



TREE Research Associate Anthony Ambrose exploring the redwood treetops, California.

TREE Foundation

Annual Report 2019

- **Dr. Meg Lowman, Director**
- **8 October 2019**
- **Historic Spanish Point, Osprey FL**



TREE research associates and students have studied water bears and water ecology in redwoods.

The world has fewer forests left, with fires in the Amazon and clear-cutting in many regions. Parts of the Pacific northwest and Canada (pictured here), along with Russia, Siberia, and the upper Amazon remain as our last tracts of large forests.



Dear TREE Foundation Supporters,

15 September 2019

Happy 20th anniversary of the TREE Foundation!! This year celebrates two decades of our mission of both local and global forest conservation actions. Saving trees has never been more important to human health, and as we head into our third decade, we thank you for supporting our forest research, education and exploration. Your grandchildren will also thank you! As the media headlines report on fires in Brazil and scientists calculate the number of trees required to absorb carbon dioxide from human activities, the role of trees is in the spotlight.

Highlights of this past year are described in our three mission pillars: research, education and exploration. We are humming on all fronts and look forward to ramping up our activities during our third decade. Big achievements this past year include: launch of our local TREE-parties, which are lively conversations about environmental issues, discussed with libations (not tea!); continued success and increased media attention to save Ethiopia's 40 highest biodiversity church forests, including major media shows in Canada, BBC, Nature Magazine, and a partnership with National Geographic; international exploration in Amazon, Mozambique, and Morocco; completion of a documentary called A Woman Who Climbs Trees by a rising-star Ringling School of Art and Design student; and a bold, audacious plan to ramp up our global canopy walkway strategy to build walkways in critical forests where local people can earn income from ecotourism, not logging. Director Lowman has shifted her base back to Florida after completion of a pledge as Chief of Science, California Academy of Sciences. With her return to the east coast, we hope to expand the role of TREE as a local and global Lorax, aka a voice for the trees.

1. RESEARCH

- a. **Scholarships** – Thanks to individual TREE donors, we now have 4 women-in-science graduates from developing countries who are female role models. Pamela Montero, TREE scholar from Peru who was mentored by TREE from grade 5, is now a PhD student in conservation and ecotourism at University of Florida. TREE Scholar Tizezew Sisay of Ethiopia received her master's degree in Women and Environmental Science at University of Maine last year; and newly minted TREE PhD graduate Sky Lan from Taiwan is now a postdoctoral scholar studying insect pests in evergreen forests. Congratulations to these young pioneers who will return to their countries and become role models for many other young women. Our fourth TREE scholar, Puja Koluru from India and award-winning graduate of Ringling School of Art and Design, finished her documentary called A Woman Who Climbs Trees, the first of a series of films about women in science. She would love to share her documentary at your local school, university or local programming to inspire girls in STEM careers. (Contact Meg if you have a venue for Puja's film.)
- b. **Grants** – TREE received funding from National Geographic to study the reptiles and amphibians in the church forests of Ethiopia. This survey has never been conducted, and Lowman accompanied our herpetology research associate, Dan Greenberg of Simon Fraser University, to visit Ethiopia and set up field surveys earlier this year. Dan

returned to Ethiopia during the wet season (now) and has submitted a detailed blog attached to this annual report. You will wish you were with him! Our TREE affiliation with two National Science Foundation grants for undergraduate students ended last summer. One project funded mobility-limited students to climb trees and survey water bears in temperate forest canopies. That TREE team is still analyzing collections of over 40,000 water bears in temperate forests. Grant-funded students presented at several national conferences, and generously donated the naming opportunity of three of the water bears as fund-raisers for TREE, to generate funds for forest conservation. Our second NSF grant involved undergraduates studying the interface of ecology and economics in Ethiopia, with the tree forests as a major community hub in rural Ethiopia.

- c. **Research Publications** -- TREE shares the joy of new findings with the world through our ever-expanding web presence. Several papers were published that described new water bear species, and others were published about forest conservation. Our children's book, "Beza – who saved the forests of Ethiopia, one church at a time," continues to sell briskly, with each English-sold volume funding a copy printed in Amharic (Ethiopia's native language) distributed free to rural kids in Ethiopia. What a joy to see children's faces, receiving their first-ever book in a lifetime. Big thanks from the Brethren Foundation! Lowman's book, Treetops at Risk, has an online downloadable feature; last year, over 5,400 downloads were executed. Lowman is working on a new book, called The Arbournaut – a girl who loved pistils, to be published with Farrer, Straus & Giroux (Macmillan Publishers), about her discoveries of the eighth continent (canopy) and the challenges as a woman in field biology. It is due for publication in late 2020.

2. **EDUCATION**

- a. **Public Outreach** – Lowman's annual talks included a keynote address for youth in National Geographic's Grosvenor Auditorium, about adventures in forest canopies, an international keynote at the European Tree Care conference in Germany with several thousand attendees, and featured guest on Canadian Broadcasting Corporation's most popular show called Ideas, hosted by Paul Kennedy. Check it out on www.cbc.ca/ideas. She also spoke at EO Wilson's 90th birthday celebration and gave over 100 virtual talks to school classes around the country over the past twelve months. To launch our new TREE-party series in honor of the 20th anniversary, Lowman spoke to over 100 attendees about the history of Myakka walkway and how it has become a global model for conservation.
- b. **Florida Forest Education** - TREE Foundation continues to attract thousands of visitors to southwest Florida with two outdoor family destinations: our popular canopy walkway in Myakka River State Park of southwest Florida, and the TREE Treehouse at Spanish Point historical site in Osprey, Florida. Visitors to Florida can now explore the treetops in Myakka, and then enjoy a lovely waterfront picnic in our thatched chickee hut on stilts along the gorgeous edge of Sarasota Bay! Watch for upcoming guided walks at Myakka for home-schooled children.
- c. **Global Forest Education and Ecotourism** - Using the Myakka canopy walkway as a global model, the TREE board will be discussing a strategic expansion of our global canopy programs, collaborating with National Geographic and EO Wilson Foundation to construct walkways in the highest biodiversity canopies of the world

as an important conservation action. In his book called Half Earth, biologist EO Wilson proposes to save 50% of the planet for 99.9% of the species, and 50% of the planet for one species (humans). TREE director Lowman met with Wilson to discuss the notion of building canopy walkways to ensure that the highest biodiversity forests have an economic incentive for conservation. Stay tuned, as we ramp up this program!

- d. Citizen Science Expedition to the Amazon Canopy** – TREE will co-host our 25th annual citizen science expedition to the Amazon forest canopy during summer 2020, taking enthusiastic teachers, students, and families to conduct research and assimilate the culture of this amazing region. Interested in participating? In addition to canopy research benefits, our groups generate local revenues for villagers who find employment in ecotourism (instead of logging). All travelers are blessed by the local shaman, learn about medicinal plants, explore the canopy, and contribute to research on tropical rain forest health by measuring insect damage in the treetops. For anyone interested, this citizen science expedition heads out on July 23-Aug 1, 2020; please share with families, teachers or adventurers! Info on: www.treefoundation.org

- e. Virtual Nature** – Our website has been expanded to offer educational opportunities about forests and canopies to diverse audiences both in English, Amharic, Spanish and most recently, Chinese and German. We continue to exceed 3 million hits per year on both websites, and the first six months of 2019 saw a 28% increase in our newsletter subscribers and a 29% increase in our YouTube followers. Students, schools and teachers continue to write emails to TREE seeking information about forests and conservation! Part of this national school outreach has been inspired because many state middle schools are required to read The Most Beautiful Roof (by Kathryn Lasky), a children's book about Lowman's work in forest canopies, for NGSS (Next Generation Science Standards). Some of these classes and their student artwork are featured on our website, with several 5th graders from rural schools commenting, "Speaking by Skype to a real scientist was the most exciting day of my entire school year!"

- f. Training the next generation** - Lowman will travel to Singapore as a visiting professor during spring 2020, as a role model for women in science and to host a series of workshops about canopy biology. She will also continue working with the team in Penang, Malaysia (site of our most recent canopy walkway project) to design a field station and future programs to train the next generation of tropical biology students. Arizona State University will partner with TREE in the exchange of students between USA and Malaysia, as a pilot for a tropical forest education course. And finally, the tourism board of Rwanda hopes to collaborate with TREE and offer environmental messaging for visitors at their new canopy walkway.

A new book called "The Leaf Detective" by well-known children's author Heather Lang, will be published in 2020. This new educational resource for TREE will expand youth outreach, and Lang will donate part of her royalties to TREE Foundation.

3. EXPLORATION

- a. **Canopy Conservation** – TREE aspires to expand our global walkway network with new sites, school programs about forests, social media including YouTube videos to educate youth about forests, activities to inspire girls in science, and expanded environmental education. Forest canopies have become “the flavor of the year” in many countries, with tree research and ecotourism providing both economic and ecological value for planetary health. TREE is in a unique position as one of the world’s only nonprofits dedicated to this expertise and mission. TREE has expanded its international reach, with five new canopy projects that provide critical conservation and education at a global scale. These include:

BHUTAN – Funded by the King of Bhutan, TREE will offer scientific expertise for a new canopy walkway in the Royal Manas National Park in southeastern Bhutan. This region has the world’s largest tiger population, as well as elephants and other endangered species. The King envisions a sustainable project with a long canopy walkway, field station for visiting scientists, and K-12 school for local villagers to ensure that visiting scientists can inspire the local kids. This type of visionary project fully embraces the economics of ecotourism and conservation using the treetops.

PENANG – The Penang canopy walkway on Penang Hill, Malaysia was the recent site for a global biodiversity blitz, funded by a grant to Lowman to invite international and local scientists to count species of the whole forest, from bottom to top. This successful survey led to a recent publication in Conservation Biology journal, and a forthcoming book. The information collected was also used for a UNESCO world heritage nomination of this site, submitted by the Malaysian government. Lowman will be assisting the eco-park called The Habitat to design a field station for future research on the biodiversity of Malaysian rain forests. She also conducted a biology review for the University of Science, Malaysia, and proposed they create a global center for biodiversity research.

RWANDA – Lowman has offered to assist a new canopy walkway in Rwanda with environmental outreach in the treetops of this incredible rain forest. This site is an ideal global model using canopy walkways to provide local income from ecotourism instead of from logging.

MOZAMBIQUE – Funding for this walkway is pledged, and construction is scheduled for spring 2020. More information next year, as this site will become a feature education and research tool for Gorongosa National Park.

VERMONT – Lowman will be giving the gala opening talk for Vermont’s new canopy walkway at VINS (Vermont Institute of Nature Studies), built by our Myakka team.

- b. **Ethiopian forest conservation** – TREE continues to be a global force in the conservation of the last remaining forests of Ethiopia, called ‘church forests’ because they surround the Coptic churches. Thanks to an initial gift from the Spurlino Foundation, small donations from hundreds of school students, and many Williams College travelers, TREE has exceeded the half-way point to conserve ~40

of the most critical forests of northern Ethiopia. We need \$227,000 to complete our goal. These church forests now have beautiful stone walls built by the local community, so that cattle and goats are excluded from eating the seedlings and farmers' plows will not ring-bark the edge trees that leads to loss of integrity and ultimate shrinkage of the church forests. These forests house the last remaining biodiversity library for Ethiopia, freshwater springs, medicinal plants, honey, pollinators, shade, tree roots that conserve soil, and an important spiritual site.

These are some of our 2019 highlights for TREE Foundation. Thank you for your support of trees and your contributions to assist with local and global programs. During this 20th anniversary year, please consider a special gift to TREE! We are a unique non-profit, because our dollars do not fund buildings or salaries; we are committed to funding programs that benefit the forest and nature education to youth. Our next TREE-party will be October 30 in Sarasota, Florida, featuring National Geographic photographer Carlton Ward who will share his images and stories of Florida's forests and waterways. Ward is a champion for the Florida corridor, a natural waterway running through the state that is home to an enormous amount of biodiversity.

We regret to report the passing of our beloved president, Gerri Aaron, earlier this year. Gerri was a champion for the environment as well as a supporter of many cultural activities in Sarasota, Florida. She will be greatly missed, but her legacy lives on with our renewed dedication to youth environmental education and getting families into nature, both activities that Gerri truly treasured. A big thanks to Laura Peters for stepping in as interim president.

We look forward to making the world a better place for the next generation, in Florida and beyond.

Yours gratefully,

Meg Lowman

Meg Lowman, PhD
Executive Director

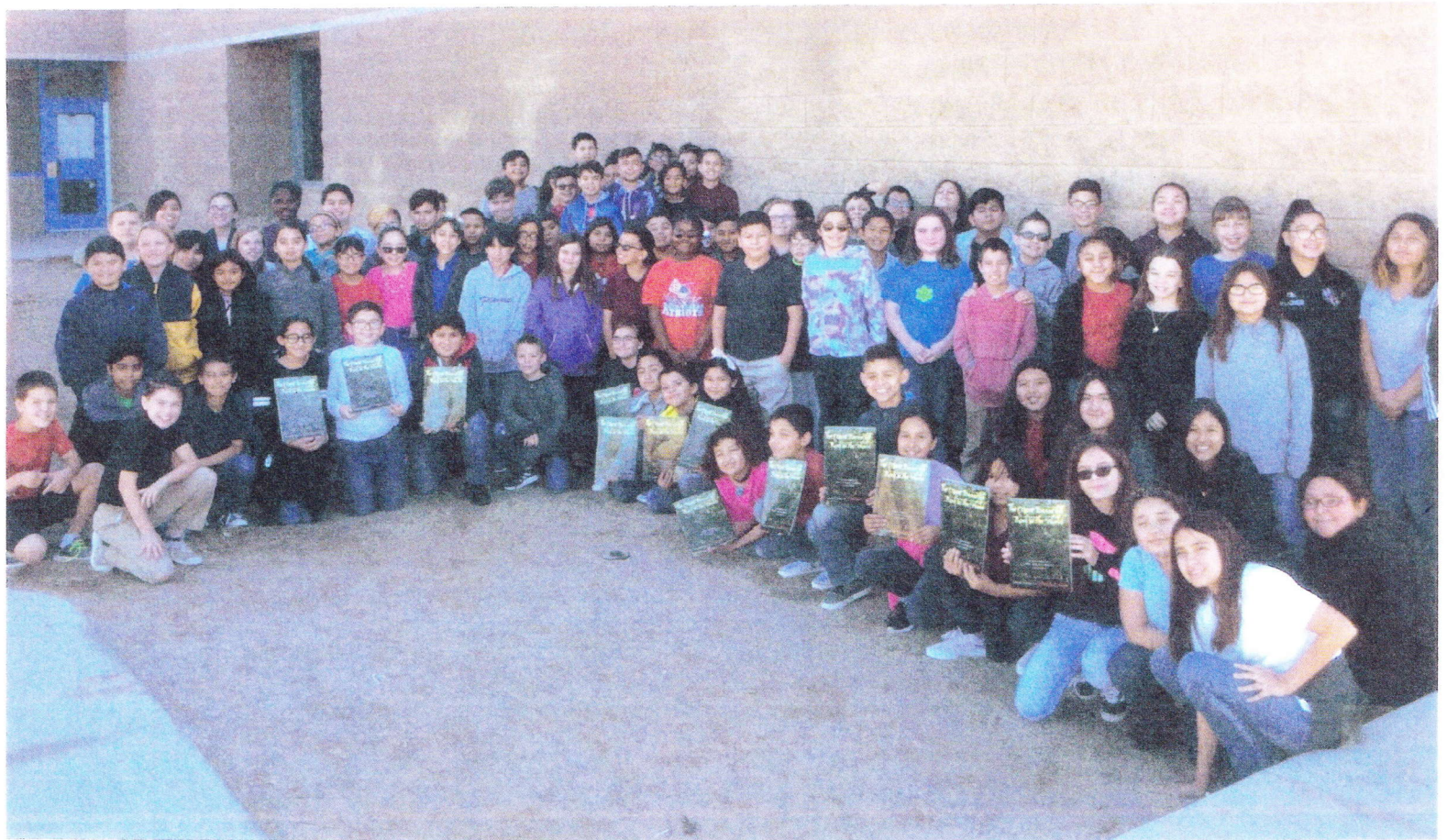
Laura Peters

Laura Peters
Interim Board President

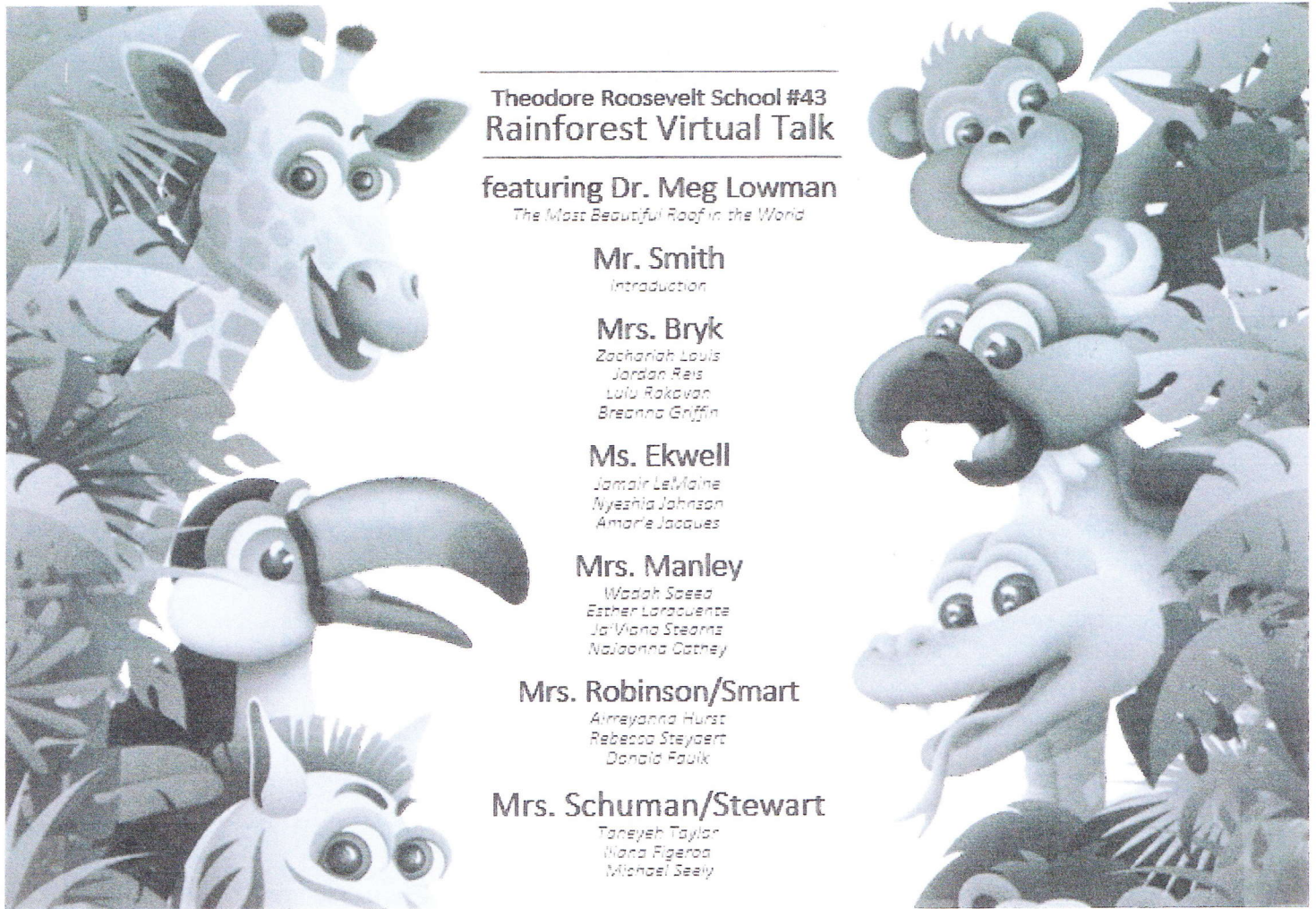


Meg Lowman Treetops Camp in Elmira offers disadvantaged girls a chance to empower themselves through tree climbing and outdoor adventure.





Many schools engage Dr. Lowman for virtual classroom talks, such as this school in India.



Theodore Roosevelt School #43 Rainforest Virtual Talk

featuring Dr. Meg Lowman
The Most Beautiful Roof in the World

Mr. Smith
Introduction

Mrs. Bryk
*Zachariah Louis
Jordan Reis
Lulu Rokovan
Breanna Griffin*

Ms. Ekwel
*Jamair LeMaine
Nyashia Johnson
Amarie Jacques*

Mrs. Manley
*Wadiah Saeed
Esther Laraqueente
Ja'Viana Stearns
Najlaonna Oatney*

Mrs. Robinson/Smart
*Aimeyanna Hurst
Rebecca Steydert
Donald Faulk*

Mrs. Schuman/Stewart
*Tahyeah Taylor
Wiana Figueroa
Michael Seely*

A public school in Rochester not only enjoyed a virtual classroom with CanopyMeg but they enjoyed many rain forest activities.



Life in the Treetops (1999, Yale University Press) was just re-printed in Taiwan.



Lowman spoke at the international Tree Care conference in Germany, and also visited one of the country's canopy walkways.



Ethiopia's church forests are conserved with simple stone walls around the edges, as pictured here.

© Kieran Dodds



Ethiopian church forests without stone walls suffer cattle/goat invasion, clearing of edges, and general degradation.

© Kieran Dodds

If church forests are exposed to degradation over many decades, their native trees and biodiversity disappear.

@Kieran DODDS





Our first TREE party celebrated the history of our Myakka canopy walkway, and the story of how it has become a global model for ecotourism and conserving forests.



TREE FOUNDATION

Please join us for the second in our series of "Tree Parties" celebrating the 20th anniversary of the Myakka Canopy Walkway. Hosted by *Dr. Meg Lowman*, creator of the Canopy Walkway, with *National Geographic Explorer Carlton Ward* as the guest speaker.

Libations and Hors d'oeuvres will be served.

October 30th - 5:00 to 7:00pm

Finish Tower at Nate Benderson Park

Contact Name _____

Organization Name (if applicable) _____

Email Address: _____ Telephone _____

Address _____ City/State/Zip _____

Correct Listing for Program _____

October 30th Lecture Topic: *Florida Wild—Hidden in Plain Sight.*

Conservation photographer Carlton Ward takes the audience on a photographic journey through the Florida Wildlife Corridor to showcase the need to protect Florida's wild places.

(Future lecture dates and topics to be announced)

CANOPY CHAMPION \$2,500

- Opportunity to speak at event; 4 tickets for each of three events; Plaque inscribed with name or logo at canopy site; Private walkway tour for 10 by Canopy Meg; Logo recognition in program book and PowerPoint; Listing in invitation; Promotion in all media releases as major sponsor

FOREST LOVER \$1,000

- Eight tickets for October 30th event; Logo on event banner; Logo recognition in program book and PowerPoint; Listing in the invitation; Promotion in all media releases

ARBORNAUT \$ 500

- Six tickets for October 30th event; Name recognition in program book and PowerPoint

Individual ticket for each event \$ 75

SPONSORSHIPS due by September 10 to be included in the program book, event signage and event media.

Reservation: Sponsorship Level _____ Individual _____ \$ _____

Make checks payable to TREE FOUNDATION and return with this form to:

TREE Foundation
c/o Laura Peters
409 Vanderkloot Drive
Osprey, FL 34229



Read about our local and worldwide activities at www.TREEFoundation.org

©Carlton Ward

The second TREE party will feature Carlton Ward sharing his adventures kayaking the Florida corridor.





Lowman was invited to the Rolex-National Geographic “party for the planet” and enjoyed a reunion with some of her international laureates.



CanopyMeg met with acclaimed biodiversity scientist, EO Wilson, to discuss canopy conservation.



TREE FOUNDATION

Dr. Margaret Lowman, Director | canopymeg@gmail.com

Bold Plan: Conserve 50% of Earth's Biodiversity

- one forest canopy at a time

VISION - Forest canopies are critical for the future of the planet, providing fresh water, pollinators, soil conservation, spiritual heritage, timber, food, climate change control, and the most efficient energy production (through photosynthesis) on Earth. Forests are critical to ensure the health of both ecosystems and humans. We have a plan to conserve the world's most important forest canopies, both to save the high diversity of species that live there and also protect the essential services provided by trees.

GOAL -To survey, select, design, build and maintain 10 global canopy walkways in the world's highest biodiversity forests. Why? Forest canopies are already earmarked by scientists as containing half of the terrestrial species on our planet, yet there is no formal conservation mechanism to conserve the treetops. We propose to build walkways in 10 forest hotspots identified in EO Wilson's book, **Half Earth**, to save a large proportion of global species, otherwise known as biodiversity. Second, we will fund students to conduct biodiversity research at these sites. And third, we will train local indigenous families (especially women) as environmental stewards to obtain sustainable income from ecotourism instead of from logging, as a global environmental justice program. TREE Foundation, whose mission is global stewardship of forest canopies, will collaborate with the EO Wilson Foundation which aims to save 50% of the planet's landscape for biodiversity. Acting together with additional partners such as National Geographic, the Global Canopy Programme, IUCN, and Earthwatch, this partnership not only achieves forest conservation, but also creates sustainable economies to benefit indigenous populations, especially women.

The following steps will be taken:

1. **Design and build canopy walkways** in 10 biodiverse forest canopies. Establish science partnerships in host countries.
2. **Fund student fellowships** to document the biodiversity in these hotspots and create a pipeline of experts in the next generation (currently missing from graduate curricula).
3. **Train local people, especially women**, to be Canopy Stewards and create income streams from canopy ecotourism, instead of from logging.
4. **Leverage collaboration** between the biodiversity experts and indigenous people to create field guides, outreach, tours, and interpretive education about forest canopies.
5. **Convene canopy teams** from different countries to compare operational information. Build alliances with local schools. Ramp up this program over time.

COST - \$10 million over 10 years

more information: www.treefoundation.org

Project is approximately half-funded at end 2019. HIGH BIODIVERSITY WALKWAYS:

Mozambique, Rwanda, Malaysia, Amazonian Peru, Bhutan, California redwoods, Great Smoky Mountains, Madagascar, Florida, Western Ghats India. Others may be nominated.



Two canopy walkways are feature activities at The Habitat, Penang, Malaysia and a centerpiece for a UNESCO Man and the Biosphere nomination of this rain forest site

First blog from herpetologist, Dan Greenberg, working on TREE's National Geographic grant to survey diversity of church forest walls, Ethiopia.

Assessing the biological diversity of Church forests in South Gondar, Ethiopia



Inside the forest at Wonchet

Arriving back in Bahir Dar, Ethiopia, I was struck by the transformation of the landscape relative to my last visit in the dry season. The barren red soil that once dominated has been replaced with lush green carpets of grass, wildflowers, and burgeoning croplands. I've come here to survey the amphibian and reptile biodiversity in the church forests around the South Gondar region. Working with colleagues Dr. Alemayehu Wassie, Dr. Meg Lowman, and Tegistu Adane, we're assessing how stone wall construction to protect the church forests from livestock grazing and agricultural encroachment may also serve as valuable habitat for many species.



Views from the plane to Bahir Dar in the wet season (left) vs. dry season of 2018 (right)



The stone wall separating forest and agriculture in Gibstiwat church forest.

To that end, Tegistu and I have been conducting herpetological surveys along the stone walls and in the forests, and trialing some pitfall traps and drift fences in four church forests sites: Zhara, Wonchet, Gibstiwat and Robit. We've documented a plethora of biological diversity in and around the forests, recording birds, mammals, and of course our targets: lizards, snakes, and frogs. Naturally, our activities draw a lot of attention (mostly good though!), so a big part of each day is science communication with priests, farmers, and villagers who are curious about what we are doing. It's been amazing to see how captivated many people become once we explain why are here, and show them some photographs of species in our bird and herpetofauna guides, and then I like to show them photographs of some of the species we have found.



Tegistu talks to priests at Zhara about their resident lizards and frogs



Priests and students look on as we show them some of the species we've found



A small group forms as we sample and measure *Trachylepis wingatii* at Zhara

Sometimes people want to get involved too, and it's not unusual that we have a small crowd and sometimes some additional field assistants. While piloting our trap arrays, we recruited four priest students (Berza, Tegistu, Tseghe, and Tseghuy) who have been dedicated field hands ever since -- in addition to helping us set up the traps, they dutifully monitor them and make sure they are well guarded. We often get tips from the people who live in these forests about what animals they've found there. For instance, we stumbled upon a Bush Duiker (*Sylvicapra grimmia*) one afternoon during our surveys at Wonchet and subsequently were informed by the priests that sometimes they see groups of up to 4 duikers at a time there and that duikers are present in many other forests (Zhara, Wonchet, and Gibstiwat). This adds another mammal to our list, including the rock hyrax and vervet monkeys, which find refuge in these sacred forests.



Priests and students help us catch and process lizards at Wonchet



Young priests in training help us dig in our pitfall traps in the forest



A bush duiker (*Sylvicapra grimmia*) forages on the outskirts of Wonchet church forest

Our surveys of the stone walls have been finding a lot of amphibian and reptile species that we're first recording in the church forests. Our protocol is to slowly walk along the outer walls, looking in the cracks and crevices for any signs of life. When we encounter any individual, we record its GPS location and identify it to species – when it's something new we make sure to take many photographs. So far we've found a lot of herpetofauna taking refuge in the church walls – recording up to 37 lizards in a single visit! Each survey seems to come up with some new observation too, over the past 5 field days we've recorded over 100 counts and discovered 5 frog ($n = 1$), lizard ($n = 2$), and snake ($n = 2$) species using the wall as habitat. The walls are typically dominated by two species of *Trachylepis* skinks: *Trachylepis isseli* and *Trachylepis wingatii*. Interestingly, both species are endemic to Ethiopia and they appear to achieve very high densities on the walls – likely due to the abundance of insects it attracts and the natural habitat it creates for these species. We believe in turn this high density of lizard likely attracts both predatory birds (we find many skinks with dropped tails, which we also record) and lizard-eating snakes including the Brown House Snake (*Lamprophis fuliginosus*) and the Hissing Sand Snake (*Psammodromus sibilans*). In this way, it seems like the positive effect the stone walls have on the lizard populations likely cascades up into the rest of the ecosystem by supporting a robust diversity of predators.

Issel's skink, *Trachylepis isselii*, our most abundant resident of the church walls





Wingate's skink, *Trachylepis wingatii*, looks on suspiciously from atop the church wall as we approach



Brown House Snake (*Lamprophis fuliginosus*) rests in the wall at Zhara

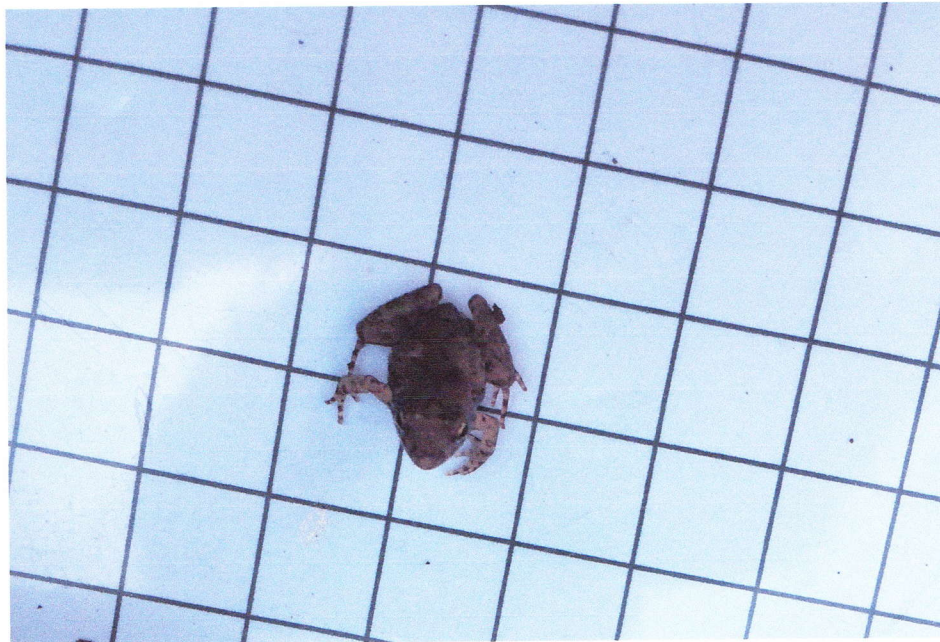


The Hissing Sand Snake (*Psammophis sibilans*) was very quietly resting amongst the stones of the church wall at Wonchet, likely looking for lizards to eat!

In the past two days of field surveys, we've also been finding very tiny frogs associated with the stone walls: the aptly named Ethiopian Dwarf Puddle Frog, *Phrynobatrachus minutus*. This tiny frog is also endemic to Ethiopia, and it is truly minute and easily mistaken for a small cricket. Interestingly, they seem to benefit from the stone walls that similarly serve as natural habitat and a refuge from the surrounding desiccating conditions of the cleared agricultural fields.



The aptly named Ethiopian Dwarf Puddle Frog, *Phrynobatrachus minutus*, takes refuge amongst the stones of the church wall at Gibstiwat



To give a sense of scale, each grid is 1x1cm! Truly a tiny frog.

During our surveys, we also take time to catch some of the species we find to sample their DNA – which we hope to ultimately sequence to provide vital molecular sequence data for these species that are often endemic or may represent uniquely isolated populations from their broader ranges across Africa.



Not just a frog belly rub, we can also get DNA from this skin swab!

This multi-pronged approach we hope will pay dividends for understanding the unique herpetofaunal communities of Ethiopia, and how the church forests contribute to their continued protection. Not only that, the species occurrences and photographs we're collecting we hope will be both useful and motivating for the people that are both spiritually and instrumentally invested in these forests. The reaction we get when explaining our purpose is typically very positive, and we hope to eventually take our photos and publish a guide to the species we've found in Amharic that we can distribute to each church. Given the excitement we've already experienced in our forays into these communities, we think it would be appreciated by both priests and parishioners to highlight the amazing diversity of species that their church forests protect.