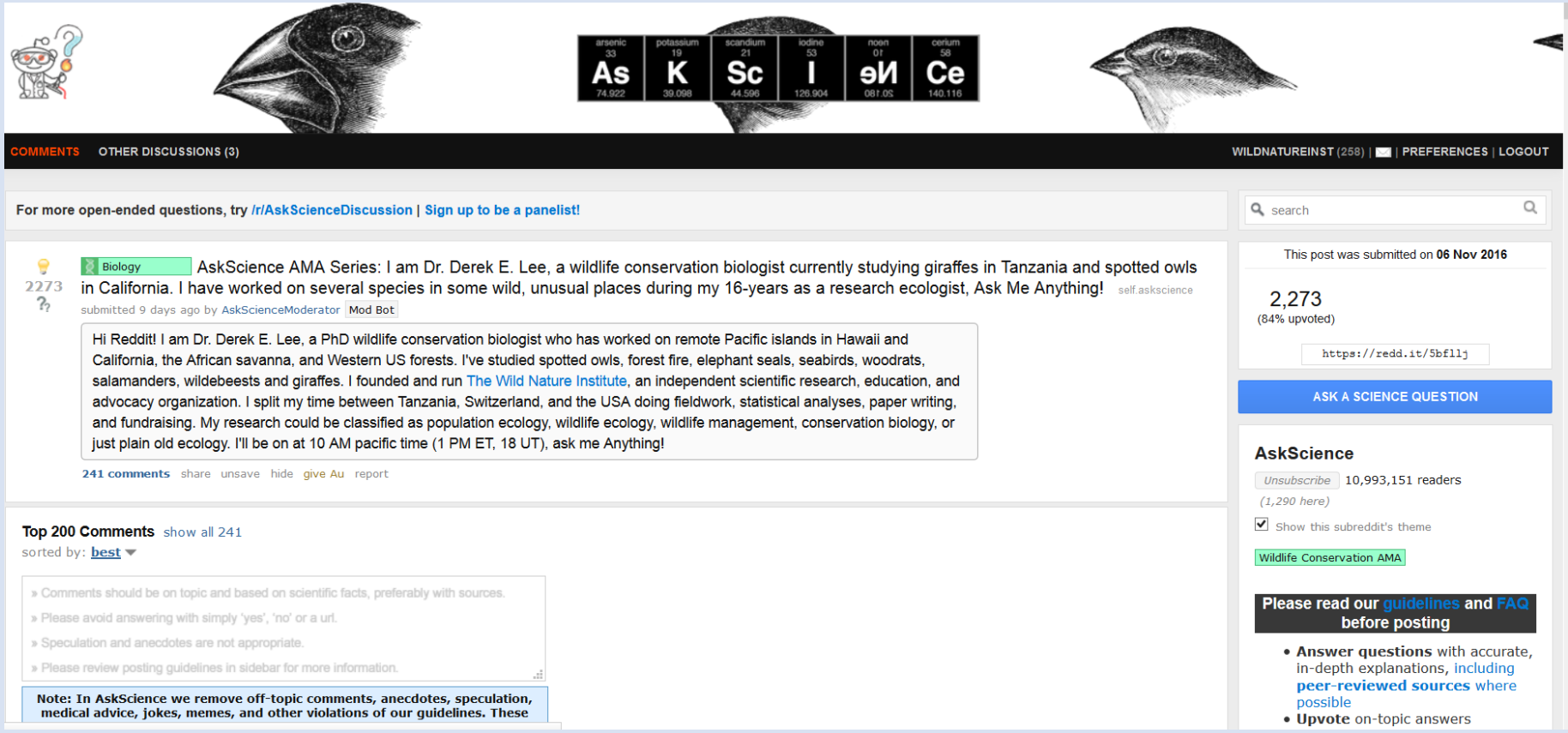
- Bond et al. 2016. Foraging habitat selection by California spotted owls after fire.
- Lee and Bond 2015. Previous year's reproductive state affects Spotted Owl site occupancy and reproduction responses to natural and anthropogenic disturbances.
- Lee and Bond 2015. Occupancy of California Spotted Owl sites following a large fire in the Sierra Nevada, California.
- Odion et al. 2014. Effects of fire and commercial thinning on future habitat of the Northern Spotted Owl.
- Lee et al. 2013. Influence of fire and salvage logging on site occupancy of spotted owls in the mountains of Southern California.
- Bond et al. 2013. Diet and home-range size of California Spotted Owls in a burned forest.
- Lee et al. 2012. Dynamics of California Spotted Owl breeding-season site occupancy in burned forests.
- Bond et al. 2010. Winter movements by California Spotted Owls in a burned landscape.
- Bond et al. 2009. Habitat selection and use by California Spotted Owls in a post-fire landscape.
- Bond et al. 2002. Short-term effects of wildfires on spotted owl survival, site fidelity, mate fidelity, and reproduction.

Wild Nature Institute

Online Education

Wild Nature Institute's Dr. Derek Lee participated in a Reddit Ask Me Anything session at the /r/AskScience subreddit. This was a great opportunity to share our conservation work.

More than 240 comments were generated by the participants of Reddit, and one participant is now volunteering for us!



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John Muir Project

Manyara Ranch Conservancy

Tanzania National Parks

Tanzania Wildlife Research Institute

Tarangire Lion Project

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The Wildlife Connection

Statement of Activities 2016

INCOME		
	Grants from Foundations	$109,918
	Individual Donations/Family Trusts	$54,638
Total Income		**$164,555**

EXPENSES		
	Field Research (Permits, Vehicle, Equipment, Food and Fuel, Tanzanian Field Assistants)	$11,816
	Travel (Including Conferences)	$17,620
	Conferences/Meetings/Membership Fees	$4,616
	Services (Anti-Poaching Activities, Scientific Publication Costs, GIS and Statistical Analyses, Printing Children's Books, Documentary Videos)	$57,248
	Mailing and Tanzania Office (Rent, Phone, Utilities)	$15,341
	Fund for Wild Nature (Fiscal Sponsorship)	$26,142
Total Expenses		**$132,783**

Starting Balance (carryover from 2015)	**$24,530**
Income - Expenses	**$31,773**
Ending Balance	**$56,303**

Officers

Dr. Derek Lee, Board President

Monica Bond, Secretary-Treasurer

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Wild Nature Institute

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