



# **TREE Foundation**

## **Annual Report 2013**

**Compiled by Meg Lowman, Executive Director**

**Annual Meeting November 21 2013**

**Board Room, Spanish Point Historical Site, Osprey FL**

**(cover photo: National Science Foundation-funded summer college students with mobility limitations learn canopy research and discover 4 new species in American temperate forests)**



Dr. Thomas E. Lovejoy, President, The H. John Heinz III Center for Science, Economics, and the Environment  
Honorary Board Chairman

Dear TREE Foundation Supporters,

30 October 2013

It is hard to believe that we have completed our thirteenth year as Florida's premier conservation foundation dedicated to forests, and one of the world's few foundations dedicated to grass-roots, local-but-global education and conservation of trees. And all of this success is due to your enthusiasm, generosity, and dedication to our mission that includes "Tree Research, Education and Exploration". Thank you from the trees, and thank you from all of the next generation whose lives are enhanced by your stewardship of forests.

TREE Foundation continues to attract thousands of visitors to southwest Florida to explore our flagship project, the Myakka River State Park canopy walkway; and we are opening a new family-friendly tree project, the TREE Treehouse, at Spanish Point historical site on Osprey, Florida. The dedication is scheduled for Monday afternoon November 25 (the week before Thanksgiving) – a nice addition to this unique historical site located on the bayfront in Osprey just south of Sarasota! Our website continues to receive almost one million hits over the past year, and we now have information featured in 3 languages! On a global scale, we have doubled our church forest conservation success in Ethiopia from two forests to four (with three more in process) with new local construction of gorgeous stone walls for preservation in perpetuity as well as a feature of local pride for the villagers. We continue to expand our global outreach to women and children with sustainability programs in developing countries, including a new project for women in science in Africa and ongoing efforts in the Amazon and India. We co-sponsored the 6<sup>th</sup> international Canopy Conference in Mexico last October, offered scholarships students and teachers in Amazon rain forest canopy research, and launched an innovative online fund-raiser to auction off insect names for forest conservation.

Thank you to all our TREE donors, as well as our tireless board of directors and volunteers who create enthusiasm for our programs to educate, explore and study forests of the world. A year-end summary of this year's ambitious activities is listed below:

#### **Local Canopy Programs**

1. **Myakka River State Park canopy walkway** – We purchased 20,000 new brochures this year, in efforts to keep pace with the increasing visitorship that flocks to this important conservation site. These brochures still only reach a

handful of the estimated hundreds of thousands of visitors, but new educational signage insures that an educational message is delivered to everyone. Our new conservation signage (in English and Spanish) inspires diverse visitors with a take-home message. In addition to one-time visitors, our long-term researchers from Pine View School in Osprey, Florida continue to conduct scientific research at the site, monitoring the health of Florida epiphytes against insect pest invasions. Although they are only third- and fifth- graders, these young scientists have not only discovered a new invasive weevil in Florida but also have monitored the health of air plants in the forest canopy. Go kids! Our new people-counter is collecting data on visitorship, metrics useful for other parks that inquire about building walkways around the country.

2. **Virtual nature** – Our website has been expanded to offer educational opportunities about forests and forest canopies to diverse audiences. We continue to offer Spanish translations, and have expanded to include Ahmaric language for our Ethiopian forest conservation section. The website was re-organized by our amazing webmaster this year, to reflect emerging needs of social media and to insure an educational experience for our nearly-one million hits per year. An increasing number of students blog and write emails seeking information about forests and conservation! A special section for our mobility-limited student group (see below) is also featured on our website. We are also creating some new web sliders that will allow visitors to virtually “visit” individual church forest in Ethiopia and learn about their biodiversity, dimensions, history, and meet some of the locals. Stay tuned!
  
3. **Education outreach** – A new volume, *Forest Canopy Methods*, was published and funded by University of California Press. The updates of new methods and supplemental information are logged onto our website, ([www.treefoundation.org](http://www.treefoundation.org)), reflecting a high-tech way of “doing business” in the publishing world. A second volume, *Treetops at Risk*, was published by Springer and reflects the proceedings of the 5<sup>th</sup> international Canopy Conference in Bangalore, India, co-sponsored by TREE Foundation in 2009. What is heart-warming about this volume is that it includes summary chapters by many authors in developing countries; such publications go a long way to give them credibility in their home countries and thus advance the status of their forest conservation.  
 In addition, our Executive Director continues her newspaper column, *Nature’s Secrets*, dedicated to educating the public about trees and related aspects of natural history.
  
4. **Matching grants** – TREE embarked on its first matching grant, thanks to a generous offer by the Bennett Foundation and in this process doubled the funding available for conservation of Ethiopian church forests. Through this match, a workshop for priests in Ethiopia was held last January that attracted 150 Coptic priests, and significantly changed the culture of conservation in rural Ethiopia. How? In this case, the priests learned that having a conservation wall is “part of their stewardship” of nature, and so henceforth all priests are engaging in wall

construction in exchange for a donation to their church. In short, our TREE efforts have made conservation walls a MUST for the religious leaders, not an option. This is a win-win-win – for the church, for conservation and for the people who need the forests for fresh water and pollinators.

5. **TREE Treehouse** – After several years of planning, treehouse construction is completed at Spanish Point Historical site (a place that previously did not offer too many attractions for children). Big thanks for the Aaron Foundation and also to the Triad Foundation for helping us complete this project in 2013! Michael Walker and Associates, a premier building firm in Florida, did incredible amounts of pro-bono work to bring this project to completion. The TREEhouse opening will be held on November 25, and a naming opportunity will be announced – we are seeking \$25,000 to offset the maintenance costs and provide education outreach in exchange for your name on the door of the TREE-house! Project Contractor Michael Walker developed the drawings for the 14 foot diameter round “Chickee-hut” structure, in keeping with the historical Indian designs of the area, ADA accessible via a bridge/walkway approximately 25 feet in length. Eight posts, all harvested cypress timber, support the thatched roof and connector walkway. The structural portion of the project are constructed under the Florida Building Code exemption for Seminole Indian labor which makes permitting less difficult. Materials and labor for the covered structure were supplied by a Chickee subcontractor, while decking and guardrail installation were completed by additional subcontractors.
6. **Training the next generation** - TREE sponsored several student scholarships and educational programs throughout the past 8 months. New College student Michael Long attended the citizen science workshop on Amazon Forest Canopy Ecology last July, along with eight high school students from the North Carolina region. High school minority science teacher, DC Randle, was funded to teach the local Peruvian guides about American science education and wildlife management, and TREE donated useful science books to several Amazon teachers and river schoolhouses. Students in developing countries, including India and Ethiopia and Mexico, also received inspirational forest science books, thanks to the Spurlino Foundation’s donation for book distribution to students. In addition, a scholarship for a rising star in the world of beetle ecology is in its second of five years, thanks to the Spurlino grant for Ethiopia. Part of the naming of new species now engages the next generation in fostering their science education.
7. **Environmental Lecture series** – TREE Foundation’s Fedder lecture series continues as part of New College’s Hot Topics lecture series in Sarasota Florida, and this past year featured Dr. Stephen Leatherman, professor at Florida International University (otherwise known as Dr. Beach) to speak about sea level rise and coastal ecosystems. This year’s lecture at the end of November features renowned Florida explorer and photographer, Carlton Ward, who will speak about his walk along the entire Florida corridor over three months, with amazing

photographs of his conservation adventure. Save the date of Thursday November 21 at 5 PM, Sainer Pavilion on New College campus, Sarasota FL!

### **National and International Activities**

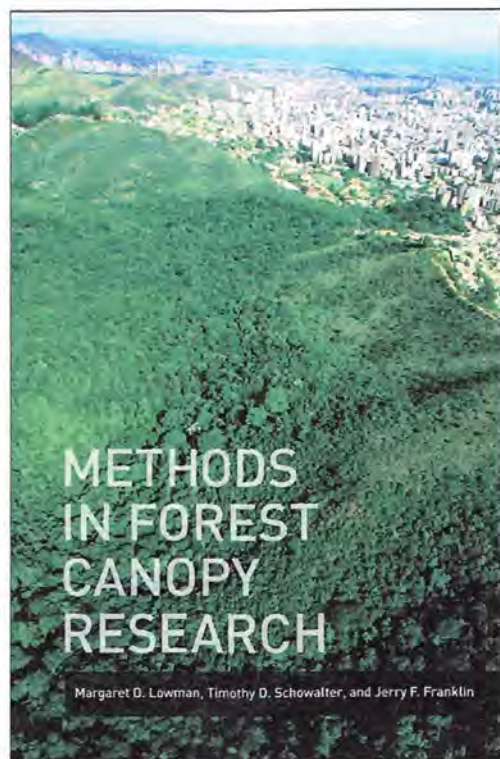
1. **National Environmental Policy** - Dr. Lowman was invited to serve on President Obama's Women and the Environment committee, meeting at the White House to determine important pathways for engaging these 2 issues. Her suggestion: plant more trees! She wrote about our TREE Foundation project, the Myakka canopy walkway, as an invited author in the online "Women and Health" publication that was published from the first Summit.
2. **International Canopy Conference** - TREE Foundation co-hosted the 6<sup>th</sup> International Canopy Conference held in Oaxaca Mexico. Several of our former student interns presented papers, and women graduate students enrolled in Mexican universities received canopy books, thanks to the generosity of the Spurlino and Booth funds. TREE convened a special session called "Land Use and the Integrity of Forest Canopies" featuring a keynote speaker from the Carnegie Institute in California who works with NASA on canopy satellite-imaging in the Amazon. Dr. Greg Asner's new aerial technologies can not only detect logging activities, but also "read" the soil and land-use history of millions of square miles of remote forests. TREE Executive Director, Meg Lowman, was one of several co-chairs of the international conference along with her Mexican colleague, Dr. Demetria Mondragon.
3. **International Lectures** – Dr. Lowman lectured in South Korea, India, Mexico, Ethiopia, and many institutions throughout USA on behalf of TREE. Her message – to inspire forest conservation and encourage the next generation of scientists – has resulted in a plethora of emails by enthusiastic young people who are encouraged to seek careers in conservation. She was the keynote speaker for the national Wildlife Conservation Day in Malaysia, where Her Royal Highness of Johor Malaysia, not only welcomed Meg and hosted her, but also pledged to bring 12 students and 4 teachers to USA next year to experience our conservation and natural areas. The competition for students to gain a place on this amazing education trip with Her Royal Highness is listed on our website, as well as publicized throughout Malaysia.
4. **Book and Journal Publications** – TREE has created a large reference collection on our website, featuring Ethiopian forest research, as well as canopy information. Spear-headed by Research Associate Dr. Worku Mulat, this effort is the first such collection of current references on this subject. Two grants are currently pending from federal sources to boost the conservation activities in Africa. The Brethren Foundation has kindly donated funds for Dr. Mulat to work on a children's book that will be published and distributed by TREE Foundation to children in USA and Ethiopia.

5. **Amazon Village Clean-Water Systems** – Thanks to last year’s citizen-scientist Carolyn Solomon of Raleigh NC, fund-raisers were held with students to pay for a new water filtration site in the upper Amazon. Carolyn’s generosity led to a new clean-water system now operates and insures clean water for hundreds of residents. Our Amazon Amigos program continues to attract donors who support the modest construction of fresh water filtration plants in Peruvian Amazon villages
6. **Citizen Science Expedition to the Amazon Canopy** – TREE led the annual citizen science expedition to the Amazon forest canopy, taking 29 enthusiastic volunteers to conduct research and also assimilate the culture of this amazing region. In addition, our groups generate local revenues for villagers who find employment supporting ecotourism. Everyone was blessed by a shaman, and also analyzed leaf data from 15 rain forest canopy species.
7. **Books for Women in Science** – Over 300 books were distributed to underserved communities around the world, sharing the message about forest conservation and also sustainability. In countries like Ethiopia and India, where women are the links to the natural environment but yet receive very little formal education, these books are a critical inspiration and educational tool.
8. **Ethiopian forest conservation** – TREE continues to be a global force in the conservation of the last remaining forests of Ethiopia. Board member Dan Bennett offered a match-grant that resulted in the complete perimeter delineation of two forests, comprising about 12 kilometers of stone walls built by local people. Now, cattle are excluded from eating the seedlings and farmers’ plows will not ring-bark and stress the edge trees, leading to their demise and ultimate shrinkage of the church forests. These small plots house the last remaining biodiversity library for Ethiopia, fresh water springs, medicinal plants, honey, pollinators, shade, tree roots that conserve soil, and an important spiritual site.
9. **Opening of the Nature Research Center** – TREE Foundation director Dr. Lowman led a team of talented construction workers, exhibit designers, scientists, educators, and technology experts to open the new Nature Research Center in Raleigh NC last April 20, 2012. It is part of the North Carolina Museum of Natural Sciences, but features “how we know what we know” that represents a new and innovative mission for a museum. Over 70,000 science “geeks” attended the 24-hour opening, making it one of the world’s largest-ever science parties. The first six-month theme for all the labs and exhibits was TREES R US, whereby scientists that study forests were featured in virtual broadcasts, Science Cafes, and education labs taught kids how to read tree-cores and understand the ecosystem services provided by forests. This six-month theme was co-sponsored by the Forest Service, and featured exhibits and activities of TREE Foundation, with close to a million visitors in the first season!

In its first year of opening, the Nature Research Center (and the entire Museum) welcomed over 1.2 million visitors.

10. **Award for our Emeritus Board Chair** – Our distinguished honorary chair, Dr. Thomas Lovejoy, received the Blue Planet Prize for his work to conserve the forests of Amazonia. Tom continues to be an inspiration for TREE Foundation as well as a global figure in the world of conservation. Congrats to Tom!
11. **Documentary Film** – The team who are filming a documentary on TREE's forest conservation efforts in Ethiopia received \$25,000 from Kickstarter, a web-initiated fund-raising tool. They were recently interviewed by Sundance, and hope that this forest conservation film will raise awareness of global environmental issues.
12. **Sloth Research** - Our sloth conservation work, inspired by former student TREE scholar, Bryson Voirin, continues bigger and better. Some recent attempts to export endangered sloths from Panama to a private USA zoo has seen our TREE sloth expert, Dr. Bryson Voirin, heading to Panama at the end of the year to testify as an expert scientist. (and Yes, DOCTOR Bryson Voirin.... Our first-ever TREE student scholar is now a doctor in ecology, and one of the world's experts on sloth and sleep in animals! Congrats to Bryson!!!)
13. **Mobility-limited students** – A federal grant was obtained from National Science Foundation to allow wheelchair-bound students to climb trees and conduct research on micro-arthropods including water bears. Eight students are training this summer of 2013 with Dr. Elzie McCord of New College, Dr. Randy Miller of Baker University KS, and Dr. Meg Lowman. These undergraduates discovered four new species in temperate forest canopies, all tardigrades or water bears (go on our website to see what they look like!) Another eight students are anticipated for summer 2014. It is an inspiration for all of us to see the photographs on our website of these students, vaulting from their wheelchairs onto the ropes and harnesses! Go team!
14. **TREE is co-hosting other student projects**, including a forest conservation program in the Congo, tree-climbing classes for students through Tree Planet Climbers, and increasing communication and presentations to classrooms around the country who are studying trees! Lots of activities for students are expanding our portfolio!!

These are some of our highlights for TREE Foundation 2012. Thank you for your contribution – please consider a donation in honor of a loved one, or just for the sake of trees everywhere! We look forward to making the world a better place for the next generation.



# Methods in Forest Canopy Research

MARGARET D. LOWMAN, TIMOTHY D. SCHOWALTER,  
AND JERRY F. FRANKLIN

"Once nearly inaccessible frontiers, forest canopies are now giving up their secrets, thanks to a growing number of methods. This volume provides a superlative, long-needed recipe book for further exciting breakthroughs in canopy ecology. Indispensable."

Thomas E. Lovejoy, George Mason University and The Heinz Center

"Lowman, Schowalter, and Franklin draw on their significant hands-on experience to address important methodological questions in canopy research. Covering a range of case studies from around the globe, the authors engage ecological problems specific to the canopy and ingeniously deploy canopy research as a tool for forest conservation. Students, field biologists, and conservation planners around the world will find this book a one-stop shop for canopy methods." M. Soubadra Devy, Ashoka Trust for Research in Ecology and the Environment (ATREE)

Poised between soil and sky, forest canopies represent a critical point of exchange between the atmosphere and the earth, yet until recently, they remained a largely unexplored frontier. For a long time, problems with access and the lack of tools and methods suitable for monitoring these complex bioscapes made canopy analysis extremely difficult. Fortunately, canopy research has advanced dramatically in recent decades. *Methods in Forest Canopy Research* is a comprehensive overview of these developments for explorers of this astonishing environment. The authors describe methods for reaching the canopy and the best ways to measure how the canopy, atmosphere, and forest floor interact. They address how to replicate experiments in challenging environments and lay the groundwork for creating standardized measurements in the canopy—essential tools for understanding our changing world.

**Margaret D. Lowman** is Director of the Nature Research Center at the North Carolina Museum of Natural Sciences and Research Professor at North Carolina State University. **Timothy Schowalter** is Professor and Department Head in the Department of Entomology at Louisiana State University Agricultural Center. **Jerry F. Franklin** is Professor of Ecosystem Analysis in the College of Forest Resources at the University of Washington.

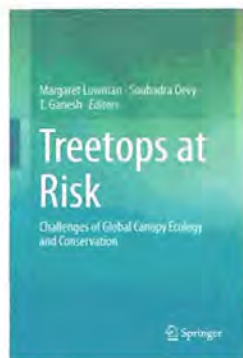
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M. Lowman, North Carolina State University, Raleigh, USA; S. Devy, Ashoka Trust for Research in Ecology and, Bangalore, India; T. Ganesh, Ashoka Trust for Research in Ecology and, Bangalore, India (Eds.)

### Treetops at Risk

Challenges of Global Canopy Ecology and Conservation

- Uses the major findings of the 5th International Canopy Conference as a platform for organization
- Assembles a global authorship to examine past accomplishments and future initiatives critical in forest conservation
- Presents articles that represent future priorities and advancements for canopy science in the next decade

Treetops at Risk brings together the world's foremost experts on forest canopies, and summarizes their views on the current and future status of forests. Forest canopies not only support high terrestrial biodiversity but also represent a critical interface between atmosphere and the earth. They provide goods and services to support humans, and represent important energy production centers for the planet. Millions of people depend upon forest canopies for their livelihoods, and millions more depend upon future sustainable use of forest resources. The canopy also serves as a hook for education outreach and conservation, inspiring ecotourism and recreation. Despite these critical services provided by forest canopies, very little dedicated research in the treetops was initiated until as recently as the late 1970s when single rope techniques were adapted for use in the canopy. Subsequently, an array of canopy access tools was designed that have opened up this "eighth continent" for global exploration and discovery.

In 2009, the fifth International Canopy Conference was held in Bangalore, India, representing the first time that canopy researchers had convened in a developing country. Not only did this conference jumpstart canopy initiatives in India, but it fostered a broader approach to critical canopy issues facing many emerging countries where forest resources are seriously in decline. Despite the global efforts of hundreds of forest scientists over the past 3 decades, forests are degrading at an accelerated rate and canopy biodiversity is increasingly threatened by human activities. Given these trends, new and innovative approaches must be taken. This volume summarizes the issue of "treetops at risk" and assembles a global authorship to examine past accomplishments and future initiatives critical in forest conservation.



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\*\*\* Regional restrictions apply.

Guest Speaker, TREE

## Visiting Ethiopian Environmentalist and Women's Rights Advocate:

*Tizezew Shimekach Sisay*

With sponsorship from the Colby College Environmental Studies Program, the Oak Institute for the Study of International Human Rights, the Goldfarb Center for Public Affairs and Civic Engagement, and the TREE Foundation, Tizezew Shimekach Sisay, a young Ethiopian environmental researcher and women's rights advocate, will visit NC Museum of Natural Sciences and NC State University from November 9<sup>th</sup> to 14<sup>th</sup>. She is currently advised and mentored by Dr. Meg Lowman, senior scientist at NCMNS and research professor in NCSU College of Sciences.



While in Raleigh she will meet with students and be available to present a series of public talks at either the Museum or NCSU campus on topics ranging from African environmental policy to religion to women's empowerment. She will share her first-hand knowledge and experiences with the church forests of South Gondar, both from the perspective of the Ethiopian government and from the perspective of women in church communities. She will also describe her recent efforts combatting child marriage practices – part of a broader effort to empower women as key economic and environmental actors in rural agrarian communities across Northern Ethiopia.

### ***Academic and Professional Background***

Tizezew is one of the few Ethiopian women with an undergraduate degree in economics and an advanced diploma in forestry and natural resource management (in what remains a strongly male-dominated field) and her experiences she has offer a valuable perspective for students and other audiences interested in the complex relationships between local traditions, public policy, women and the environment in Ethiopia today. Her specific areas of expertise include:

*Government-led conservation efforts.* Upon receiving her Diploma Tizezew worked for three years as a field expert for the Gondar Zuria District Agriculture and Rural Development Office, where she was responsible for developing, implementing and monitoring community-based natural resource conservation efforts throughout the District.

*World Bank efforts linking environment and human health.* After her government service Tizezew worked for five years as a Community Participation Management Advisor for the World Bank's Rural Water, Sanitation and Hygiene Program (WASH). There she focused on needs-assessments, community mobilization, and women's empowerment for improving water quality and human health.

*NGO-led initiatives linking food, women's rights, and the environment.* Most recently Tizezew has been working with two internationally-funded NGO initiatives focusing on food, environment, and women's rights. As an Urban Gardening Extension Officer for the Selam Ethiopia People living with HIV/AIDS Association (PLHA) she has worked with extremely vulnerable populations to develop programs and marketing strategies using urban gardens as a way to improve food security, nutrition, and health and environmental outcomes in North Gondar (sponsored by the USAID Urban Gardening Program). Most recently, she has taken on the role of community organizer with the Finote-Hiwot End Child Marriage Program in West Gojam, where she has focused on women's rights and women's empowerment in rural areas.

Tizezew will be hosted by Dr. Lowman, and available on November 12-16 for programs ranging from guest lectures to small discussion groups of graduate women in science. Please contact Cindy Bogan for scheduling:

[cindy.bogan@naturalsciences.org](mailto:cindy.bogan@naturalsciences.org).

# NEW TOPICS NEW COLLEGE

2012  
2013 series

Series \$75 • Individual Lectures \$15

## AN ANALYSIS OF THE 2012 ELECTIONS • OCT 23

Alexis Simendinger '75, Charlie Mahtesian, Jeremy Wallace & Dr. Frank Alcock

Join national political correspondents Alexis Simendinger (NC Class of '75) of Real Clear Politics and Charles Mahtesian of Politico, along with Sarasota Herald-Tribune politics writer Jeremy Wallace and New College political science professor and ABC-7 political analyst Frank Alcock, for expert analysis on this year's national, state and local elections. Who will win the presidency and why? What critical races will determine control of the U.S. Senate and House? What are the issues that will shape our local and statewide elections? And what effect will this year's elections have on the future of the Republican and Democratic parties, both nationally and statewide? Simendinger, Mahtesian and Alcock wowed us four years ago, and we expect this year's discussion to be just as insightful.



## WHAT MAKES A GREAT BEACH? • NOV 8

Dr. Stephen Leatherman (a.k.a. Dr. Beach)



Shakespeare said "beauty lies in the eye of the beholder." Certainly, beauty is an important ingredient in Dr. Beach's rating of beaches, but the most important criteria are clean sand, clean water and beach safety. Attendees will learn about the 50 criteria he uses to rate beaches, using applied coastal science for public

outreach. Dr. Beach's work rewards good beach management and encourages other beach communities to maintain or improve their overall quality, especially environmental quality. Dr. Leatherman's book *Field Guide to the Water's Edge*, from National Geographic, will be for sale.

## COURTING PRESCRIPTION PAIN MEDICATION: FOR BETTER OR WORSE? • DEC 4

Mary Ruiz '73, Manatee Glens President/CEO

Modern medicine offers compassionate relief for chronic pain and terminal illness. But something has gone terribly wrong. More than seven lives a day in Florida alone are lost as a result of a prescription pain pill epidemic. Hear from mental health and addiction expert and New College alumna Mary Ruiz about the medical, social, economic and political forces that are forcing patients of all ages to decide whether courting prescription pain medication is for better or worse. Ruiz has been in the field of addictions for 25 years. She currently serves on the New College Board of Trustees.



## POSITIVE AGING PIONEERS • JAN 15

Tom Esselman, Institute for the Ages President & CEO



The Institute for the Ages has an ambitious vision — to be the world's largest and most significant change agent for positive aging. Tom Esselman will provide the community with an update on how individuals and community groups within Sarasota as well as innovators around the world are focused on the global aging phenomenon. Esselman will discuss ground-

breaking research initiatives and the development and applications of products, services and policies that are improving our lives as we live to be older and older.

Herald-Tribune  
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## HELPING PATIENTS OBTAIN INFORMATION

Dr. John Col... Chief of Staff... Healthcare In... (HIE) is the e... medical infor... rate systems s... mation syster... EMR systems, and even dise... istries. Dr. J... Memorial Ho... and New Coll... plain how th... electronically... will improve... only do patien... physicians, bu... mation to acc... fective data ex... safety and effi...

## THE PROBLEMS OF SUB-SAHARAN AFRICA

Ambassador... Ambassador J... year Foreign S... of U.S. Gover... ences from six... served as U.S... Using South A... he will outline...



A wine and... lecture, gr...

TRC Foundation Lecture

24



## Bronx Students and Biodiversity in Ethiopia...

3 messages

Katrina Scherben <katrina.scherben@equalitycharterschool.org>

Fri, Dec 7, 2012 at 7:58 PM

To: meg@canopymeg.com

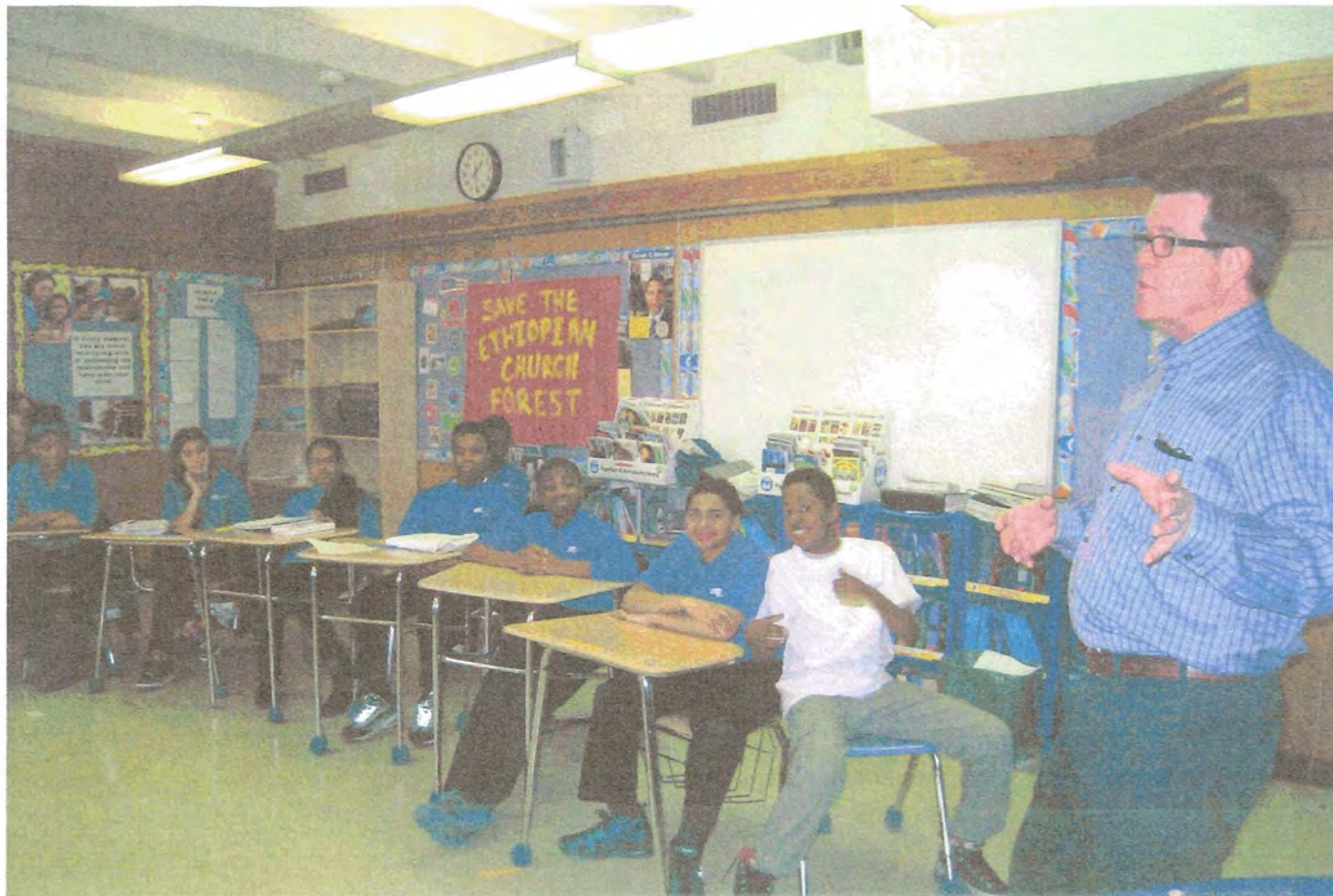
Hi Ms. Lowman,

I am a New York City charter school science teacher. I just read Saving Ethiopia's "Church Forests" and read your website. I think the work you are doing is amazing and it so happens to be correlated perfectly to our advanced high school Living Environment course. The students in this course are beating incredible odds within the education system and are highly motivated to learn and give back to their community. In this class we have been studying human impact on biodiversity. The class is very student centered and research driven. Students generate their own questions and topics to research and investigate. I plan on having my students read the article and having it blossom into a final project for this unit. I was hoping that my class could video chat with you to ask you questions and hear more about your experience. Although none of my students are Ethiopian many are first or second generation West African immigrants and would be extremely interested in helping such a noble cause closer to their homeland. Our classes are from 3:00 to 3:50 Monday, Wednesday and Friday.

--

Thank you,  
Katrina

Katrina Scherben  
7th and 8th Grade Science Lead Teacher  
[Katrina.Scherben@equalitycharterschool.org](mailto:Katrina.Scherben@equalitycharterschool.org)



Students at Bronx (NYC) Equity Charter School raised \$259.30 for ETHIOPIAN forest walls!



A new gift!



Myakka canopy  
walkway continues  
to be a TOP  
sw Florida attraction



The most photographers  
plant!



Students at Pine View School in Osprey, Florida continue their canopy research observations on bromeliads in Myakka River State Park's canopy walkway. For over ten years, the third- and fifth grade students of Ms. Gould-Olsen and Denise Fugere have conducted long-term monitoring on bromeliad health and an invasive weevil that can kill entire plants. Citizen science at its best!!!!

Our newest TREE activity- "TREE-HOUSE"  
at Spanish Point Historical  
Site, Osprey FL

OPENS NOV. 25  
to The  
Public





## E.O. Wilson's Global Town Hall

A discussion with one of the greatest scientists of our time

- Who:** *Edward O. Wilson:* world-renowned Harvard biologist, mentor of generations of scientists, champion of environmental conservation, and *YOU:* students, educators, scientists, conservationists, photographers, storytellers, and engaged inhabitants of planet earth.
- What:** Join E.O. Wilson as he empowers a new generation of scientists to embark on journeys at the cutting edge of science. Against a backdrop of images from the Gorongosa Restoration Project in Mozambique and coinciding with the launch of the museum's permanent exhibit of the digital high school biology textbook, *E.O. Wilson's Life on Earth*, E.O. Wilson will discuss how studying and exploring biodiversity is now cutting-edge science, offering hands-on physical adventure, and the promise of contributing to important advances in medicine and the environment.
- Why:** E.O. Wilson is among the leading voices bringing attention to the loss of our Earth's biodiversity. He will draw from a lifetime of research, exploration, advocacy, and writing to inspire and engage high school students regarding the importance of biodiversity and environmental conservation. In conversation with the audience, and responding to questions, Dr. Wilson will offer advice to those who are engaged in and will inherit the urgent mission to protect, maintain, and restore the biodiversity of our planet.

### Before December 13<sup>th</sup>

Join the conversation!

Send your questions for E.O. Wilson throughout the month of November to [askeowilson@eowilsonfoundation.org](mailto:askeowilson@eowilsonfoundation.org)

Visit our Facebook event page E.O. Wilson's Global Town Hall!  
[www.facebook.com/events/432573543465663/](https://www.facebook.com/events/432573543465663/)

### On December 13<sup>th</sup>

Live event: 1pm EST, 10am PST

In person at The Nature Research Center, North Carolina Museum of Natural Sciences

Live streaming into your classroom anywhere around the world!  
<http://www.livestream.com/naturalsciences>

For more information, please visit [www.eowilsonfoundation.org](http://www.eowilsonfoundation.org)

Join our mailing list for updates on the event!  
[www.eowilsonfoundation.org/join-the-movement](http://www.eowilsonfoundation.org/join-the-movement)

KIDS' "MEET-THE-SCIENTIST"  
with EO Wilson

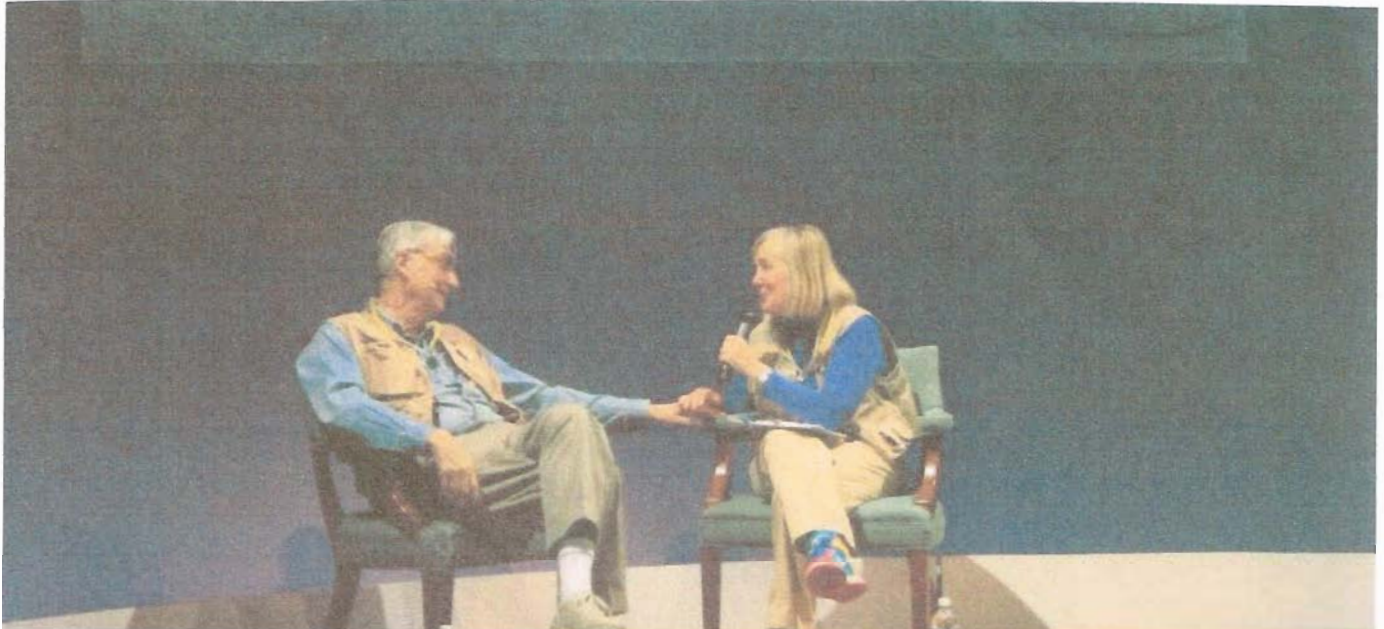
## Questions for E. O. Wilson

1. What is the best way to bring a species back from the brink of extinction? ----- Molly DuBose, 10<sup>th</sup> grade
2. What is your view on religion? ----- Molly DuBose, 10<sup>th</sup> grade
3. What are the causes and/or explanations for the five major extinctions that have occurred in the past 4 billion years? ----- Rhiannon Faith, 12<sup>th</sup> grade
4. What prompted you to study biodiversity and how has that benefited you? ----- Mikaela Morocco-Schelp, 12<sup>th</sup> grade
5. Explain some of the effects climate change is having on biodiversity. ----- Tyler Keel, 12<sup>th</sup>
6. How are scientists using biodiversity to increase food production in impoverished places around the world? ----- Tyler Keel, 12<sup>th</sup>
7. Can we use biodiversity to improve our current fuel situation? ----- Tyler Keel, 12<sup>th</sup>
8. How do we maintain biodiversity and feed a population of perhaps 9 billion by 2050 when we have a limited landmass for growing the required food?
9. As we attempt to conserve biodiversity, how can we also conserve the behavioral differences of populations of a species?
10. Through creating genetically modified plants, are we adding to the biodiversity of the planet? --- Doug MacLeod, 11<sup>th</sup>
11. With global warming and changing global trends, how will biodiversity be affected? ----- Nick MacLeod, 12<sup>th</sup>
12. Do you see that any effects, national or international, are having success today in preserving marine biodiversity?

E.O. Wilson and Canopy Meg talk to TEENS.



View "DOWN" in Daily Planet Theater



NSF: REU: ANNOUNCEMENT (DBI: 115650)

# In the Canopy with Wheelchairs and Tardigrades



W.R. Miller, M. Lowman and E. McCord



## Want A Different Research Experience?

Want new skills, new challenges, a research publication opportunity, a bit of adventure, and to be part of the future of the planet?

## NSF: REU: Research Opportunity

This is a three-dimensional research project to define the taxonomy and distribution of Tardigrades (Water Bears) in the canopy and the herbivory of insects on a North American deciduous forest. This project is a fast paced, tree climbing, data collecting, rapid analysis, and results oriented internship. It's not for the timid.

Students will be professionally trained to ascend into the canopy. There they will measure the impact of micro and macro invertebrates on the habitat and establish a baseline from which change can be measured. This is the cutting edge of ecological analysis in a world impacted by climate change. Students will learn to use remote sensing, GIS, HPLC, GC-MS, and an EA Scanning Electron Microscope to document the microenvironment.

## We are recruiting a few good students with ambulatory disabilities

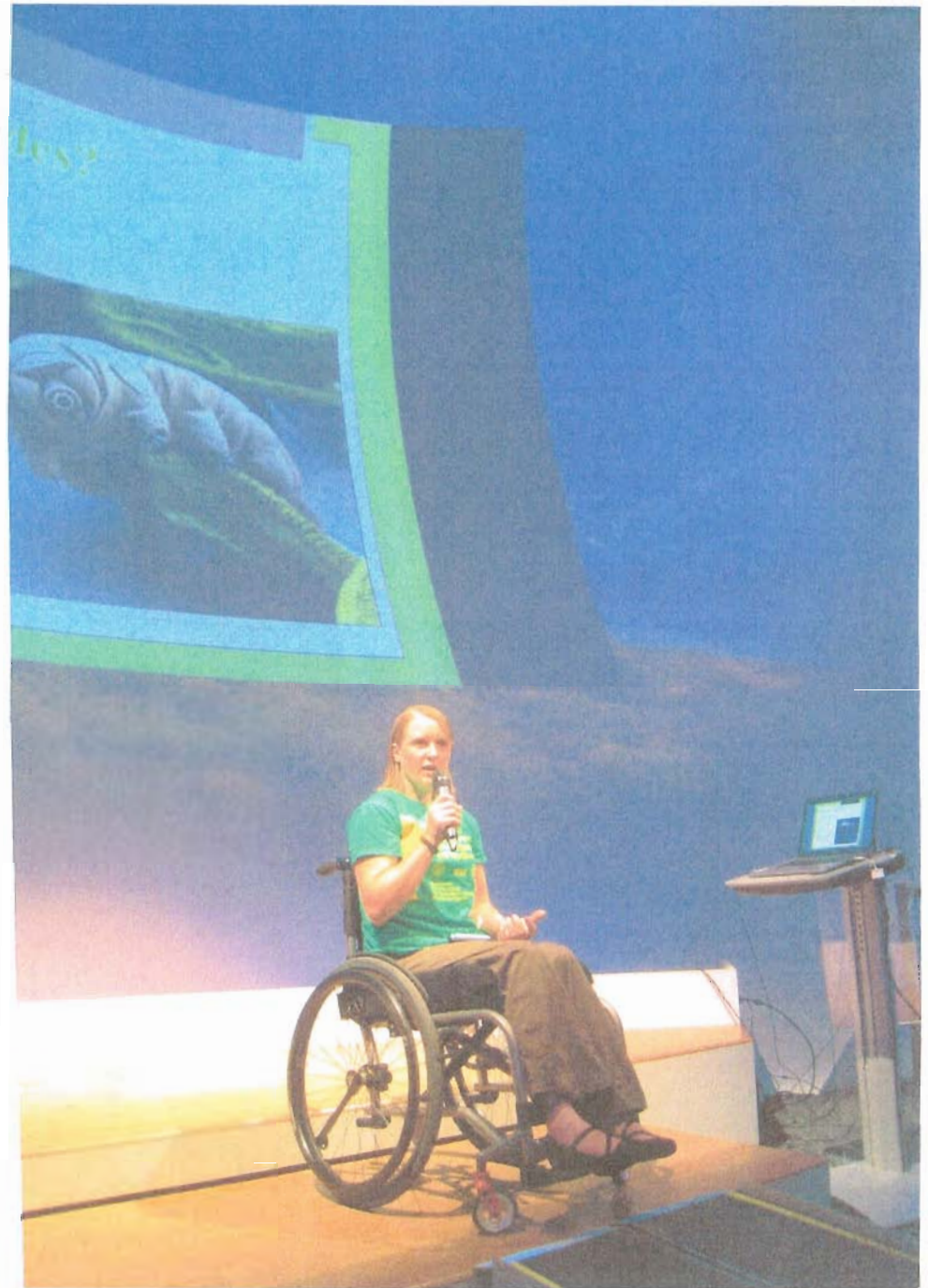
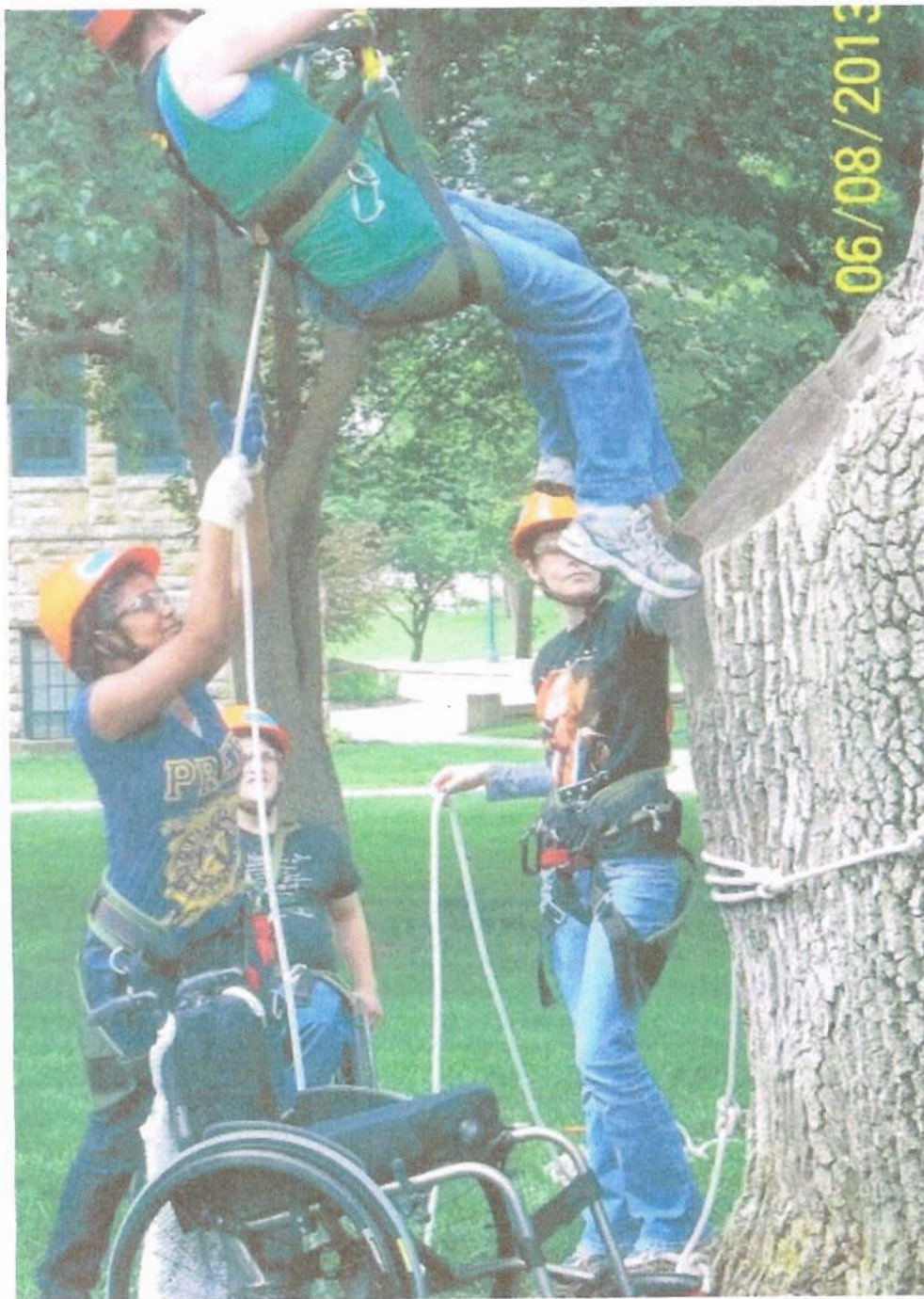
Designed for 8 students, 4 with ambulatory disabilities and 4 without, this project is based on the idea that wheelchair dependency is not a limit to good field biology or canopy access. In the canopy we climb ropes, not trees, and in the lab we use computers, microscopes, and minds that have no boundaries.

Students will be employed for the summer. They will collaborate with the PIs to prepare their data for presentation and publication. They will also meet and network with the scientists and graduate students at the NC Museum of Natural Sciences, KU Microscopy & Analytical Imaging Lab, KSU LTER, and the Missouri Botanical Garden. Students may attend a regional, national, or international meeting and present your results.

Graduates will be part of a small team of young scientists who are defining the condition of the temperate forests before global warming exerts pressure for the forests and canopy to change.

Contact: William Miller at 785-594-8379 or [reu-canopy@bakeru.edu](mailto:reu-canopy@bakeru.edu),  
<http://canopy.naturalsciences.org> or [www.bakeru.edu/canopy](http://www.bakeru.edu/canopy)





Student Rebecca Tripp climbed, discovered, and presented her  
 ROSINTE

# JOURNAL-WORLD

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FRIDAY • JUNE 7 • 2013

## Students learn ropes of research

By Elvyn Jones

[ejones@theworldco.com](mailto:ejones@theworldco.com)

**BALDWIN CITY** — On her second attempt at tree climbing using the single-rope technique, Rebecca Tripp quickly ascended a 15-foot rope hanging from a branch of a pin oak on the Baker University campus.

"That's as high as you can go," said Dan House, a member of Tree Climbing Kansas City, who was instructing the first-time climber in the technique. "You want a higher tree, don't you?"

Tripp nodded yes — and lowered herself into her wheelchair. "I used to climb trees when I was a kid," she said. "When I got in this wheelchair, it was something I thought I'd

Please see RESEARCH, page 7A



**SNOUSHA GLAUDE**, a research intern from Sarasota, Fla., climbs into one of the trees Thursday at Baker University.



Nick Krug/Journal-World Photo

**DEVAN GLENNY, A COLLEGE SENIOR** from Lebanon Valley College in Annville, Pa., leaves his wheelchair on the ground as he ascends into a tree Thursday on the Baker University campus. Eight research interns were selected from across the country to participate in a 10-week canopy-research project funded by the National Science Foundation. The interns will be climbing the trees at various heights to collect moss and lichen samples for measuring the density and diversity of microscopic animals called tardigrades. Glenny, who is interested in pursuing a career that involves field research, says he was drawn to the project when he found out it was open to students with wheelchairs.

## Research

CONTINUED FROM PAGE 1A

never do again."

Tripp and seven other students from around the country were being introduced to tree climbing Thursday as part of a two-month summer research project that Baker biology professor Randy Miller designed with Meg Lowman, who pioneered the single-rope technique's use in biological field research.

Tripp, who has used a wheelchair since a car accident five years ago, is one of two ambulatory disabled researchers involved in the project. The eight students in the project will be climbing trees in the area to collect tiny invertebrates called tardigrades, whose appearance under a microscope gives them the nickname water bears.

"We're emphasizing safety first and then proficiency," Miller said. "In two weeks, it will be second nature to them."

Once trained by House and other members of his group in rope climbing, the eight students will gather field data from trees during the cool of the morning at the Baker Prairie, Baker Woods, Baker Wetlands, Kansas University Field Station north of Lawrence, Overland Park Arboretum and Johnson County parks.

They will gather data from five different vertical layers of 10 examples of 10 different tree species on their morning climbs, then spend afternoons analyzing the samples in labs to learn more about the presence and distribution of tardigrades, organisms

field and lab experience, he said.

"Field research is a dying art in biology," he said. "Not all answers can be found by studying DNA."

Tripp acknowledged that she was an unlikely candidate for the research project. She wasn't currently in school, having already earned a degree in psychology from the University of Maine. She learned of the research opportunity after she informed school officials of her desire to return to school to study environmental science or wildlife ecology. "I don't have experience in either the field or lab," she said. "It's something I want to study when I go back to school."

And yes, there was the matter of the wheelchair. But Tripp said using her wheelchair had given her added strength in the arms and shoulders and an advantage in rope climbing.

Miller said he and Lowman supported the federal government's push for the inclusion of students like Tripp in research opportunities.

"Dr. Lowman and I both have friends in wheelchairs who do world-class work in science," he said. "You don't have to use your legs to collect field data, work in the lab or write reports."

### Water bears

Also new is the research into tardigrades, said Tony Volpini, who will be a junior studying environmental science and biochemistry this fall at Amherst College in Somerville, Mass. He said learning to climb trees was what attracted him to the opportunity, but the experienced lab hand said he also found the research into water bears interesting.

Lots of great  
press for our  
new Canopy  
program for students  
in wheelchairs -

isms so hardy that they can withstand the most extreme conditions. The tiny animals even reproduced after a Swedish scientist exposed them to the cold, heat and radiation outside the European Space Station for 10 days.

The eight student researchers arrived in Baldwin Sunday, toured the labs that they will be using at Baker's Ivan Boyd Center and received an introduction to the subject of their data collection.

The project will conclude with an August trip to Raleigh, N.C., where Miller and the students will give a report on their findings at the North Carolina Museum of Natural Sciences, where Lowman works.

### Field research

Miller and Lowman spent about three years developing the research project, which the National Science Foundation is funding. It is different from many research opportunities in that it allows students to gain both

"I'd heard about them because they are some of the hardiest animals on earth," he said. "You don't see them. But because they basically live on water, they're everywhere."

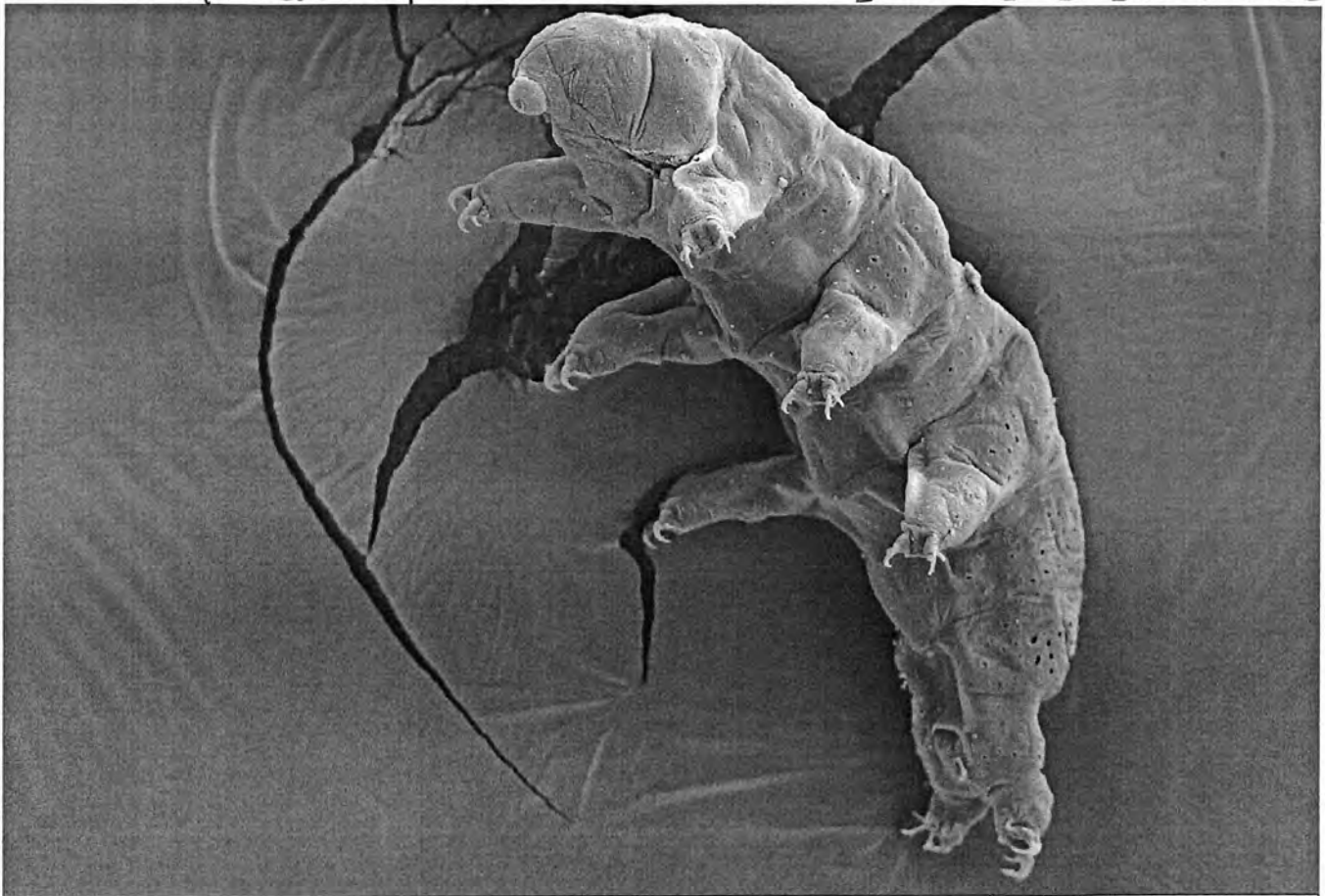
Miller said that the lack of knowledge about tardigrades made the project intriguing. "We don't know what we will find," Miller said. "So little is known about it compared to other organisms. We do know it has many unique biological features."

But to collect the tardigrades, the researchers have to go climbing.

Anna Spires, a Virginia native and student at Williams College in Williamstown, Mass., said she expected to feel the effects of her first climbs later on unused muscles. The daily workouts would be another benefit of the project, she said.

"I'll get cut," she joked. "It's something new. I'm really looking forward to learning research skills. It's just a real exciting opportunity to get a real look into the life of a research scientist."

A new species of tardigrade discovered!



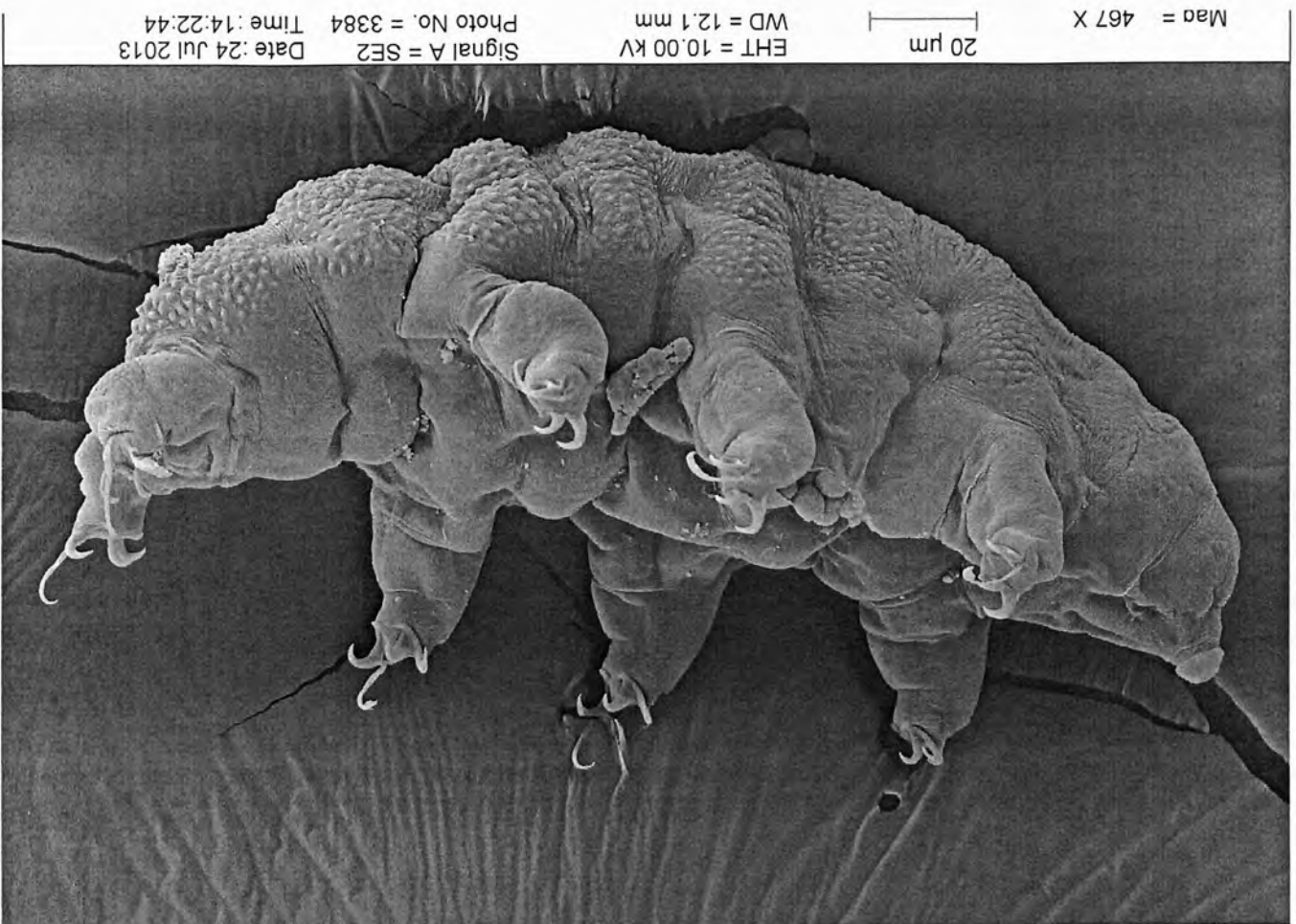
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WD = 12.0 mm

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Photo No. = 3374

Date : 24 Jul 2013  
Time : 13:51:09



Mag = 467 X

20  $\mu$ m

EHT = 10.00 kV  
WD = 12.1 mm

Signal A = SE2  
Photo No. = 3384  
Date : 24 Jul 2013  
Time : 14:22:44

If you love trees, there's something here for you!  
Recreational and professional tree climbers, arborists,  
foresters, canopy researchers, students:

**Come climb with us in big, tall trees**

**Learn to be a "citizen tree scientist"**

**Non-climbers welcome!**

## **"CITIZEN SCIENCE FOR TREES"**

**a scientific symposium at the**

## **TREE CLIMBERS RENDEZVOUS**

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**A joint project of  
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and the Native Tree Society (NTS)**



### **Featured Speakers:**

- Will Blozan, ISA-C; President, NTS
- Kim Coder, PhD, ISA Past-President
- John Gathright, Founder, Tree Climbing Japan
- Peter Jenkins, Founder, TCI
- Bob Leverett, Executive Director, NTS
- Meg Lowman, "Mother" of canopy research
- Joan Maloof, Founder, Old Growth Forest Network
- Richard Preston, author, The Wild Trees
- Cameron Williams, NTS, UCalif-Berkeley

### **Workshop Leaders:**

**Some of the featured speakers and**

- Kevin Bingham, ISA-C
- Eric Folmer, ISA-C
- Tim Kovar, Founder, Tree Climbing Planet
- William Miller, PhD, Baker Univ., Kansas City
- Michael Spraggon, NTS, U.K.
- Tony Tresselt, ISA-C
- David Tukey, ISA

**For more information and to register:  
[www.TREECLIMBING.COM/RENDEZVOUS](http://www.TREECLIMBING.COM/RENDEZVOUS)**

# TanglewoodTalk



"How many students like to climb trees?"  
(hands raised)

## Meg Lowman Treetops Camp Recap

Elmira's most famous (and only) rainforest ecologist, Dr. Meg Lowman, returned to Tanglewood on July 26 to meet with the latest cadre of campers and give a fabulous lecture. This sixth year of Meg Lowman Treetops Camp was the best yet. 20 wonderful girls spent the week exploring field, forest and pond. We learned about the importance of the rainforest, had guest engineers from Corning Inc. participate in a career panel, spent part of a day doing spa activities and we got to craft with ladies from the Chemung Valley Fiber Arts Guild. We ended the week making t-shirts more fashionable with Betsy Hilfiger, and we got to climb trees with the Cornell Outdoor Education people. So many wonderful teachers, volunteers and sponsors make this week one that the 9-12 year old girls will never forget. Thanks to everyone (see the volunteer and donor lists) and we look forward to next year.



1 Day = 1 student inspired!

Lowman, Meg

---

From: Meg Lowman <canopymeg@gmail.com>  
Sent: Saturday, July 27, 2013 3:09 PM  
To: Lowman, Meg  
Subject: Fwd: Samia Israel (meg lowman camp 2013)

----- Forwarded message -----

From: <normasexton@hotmail.com>  
Date: Fri, Jul 26, 2013 at 4:03 PM  
Subject: Samia Israel (meg lowman camp 2013)  
To: "meg@canopymeg.com" <meg@canopymeg.com>

Dear Meg,

This is Samia Israel I met you today at Tanglewood. I want to thank you and everyone for having me at camp this is my second year. I am using my moms email address because I do not have my own. We would like to know more information about going to the Amazon in July please. My mom told nothing is impossible and with hard work and determination I can achieve anything I want. I really would like to go so I would like the information so I can try to earn the money by doing fundraisers and maybe some of my family could donate money to me. My parent said they would help me as much as possible. I have raised money this year for The March of Dimes and for The Ride for Roswell and I got a lot each time. I believe I can do this and it means so much to me to save trees and learn about them. Have a good day.

Thank You  
Samia Israel

--  
Dr. Meg Lowman  
Senior Scientist  
Director of Academic Partnerships & Global Initiatives  
North Carolina Museum of Natural Sciences  
Research Professor, North Carolina State University  
121 W. Jones Street  
Raleigh NC 27603  
(919) 707 9288 [meg.lowman@naturalsciences.org](mailto:meg.lowman@naturalsciences.org)  
[www.naturalsciences.org](http://www.naturalsciences.org)  
[www.canopymeg.com](http://www.canopymeg.com)  
<http://about.me/Canopymeg>



# **Mobile Data Collaboration**

PARTNERING IN A MOBILE WORLD

**A SPECIAL REPORT BASED ON A CONFERENCE OF TECHNOLOGISTS,  
APP DESIGNERS, AND AGRICULTURAL SCIENTISTS CONVENED AT  
THE NORTH CAROLINA MUSEUM OF NATURAL SCIENCES,  
RALEIGH, NC MAY 8-10, 2013**

Prepared by:

Amy Kamarainen, Technical Writer

Brian Kopper and Meg Lowman, Conference Committee Chairs

Pam Hopkins, Conference Coordinator

**Technical Report Published Wednesday, September 11, 2013  
North Carolina Museum of Natural Sciences, Raleigh, North Carolina**

This project was made possible by funds received through  
Section 10201 of the Farm Bill, and on behalf of:





Images  
From  
The  
Mobile  
App  
Conference  
- May  
2013

# AMAZON RAINFOREST WORKSHOP

**Group Leader:** Dr. Meg Lowman, NC Museum of Natural Sciences and Research Professor,  
College of Physical and Mathematical Sciences, NCSU  
*with Dr. Michelle Trautwein, Assistant Director, Biodiversity Lab, NC Museum of Natural Sciences*

**JULY 11-20, 2014 door-to-door**



**Global Issues –Tropical Rainforest Cultures and Conservation** – an immersion summer field course to embrace global issues for NCSU undergraduates and graduate students.

Ever wanted to experience a developing country? or a tropical rain forest? or solve global challenges that are confronting cultures and landscapes around the world? This short, summer field course touches on ecology, economics, culture, politics, sciences, and Spanish. It is an eye-opening introduction to the environmental and cultural aspects of the Amazon Rainforest and river system in the Amazon basin of Northern Peru. Field experiences include:

- ❖ Work side-by-side with scientists in one of the most biologically diverse environments on the planet.
- ❖ Ascend over 115 feet on a 1/4-mile Rainforest Canopy Walkway, one of the few of its kind in the New World.
- ❖ Interact with indigenous people and see how they use the forest for medicine, food, and shelter.
- ❖ Contribute to a Community Service Project to benefit people who live in a village along the Amazon River.
- ❖ Use hand lenses, binoculars, maps, taxonomic keys for identification, and simple field equipment with the help of our experienced Naturalist Guides to learn about:

Insect Camouflage & Mimicry • Neotropical Butterflies • Rainforest Canopy Research • Reptiles and Amphibians  
Medicinal Plants • Orchids & Bromeliads • Amazon River System • Neotropical Birds & Migration

## EXPEDITION AT A GLANCE

*Amazon Options Every Day – Birding by Boat or Walking • Night Hike or Boating to see Stars or Night Creatures*

**Day 1 - USA / Lima**

**Day 2 - Lima / Iquitos / Explorama Lodge**

- A.M. flight to Iquitos, Visit the City Market, Boat to Explorama
- P.M. Exploration hike on the Bushmaster Trail

**Day 3 – Explorama Lodge**

- A.M. Amazon Culture & Craft Fair
- P.M. Yagua Trading & Amazon Clinic Visit

**Day 4 – ExplorNapo Lodge**

- P.M. Visit ReNuPeRu Ethnobotanical Garden

**Day 5 – Napo Lodge / Amazon Conservatory of Tropical Studies**

- A.M. / P.M. Village Service Project or Research at ACTS

**Day 6/7 – Amazon Conservatory of Tropical Studies (ACTS)**

- Research at ACTS Canopy Walkway • Rainforest Explorations

**Day 8 – ACTS / Ceiba Tops Resort**

- A.M. Visit Black Water Lake • Return by boat in search of dolphins
- P.M. Transfer by Boat to Ceiba Tops Resort • Closing Ceremonies

**Day 9 – Ceiba Tops Resort / Lima / U.S.A**

- A.M. Visit Monkey Island & Giant Ceiba Tree • P.M. By Boat to Iquitos for Flight to Lima and return home or ext. to the Galapagos.



Workshop cost is \$2035 land, plus in-country air ~\$325 and int'l air roundtrip Lima (or save on direct flights to Iquitos, Peru). Contact: Christa Dillabaugh, [christa@amazonworkshops.com](mailto:christa@amazonworkshops.com) 1-800-431-2624. Space is limited, so register early! Amazon Rainforest Workshops are hosted by EcoTeach, PO Box 604, Poulsbo, WA 98370.

For general information see the website (case sensitive) <http://www.amazonworkshops.com/2014/canopymeg/>



# JOHOR CORPORATION

( 4 ) dlm. JCorp : PK/14/14

5 April 2013

Professor Margaret D.Lowman, Ph.D.  
Director  
Nature Research Center,  
North Carolina Museum of Natural Sciences.

Dear Professor.

## LETTER OF APPRECIATION

It is our pleasure to have witnessed the success of the recent *Wildlife Conservation Awareness Day : Save Wildlife, Save Lives* which was jointly organised by Johor Corporation and Universiti Teknologi Malaysia on 2 April 2013.

On behalf of Johor Corporation I would like to take this opportunity to express our gratitude and appreciation for your willingness to share invaluable knowledge and eye opening experience as one of the panelists in the forum session.

Your effort and commitment are pivotal in fulfilling the will of HRH Raja Zarith Sofiah Binti Almarhum Sultan Idris Shah in ensuring the success of this forum.

Thank you.

Yours faithfully,  
**JOHOR CORPORATION**

( DATO' KAMARUZZAMAN ABU KASSIM )  
President & Chief Executive

(Sila Nyatakan Rujukan Surat Kami Apabila Menjawab)

LEVEL 2, PERSADA JOHOR, JALAN ABDULLAH IBRAHIM, 80000 JOHOR BAHRU, JOHOR, MALAYSIA.

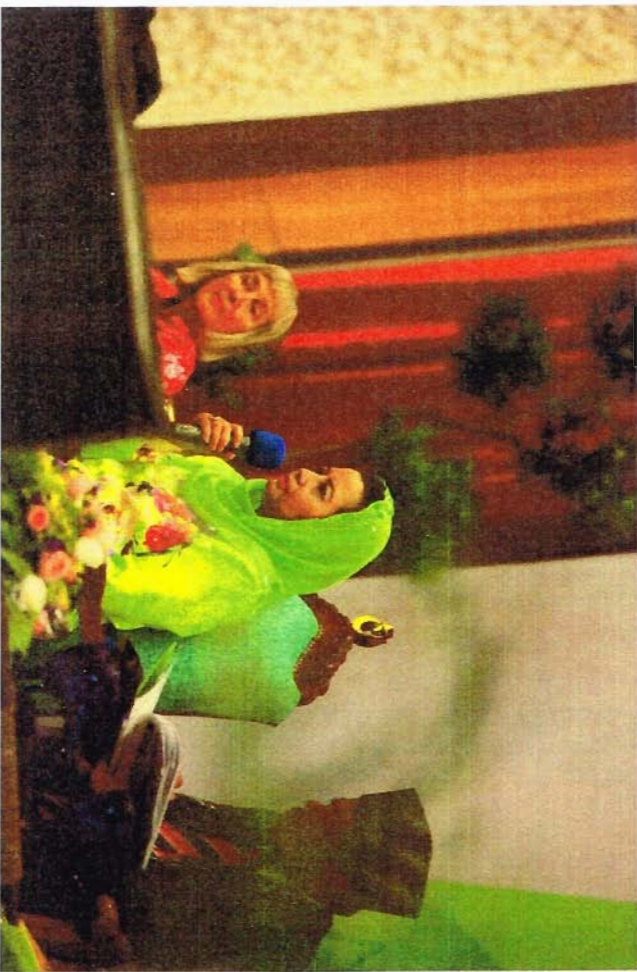
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OFFICE: TINGKAT 11, MENARA JCORP, NO 249, JALAN TUN RAZAK 50490 KUALA LUMPUR, MALAYSIA. TEL: (03)-27872693 FAX: (03)-27872700



**Dr. Lowman gave the keynote lecture at the Wildlife Conservation Awareness Day in Malaysia, as the guest of Her Royal Highness of Johor, Raja Zarith Sofiah binti Almarhum Sultan Idris Shah.**

**2 April 2013 in Johor, Malaysia**



Images of Canopy meg & Her Royal Highness



January 7, 2013

To: Dr Margaret Lowman, Tree Foundation

Re: Letter of Appreciation

In appreciation to your contribution and Tree Foundation to our effort of capacity building to protect Orthodox Church Forests within Churches and monasteries in South Gondar, we would like to express our sincere gratitude and issue this letter of recognition. We sincerely hope that our collaborative endeavor will continue at a higher level for years to come.

With spiritual greetings

Aba Endrias

Archbishop of South Gondar Diocese



« ከመንፈሳዊ ሰላምታ ጋር »  
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 Abba Endriyas  
 Archbishop of South Gondar Diocese

ለዶ/ር ማርጋሬት ሎማን

Tree Foundation

ጉዳዩ:- ምስጋና ስለማቅረብ::

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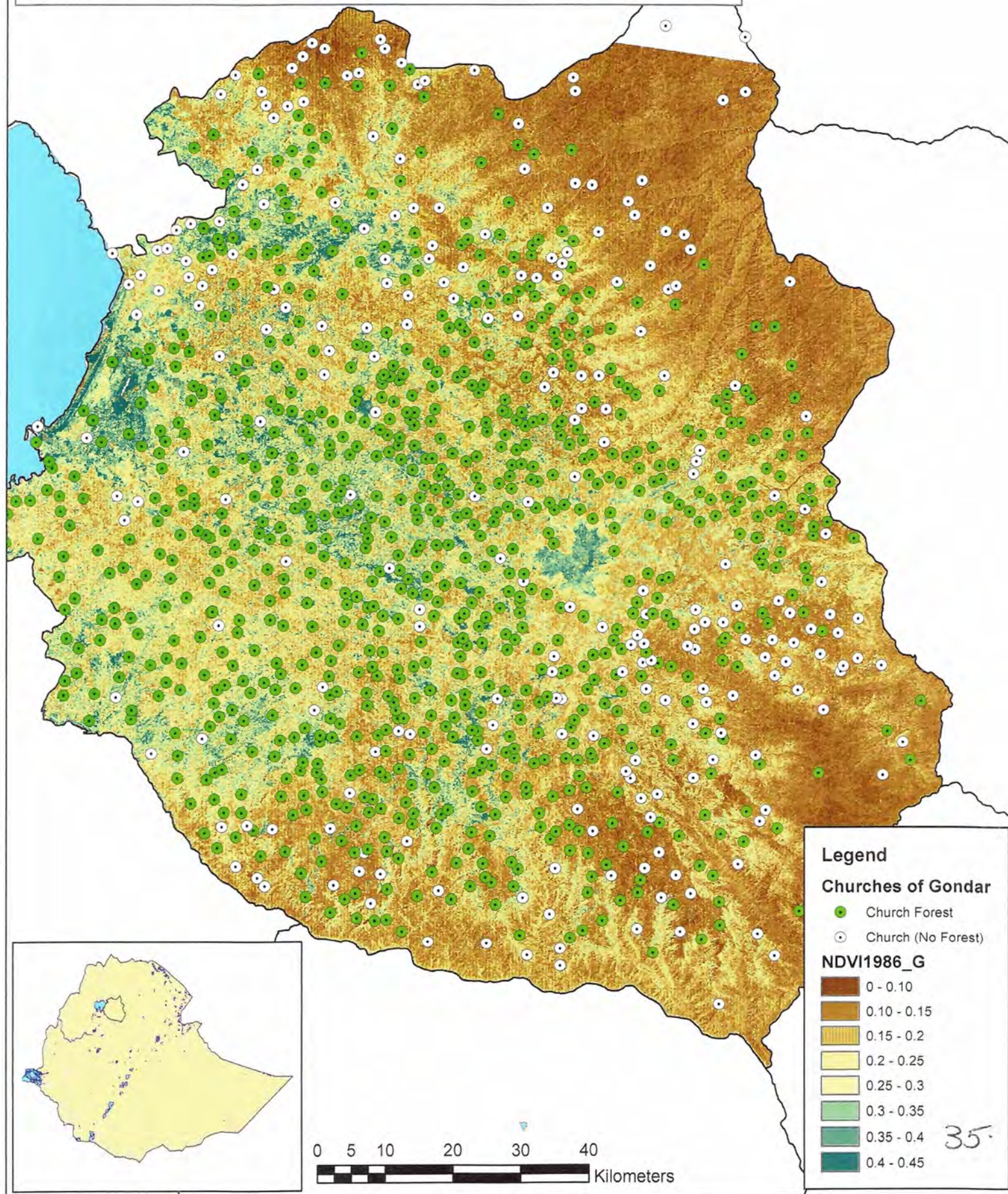
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Abba Endriyas  
Archbishop of South Gondar Diocese

# Church Forests of South Gondar, Ethiopia

## NDVI Estimated Forest Cover 1986



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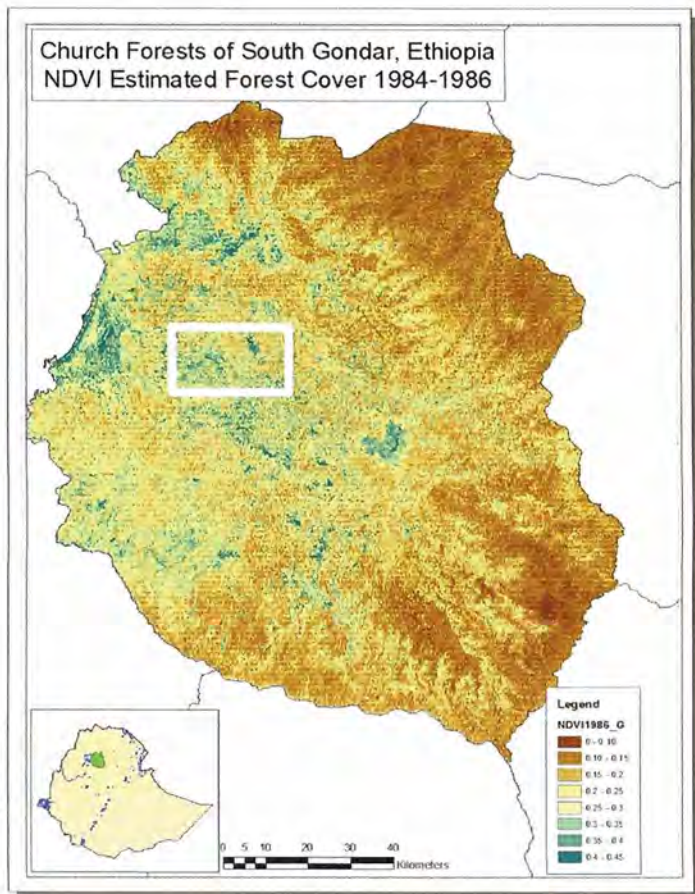
**SAVING THE FORESTS OF ETHIOPIA - A Church and  
Science Partnership**

**Workshop on January 12, 2013, Bahir Dar**

**- Dr. Meg Lowman, Director of TREE Foundation and  
Professor, North Carolina State University**

**- Dr. Alemayehu Wassie Ashete, Bahir Dar University**

# Forest Loss in Northern Ethiopia



- In the early 1900s, over 40% of the Northern Highlands of Ethiopia was Afromontane forest
- By the 1980s <10% of South Gondar was forest
  - Agricultural expansion
  - Livestock grazing
- Today only 2% of forest cover remains

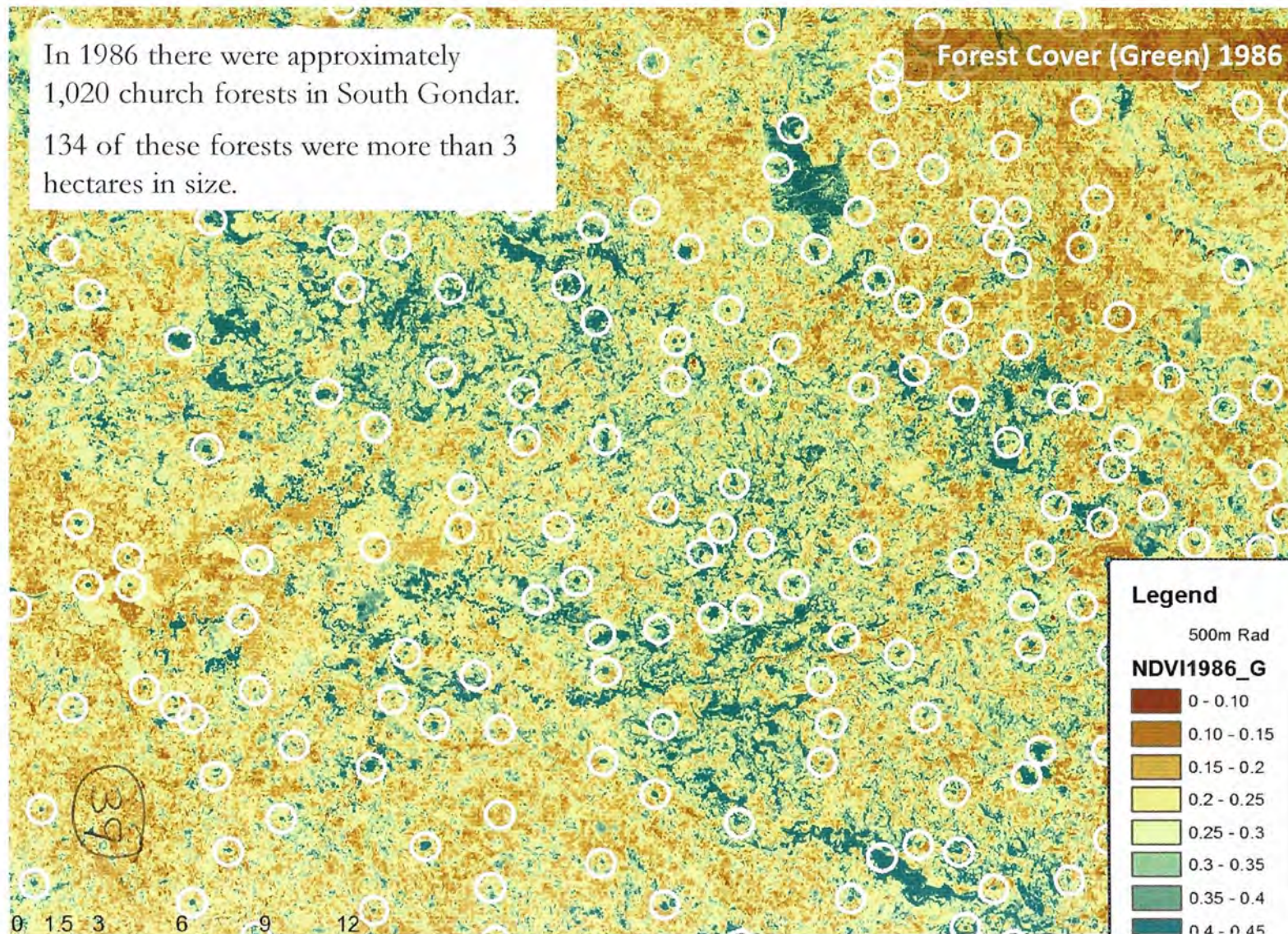
## Research Goals & Methods

- Systematic inventory using GoogleMaps imagery to identify the extent and diversity of church forests in Northern Ethiopia
- Geographic Information Systems (GIS) analysis to understand church forest land cover change over time using USGS Landsat imagery (Landsat 5, 7 & 8)
- Household surveys and interviews to explore how church rules/norms have protected church forests from clearing



In 1986 there were approximately 1,020 church forests in South Gondar. 134 of these forests were more than 3 hectares in size.

### Forest Cover (Green) 1986

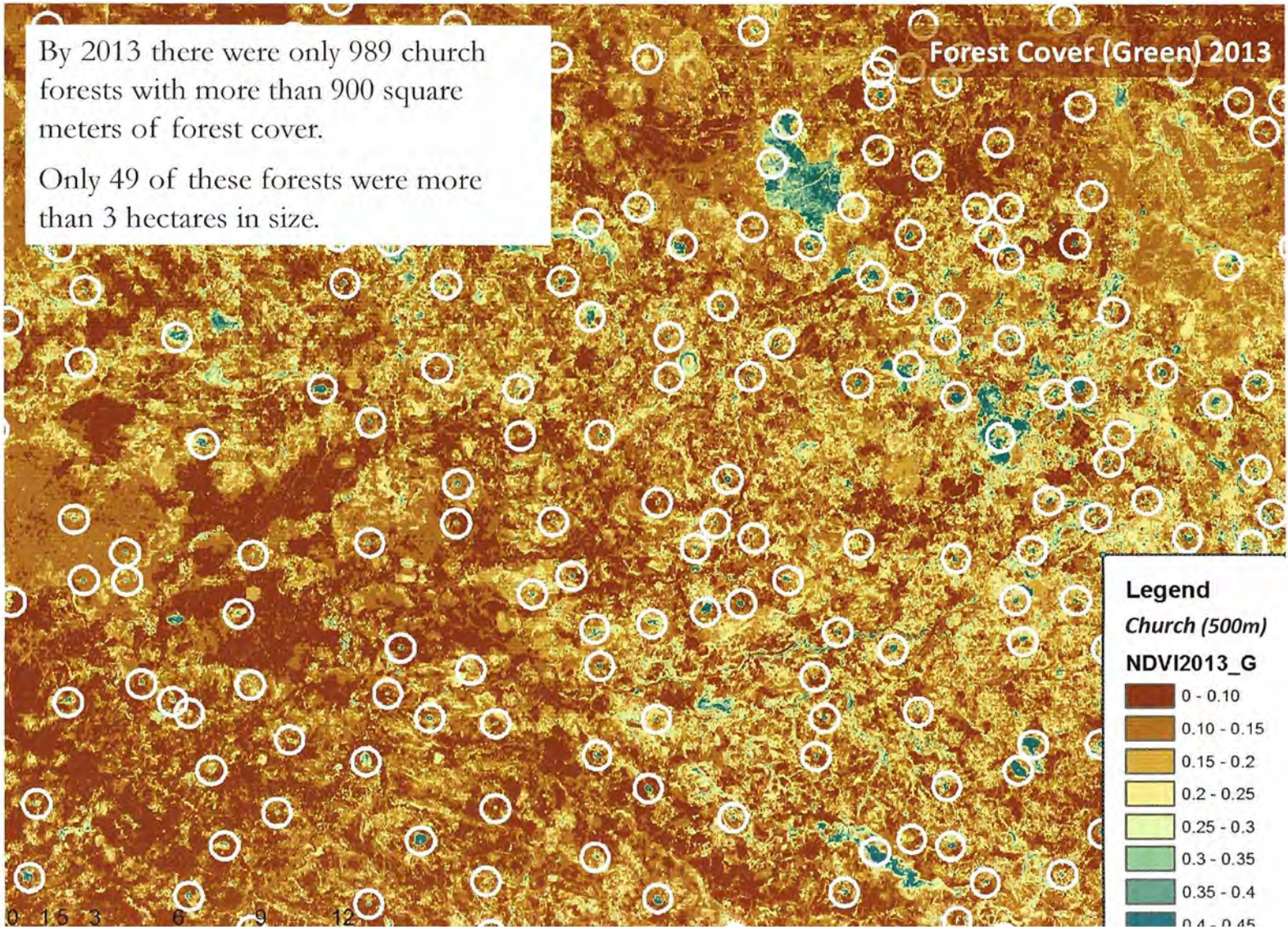


40.

By 2013 there were only 989 church forests with more than 900 square meters of forest cover.

Only 49 of these forests were more than 3 hectares in size.

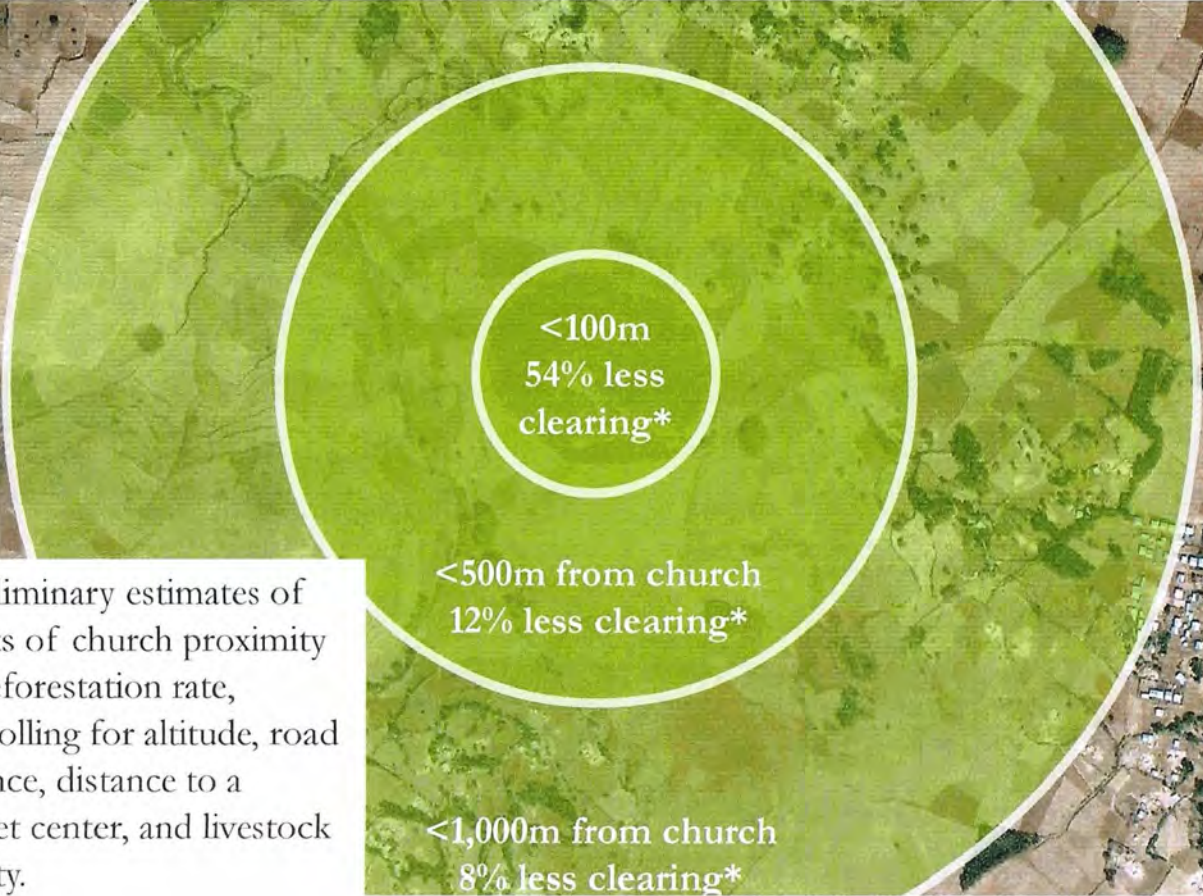
Forest Cover (Green) 2013



| Legend        |             |
|---------------|-------------|
| Church (500m) |             |
| NDVI2013_G    |             |
|               | 0 - 0.10    |
|               | 0.10 - 0.15 |
|               | 0.15 - 0.2  |
|               | 0.2 - 0.25  |
|               | 0.25 - 0.3  |
|               | 0.3 - 0.35  |
|               | 0.35 - 0.4  |
|               | 0.4 - 0.45  |

41.

**Human populations** and **livestock density** are strongly associated with declining forest cover in South Gondar since 1986, but their effects have been significantly weaker within and around church forests.



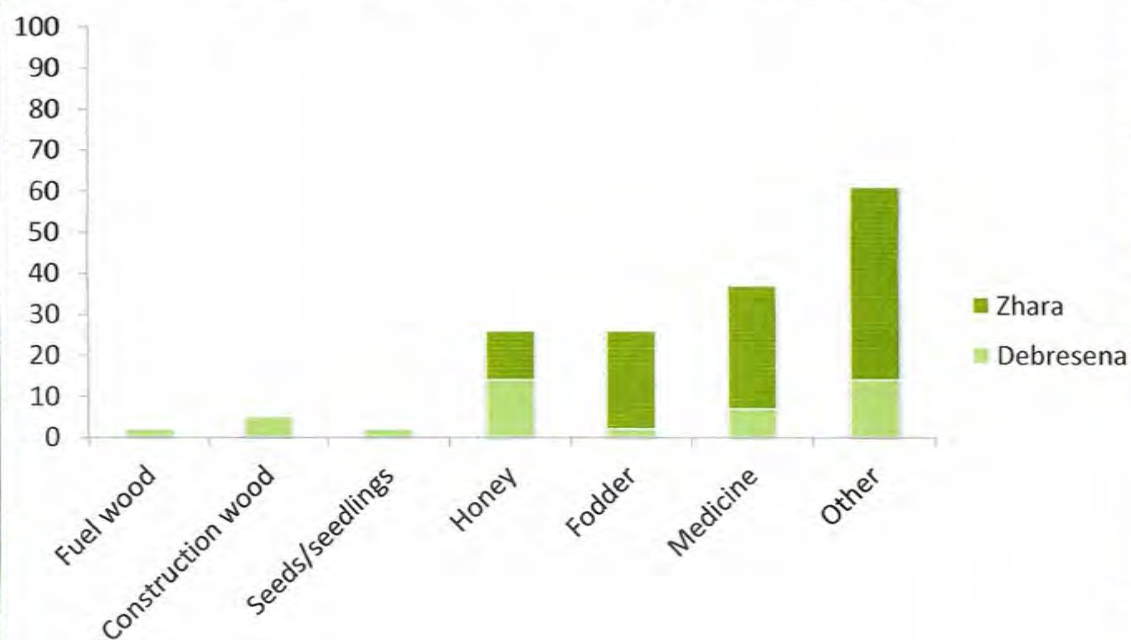
<100m  
54% less  
clearing\*

<500m from church  
12% less clearing\*

<1,000m from church  
8% less clearing\*

\* Preliminary estimates of effects of church proximity on deforestation rate, controlling for altitude, road distance, distance to a market center, and livestock density.

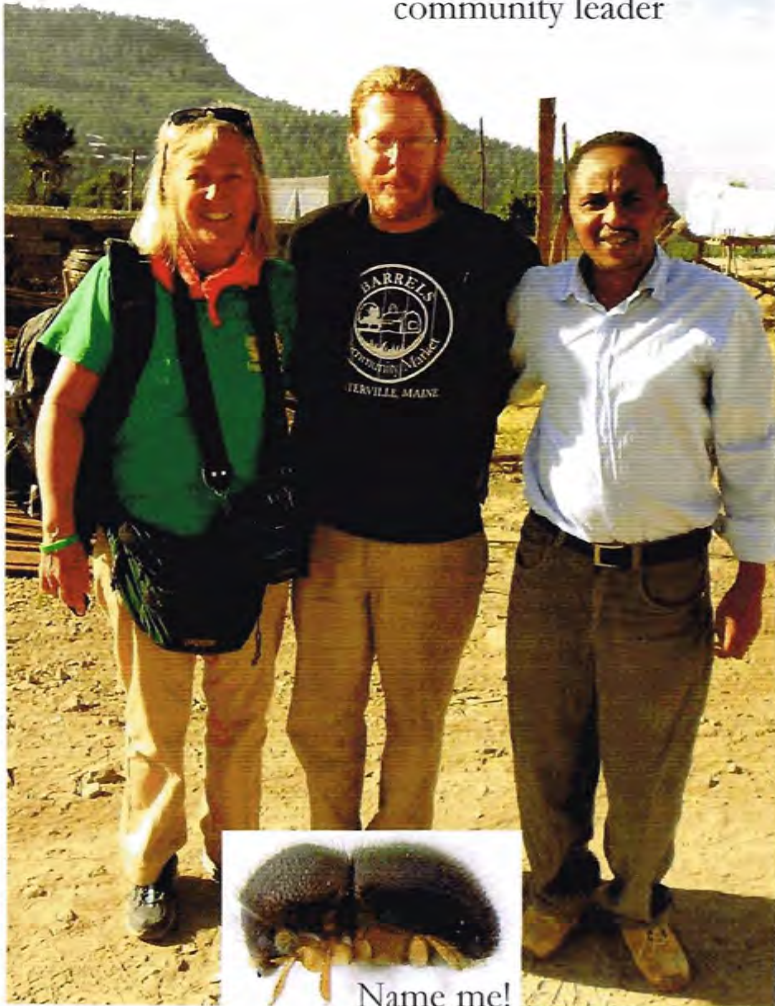
**Benefits Obtained from Church Forests**  
(Percent of Household Respondents, n=63)



43

Meg Lowman, Ph.D.  
TREE Foundation

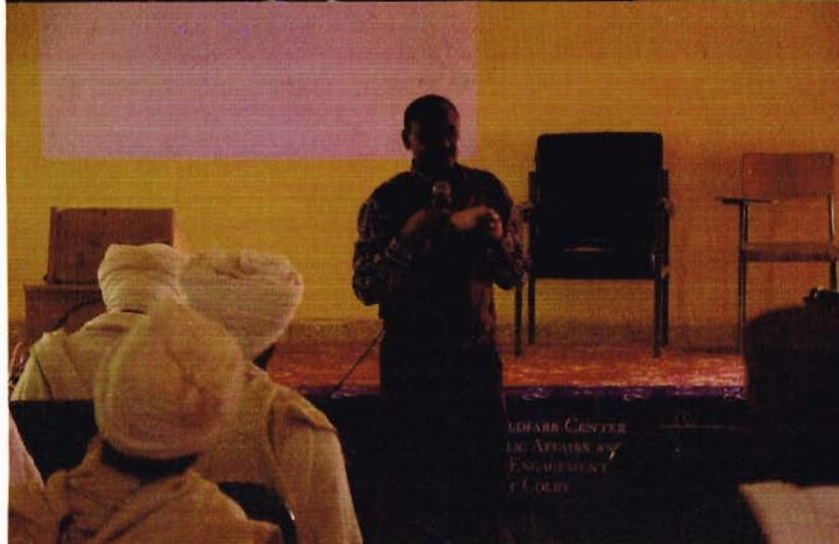
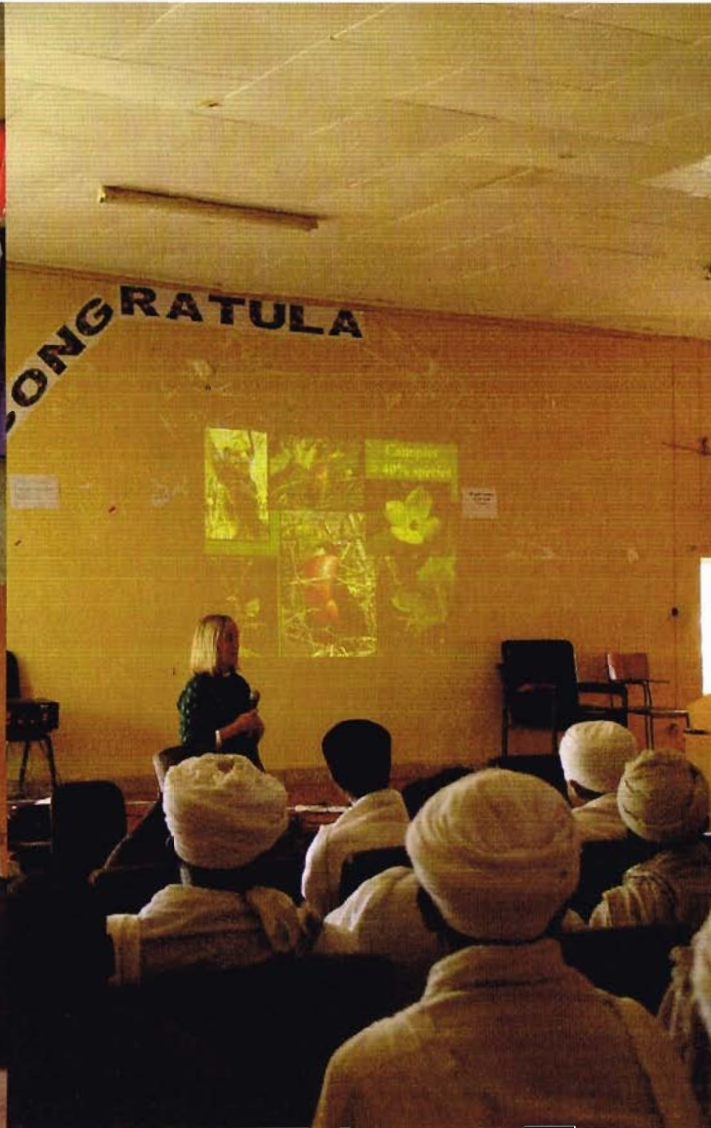
Alemayehu Wassie, Ph.D.  
Local expert and  
community leader



## Roles for “Outsiders”?

- Church communities and local and international experts currently trying to raise awareness
  - Formal designation as conservation sites
  - Access to international funds for wall construction
- Learning from an ancient institution...

44.



51



*When the most respected and  
most effective conservation  
institution is the church,  
conservationists should...*

Wall at Zhara church funded by the TREE  
Foundation and built by the community



New walls at Debreseena & Woji churches





Almost finished!  
Priests are joyful about  
our science - religion  
partnership.



Gelawdios



Dengolt Mariam



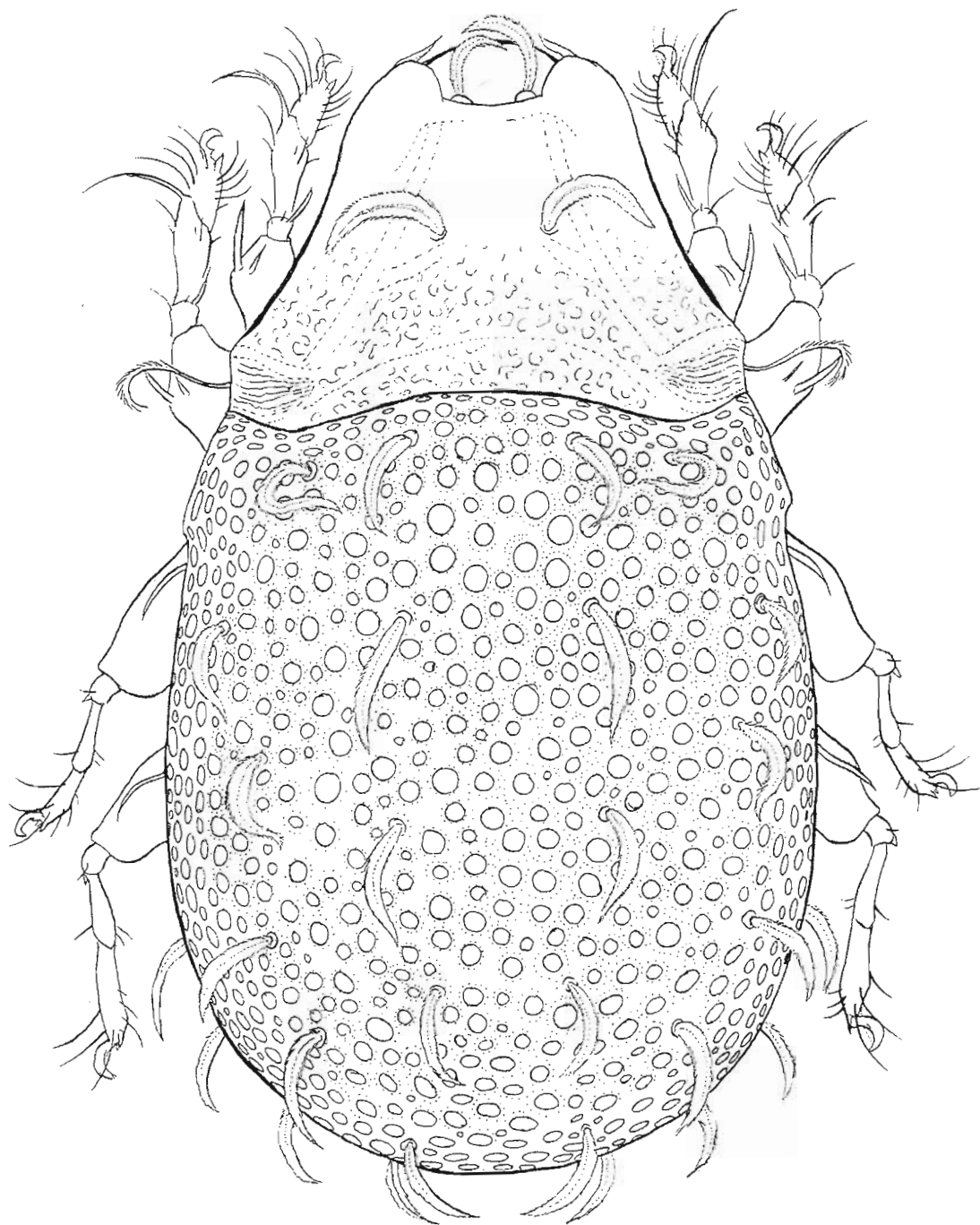
Woji Abuneargawi - (walls in process)



Tara Gedam



Board member Dan Bennett and Meg meet with Leadership at Jimma University, Ethiopia, to integrate the academic community into our forest conservation partnership.



*Austrocarabodes (Uluguroides) kluttzi*  
*New species from the church forests of Ethiopia*

# WHAT'S UP?

THE NEWSLETTER OF THE INTERNATIONAL CANOPY NETWORK

Nalini Nadkarni, Executive Editor

Jennifer Baguley, Editor

## Saving the Forest Canopies of Ethiopia

Dr. Meg Lowman  
Director, Nature Research Center  
North Carolina Museum of Natural Sciences

*"I can try to explain it to you, but unless you see it for yourself, you really can't grasp the situation. They're going through one of the worst droughts ever, it's barely rained in three years. There is no water to grow vegetation, no water to drink. Everything is like desert. For people in the United States, it's hard to wrap your mind around that."*

Anquan Boldin, Football star for Baltimore Ravens, winner of the 2013 Super Bowl

As a nerdy scientist, I was never a Super Bowl fan. This year when Anquan Boldin, who shares my passion for building stone walls in Ethiopia, made the first touchdown of the winning Baltimore Ravens, I became one. Although science and sports appear worlds apart, both of us are dedicated to aiding a country that faces drought, poverty, deforestation, and disease.

Northern Ethiopia has a serious problem with its forest resources. The last remaining forests exist as small fragments called "church forests." These forests surround virtually all the Ethiopian Orthodox churches. Thanks to Google Earth, the shrinkage of these forests in recent decades can be documented. At current rates, these precious green islands are rapidly disappearing forever. The causes are clear. Farmers plow too close to the forest boundaries, which kills the trees around the edges. Cattle meander into the woods nibbling the seedlings and threatening the next generation of trees. Villagers are constantly tempted to grab occasional dead branches for firewood. Despite these activities, Ethiopians love their church and depend on these forests for essential ecosystem services, especially fresh water. These forests provide the last remaining seed source for Ethiopian native trees, important medicines, honey, fresh water, homes for pollinators and other animals, and a highly-valued spiritual sanctuary. In short, no one in rural Ethiopia wants the forests to become extinct.

For five years, I have headed up a conservation task force to reverse northern Ethiopia's deforestation. This



The author presenting a workshop on forest ecosystem services to the Coptic priests of the Gondor region (northern Ethiopia).

requires gaining the complete trust of the church leadership, as well as offering creative solutions acceptable to the diverse needs of clergy, villagers, and the science of forest management. In some breakthrough negotiations only two weeks before the Super Bowl, we brought government officials to the table with church leadership, hopefully ending the carnage around the forest edges. Local government officials pledged to settle the boundary disputes between church forests and farmers, and church leaders promised to conserve their remaining forests. We now have generous American students and

Inside this issue:    Upcoming Events : p. 2    Tree Stewardship: p. 4    SATF Biodiversity: p.6

citizens donating for construction of beautiful stone walls to demarcate the church forest boundaries.

Conservation is usually not this easy. Grassroots efforts that engage local people in negotiations and involve listening to different points of view often prove more successful than high-powered negotiations in far-away capital cities. The Ethiopian Orthodox church considers the stewardship of all of God's creatures as a primary mission, as do conservation biologists who seek to conserve biodiversity. Working together, church and science are achieving amazing results for Ethiopia. And it does not hurt to have a famous Super Bowl star willing to building the stone walls.

### About the Author



Photo by: Carlton Ward Jr.

Margaret D. Lowman, Ph.D. a.k.a. "Canopy Meg" is an American biologist, educator, ecologist, writer, editor, and public speaker. Her expertise involves canopy ecology, canopy plant-insect relationships, and constructing canopy walkways.

Nicknamed the "Real-Life Lorax" by National Geographic and "Einstein of the Treetops" by the Wall Street Journal, Meg Lowman pioneered the science of canopy ecology. She came to North Carolina as Director of the Nature Research Center for the Museum of Natural Science, but now serves as Senior Scientist for the entire Museum and research professor at NCSU's College of Sciences. For over 30 years, "Canopy Meg" has solved mysteries of insect pests and ecosystem health in the highest layer of the world's forests, designing the tools of the trade- hot-air balloons and walkways for treetop exploration- as she went. Her personal mantra is "no child left indoors."

Bio courtesy of [canonymeg.com](http://canonymeg.com)

### Did you know?

- ♦ 80% of the population in Ethiopia works in agriculture.
- ♦ Ethiopia is the 10<sup>th</sup> largest country in Africa, with a total area of 1,127,127 sq. km
- ♦ Archeologists have found the oldest known human ancestors in Ethiopia, including *Ardipithecus ramidus kadabba* (c. 5.8–5.2 million years old) and *Australopithecus anamensis* (c. 4.2 million years old).
- ♦ Among the many varieties of trees and plants found in Ethiopia are the date palm, mimosa, wild olive, giant sycamores, junipers and laurels, the myrrh and other gum trees.

### Conferences, Meetings, and Events

#### International Society of Arboriculture Annual Conference and Trade Show

August 3-7, 2013: Toronto, Ontario, Canada

The ISA Annual International Conference and Trade Show provides a forum for the exchange of information and opportunities to network with others in the arboricultural profession.

The Conference and Trade Show feature a lineup of educational sessions led by industry leaders from around the globe, sharing their thoughts and views about the newest trends in equipment, practice, technology and research.

Highlights of the Conference include:

- International Tree Climbing Championship
- Arbor Fair
- Educational Sessions
- Trade Show
- Tree Academy Workshops

The ISA Conference and Trade Show is the premier event for arborists from around the world. Consider attending as a way to build your business network, meet the industry's leaders, and learn from the best in the profession.

<http://www.isa-arbor.com/events/conference/index.aspx>

MARY COLWELL

# The Church in the forest

Thousands of sacred forests in Ethiopia are protected by the Orthodox Church and the state. The fact that they are so regarded speaks not of paganism, but of a special respect for God's Creation. This kind of stewardship of the natural world could be a model for other Churches and other countries.

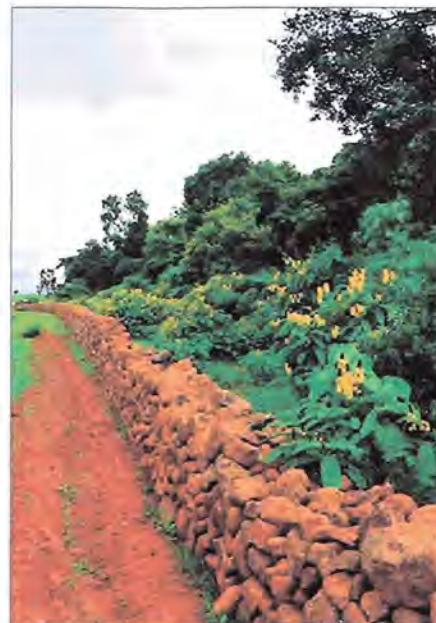
**“W**hat you notice immediately is that when you leave the agricultural fields and go into the forest you experience a sense of prayerfulness and peace; it's a spiritual place. I'm not surprised the locals see the forest as an extension of the church.” Claire Ozanne is deputy provost of Roehampton University, London, a specialist in the ecology of forest canopies and a Catholic. She has recently returned from an international expedition to record the invertebrate life of Ethiopia's sacred forests, which surround all Ethiopian Orthodox churches. The pictures provide a stark image of islands of greenery amidst desert and fields.

Ethiopia has experienced great changes over the last 50 years. The population has increased fourfold from 22 million in 1960 to more than 80 million today (World Bank Statistics). Climate change, decrease in the fertility of soils, increasing urbanisation and agriculture, combined with political turmoil and mismanagement have meant that a once

fertile and biodiverse nation is struggling to feed its population and the majority of Ethiopians live in abject poverty. It is therefore not surprising that the only land that survives intact is that which is properly protected. In northern Ethiopia church forests are the only areas left that contain native trees and wildlife. Thankfully there are 35,000 of them of various sizes, providing refuge and habitat for species that have otherwise disappeared from the rest of the country.

The Ethiopian Orthodox Tewahido Church (EOTW) is the predominant Orthodox church in Ethiopia, and more than 42 per cent of Ethiopians are members. It was part of the Coptic Orthodox Church until 1959, but was then granted its own Patriarch by the Coptic Orthodox Pope of Alexandria and Patriarch of All Africa. There are 45 million followers making it the largest sector of the Orthodox Church.

EOTW has a strong theological conviction that the natural world is a gift to be protected and respected. It has a long history of nature



**'Religious protection is the main mode of safeguarding the forest': Zhara church forest wall in northern Ethiopia**

conservation in the form of planting, protecting and preserving trees. Care for nature is an integral part of the life of the Church and followers are expected to respect and exercise good stewardship of forests, at least in the church compound if not in the whole landscape, which is obviously more difficult. The basis for this belief is biblical and drawn from Genesis: "The Lord God took the man and put him in the garden of Eden to till it and keep it." (Genesis 2:15)

Stewardship is a word that causes discussion in western environmental circles but in this case it is a good description of how the locals see themselves in relation to the forest around them. Claire Ozanne points out that nature worship is certainly not an aspect of EOTW faith, rather it is based on respect for a gift provided by God, and a religious obligation that has to be carried out daily and not sidelined or considered less important than other Christian duties.

This belief is so strongly held that the forests have developed two forms of protection, one by the Church and one by the State. Religious protection is the main mode of safeguarding the forest and is achieved through encouraging religious commitment and respect among the followers. As the church is believed to be the house of God, everything in the compound is sacred and holy. The local church authorities give permission for some activities such as collection of fruit and medicinal plants, but forbid others such as collection of wood for fuel or construction.

## Thinking about a RETREAT for 2011?

### The RETREATS 2011 handbook includes:

- Details of over 200 retreat centres across and beyond the UK.
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# Habits of virtue

The Advent season is a time of watching and waiting. In our final reflection taken from Cardinal Newman's writing he considers those qualities that distinguish the Christian from other law-abiding people

**T**he substance of religion consists in faith, hope, and charity; and the qualification for eternal life is to be in a state of grace and free from mortal sin; yet, when we come to the question, how we are to preserve ourselves in a state of grace, and gain the gift of perseverance in it, then a number of observances have claims upon us, over and above those duties in which the substance of religion lies, as being its safeguard and protection. And these same observances, as being of a nature to catch the eye of the world, become the badges of the Christian, as contrasted with other men; whereas faith, hope, and charity are lodged deep in the breast, and are not seen. Now, one of these characteristics of a Christian spirit, springing from the three theological virtues, and then in turn defending and strengthening them, is that habit of waiting and watching, to which this season of the year especially invites us.

If, indeed, we listen to the world, we shall take another course. We shall think the temper of mind I am speaking of, to be superfluous or enthusiastic. We shall aim at

doing only what is necessary, and shall try to find out how little will be enough. We shall look out, not for Christ, but for the prizes of this life. We shall form our judgement of things by what others say; we shall admire what they admire; we shall instinctively reverence and make much of the world's opinion. We shall fear to give scandal to the world. We shall have a secret shrinking from the Church's teaching. We shall have an uneasy, uncomfortable feeling when mention is made of the maxims of holy men and ascetical writers, not liking them, yet not daring to dissent. We shall be scanty in supernatural acts, and have little or nothing of the habits of virtue which are formed by them, and are an armour of proof against temptation. We shall suffer our souls to be overrun with venial sins, which tend to mortal sin, if they have not already reached it. We shall feel very reluctant to face the thought of death.

All this shall we be, all this shall we do; and in consequence, it will be very difficult for a spectator to say how we differ from respectable, well-conducted men who are



The Nativity, as depicted on a roof boss in Norwich Cathedral. Photo: © Julia Hedgecoe

not Catholics. In that case certainly we shall exhibit no pattern of a Christian spirit, nor shall we be in our own persons any argument for the truth of Christianity; but I am trusting and supposing that our view of Christianity is higher than to be satisfied with conduct so unlike that to which our Saviour and his Apostles call us. Speaking, then, to men who wish now to take that side and that place which they will have wished to have taken when their Lord actually comes to them, I say, that we must not only have faith in him, but must wait on him; not only must hope, but must watch for him; not only love him, but must long for him; not only obey him, but must look out, look up earnestly for our reward, which is himself.

■ Our Advent series has been prepared by Stratford Caldecott, editor of *Second Spring*. The above is taken from *Sermons Preached on Various Occasions*, 1908.

If someone does transgress and cuts a tree or even a dead branch for personal use, they would be presented to the church community and scholars and asked to repent and be committed not to repeat the mistake again. If they fail to confess, or they make the same mistake again, they would be alienated from the community and would not be entitled to services from the church. This sanction is known as Gizet. Although churches are primarily houses of God, they are also afforded legal protection by the state. Some larger churches are assigned guards and anyone who encroaches on to church land with cattle or crops, and anyone who acts as a poacher or illegal logger, is brought before the civil courts.

These sanctions have worked well for many years but as pressures increase in this ravaged country, encroachment from the surrounding fields is causing increasing concern and ways are being sought to raise the level of protection. The scientific findings that Ozzanne and colleagues are collating now will provide concrete evidence of the richness of the invertebrate life of these forests (invertebrates are the bedrock of all other life) and help increase awareness of the importance of the forests to the ecology of Ethiopia. Vegetation surveys that have already been carried out show that the forests house a large proportion of the endangered plant species of the area and provide ecosystem services to local people, such as fresh water, pollinators (which are essential for the surrounding crops), honey, shade, and spiritual value.

Pope Benedict XVI has made many statements on the need for the Catholic Church to protect nature. On his recent visit to the UK he mentioned it three times and in his final address before boarding the plane he pledged cooperation between the UK Government and the Holy See on environmental issues. We do not yet know how that relationship will develop and what can be achieved, but perhaps this sector of the Orthodox Church could provide inspiration and point a way forward.

It is obviously not possible to create forests around all Catholic Churches, but a sense of the sacred and respect for nature is not always evident; there is a far more utilitarian approach to the natural world in the West. Land, however small, around a church could be made into a welcoming haven for urban wildlife and act as a witness to the wider community. So often Catholic church gardens and borders look barren and denuded.

In 2007 the Vatican accepted the gift of a potential forest from a carbon offset company to be planted on degraded land in Hungary to account for the Vatican's carbon emissions. The forest is being carefully sized on the level of emissions from the Holy See in 2007. This is often highlighted as a prime example of the Catholic Church's intent to be green, and so it is as far as carbon offsetting is concerned.

However, the image portrayed is one of calculation and mathematical equations, not reverence and respect. If the Vatican had declared the forest to be sacred and the life

in it worthy of protection because it is a gift from God then it would send a message to the world that nature is not just for our use but is to be cared for and revered as holy. As the UN report "Harmony with Nature" has just been published, detailing a bleak outlook for so much of life on earth, this would be a welcome boost to an issue whose serious importance is increasingly appreciated.

The Catholic Church has often been wary of embracing a spiritual approach to the natural world, sometimes for fear of encouraging paganism and nature worship, but also because it is concerned about blurring the distinction between nature and the special place of people in the eyes of God; but as Ethiopia shows, that is not necessarily the result of a more spiritual approach. What happens when nature is considered sacred is that it gives back, in ways that benefit all of humanity, resources, spiritual succour and aesthetic pleasure, all sorely needed in an increasingly urbanised and functional world.

The sacred forests of Ethiopia are a stark reminder of the extent to which people will go to convert rich forest into desert if left unchecked. As the population of the world continues to increase we will need more, not less, biodiversity to provide us with what we need to survive, both physically and spiritually.

■ Mary Colwell advises the Catholic Bishops' Conference of England and Wales on environmental matters.

54

Review

## The Status of Ethiopian Sacred Groves

Catherine L. Cardelús<sup>1,\*</sup>, Peter Scull<sup>1</sup>, Joshua Hair<sup>1</sup>, Maria Baimas-George<sup>1</sup>, Margaret D. Lowman<sup>2</sup> and Alemaheyu Wassie Eshete<sup>3</sup>

<sup>1</sup> Department of Biology, Colgate University, Hamilton NY 13346, USA

<sup>2</sup> Nature Research Center, North Carolina Museum of Natural Sciences, Raleigh, NC 27601, USA

<sup>3</sup> College of Agriculture, Bahir Dar University, Bahir Dar, Ethiopia

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Tel.: +1-315-228-7460; Fax: +1-315-228-7997.

Received: / Accepted: / Published:

**Abstract:** The northern Ethiopian landscape is dotted with small patches of church forests that are religious centers for the Ethiopian Orthodox Tewahido Church (EOTC). These church forests are all that remain of the once vast tropical Afromontane dry forest. Herein we review the pattern of distribution at the landscape scale and their status with regard to ecosystem function. We present nutrient measurements of soils and foliar tissue of the dominant tree species in each of two forest fragments (~10 ha) to determine their nutrient status. A total of 1,488 sacred groves were inventoried within the study area, yielding an overall density of one sacred grove for every twenty square kilometers. Sacred groves averaged a little over five hectares and were separated from one another by more than two kilometers. Our findings indicate that these forests are vulnerable to loss because of their size and isolation and that soil carbon and nitrogen stocks have decreased significantly between the forest interior and the clearing with carbon losses as high as 72%.

# Preserving the Nsoli Rainforest, Lac Tumba, DRC

2013 Summer Trip to Lac Tumba



**GO CONSCIOUS EARTH**

2013

Authored by: Godi Godar

# Report 2013 Summer Trip to Lac Tumba

## Preserving the Nsoli Rainforest, Lac Tumba, DRC

Traveling with two other members of Go Conscious Earth, I returned to the Congo after 27 years in the United States to preserve the ancestors' land in the Lac Tumba region. We arrived in Kinshasa and met with Congolese government officials, including the Minister of the Environment, to register and claim the land for the Batumba people living on Lac Tumba in the equator region.



After presenting the project to the minister, he authorized delegates to come with us on the trip to make a final survey of the land, and to see

how the local people were accepting the conservation project on their behalf.

It is a traditional custom, *matoko*, that before you exchange news, the visitor is required to give a token or small amount of money (\$5-\$10) to the chief, representing giving respect and thanks to our ancestors because without them we wouldn't exist. These gifts are distributed amongst the tribe. We arrived in Bikoro and were introduced to the local chief, Chief DeZone, and at the end of the day they had a reception in Bikoro welcoming us and celebrating the occasion.

The next day my brother came to Bikoro and we traveled to my village in a large dugout canoe with a 30 horsepower outboard motor.



When we arrived in Ikoko I remember it was one of the best moments of my life. Over a thousand people were waiting with palm branches, dancing and wearing traditional costumes. We were carried through the village on special chairs called *ipoy* and it was a moment of sheer overwhelming joy, marching two miles from one end of the village to the other. We stopped at the church filled with people and the pastor welcomed us to the village. He said, "No longer will we call you Tata Godar, but

we give you a new name, Nehemiah, one who returns to help his people." I felt like a king returned. A Congolese government official said you are then chief of Lac Tumba.



The next day we went to other villages, Nkake and Ngelo Monzoi, my mother's village where she was born. The celebration continued with so many people waiting. We met the chief of the village and the people performed for our entertainment.

As we traveled to each village we shared the vision of Go Conscious Earth, how we can work with all the villagers to preserve and protect the ancestors' land from further logging and conserve it for the use of the local village.

In all the villages we visited, people complained most about how the logging companies came and promised them things like schools or clean water or health care but in the end when the logs were shipped they ended up with nothing.

For example, some of the villagers said they had worked for one company, Itebe, for a year and still had not been paid. I was happy that the government officials were there to hear the complaints from the people. They collected information about all the abandoned logs that the loggers had left, rotting in the forest, information to be submitted to the Minister of the Environment in Kinshasa.



I was happy to see that since I left over twenty years ago, the villages have not changed very much. The fishermen and tribe people still travel everyday by canoe. The women go the gardens early each day, carrying the baskets on their backs to haul the cassava or wood for cooking. Seeing the women carrying the baskets, reminded me of my mother, working hard to raise nine children in the village.

One day Clarence, Zach and I asked someone to take us into the forest to see the animals; we did not see any monkeys that day but the next day we found them way up high in the trees. We took photos of the huge trees in the heart of the forest, standing 200 feet tall, and at the base, roots spreading out 25 feet wide.



We continued on our journey, village to village, meeting with the chiefs and sharing our vision to assist them in the future. We brought 8 water filter units, GCE t-shirts, soccer balls, clothes, etc and distributed them to the villagers. Zach demonstrated how to operate the water purification systems; the villagers loved it. Traveling the lake, the sunsets, the moon

rising, the forest was a sight of spectacular beauty, a paradise. The people were wonderful, very grateful, providing food, cooking, traveling with us and sharing stories. Villagers came and embraced the project.

We found out that the lake is being over-fished. Some of the fishermen are fishing with mosquito nets, using them to drag all of the fish, even the tiny ones to the shore, and eating everything they get, putting nothing back. We learned that the people have many needs – the problem of malaria fever, babies dying of infections, tooth infections, some people sick from drinking dirty lake water.

Zach and I were happy to hang out with the pygmies, being welcomed by them, sharing their stories, sharing some of the medicinal plants used for many generations, watching the ladies making baskets. Some of the plants were used for fighting infection, some for energy, many others for a variety of medical purposes.

Our last days in the village, Ngilo Monzoi, a family with an eleven year old, Bopata, came to us and we found out that his cheek from the top to bottom was swollen due to a tooth infection of 4 months without treatment. He was in pain and crying. Petro, one of the Congolese government survey technicians, told us that there were no physicians in the entire region of Lac Tumba and there was only one physician in the closest town, 120 km away, Mbandaka, that could help him. I told his parents that Go Conscious Earth is here to help (or what else is our purpose there?), to pack their stuff and we traveled to Mbandaka together. The road was rough and we were afraid he was going to die because the infection could reach his brain and kill him. Petro and I dropped Clarence and Zach at the hotel and rushed the child to the hospital. The physician agreed to see him immediately and took him to the emergency surgery, removing 3 teeth and giving him life saving medicine. He said that in 2 more days the child would've died. The family stayed there for 2 weeks while he recovered and GCE made sure that all the medical expenses were paid (only about \$600 total). A month later the mother of the child had a baby boy that they named Godi Godar in thanks for saving their son's life.



We said our goodbyes and returned to the capitol, Kinshasa, for a final meeting with the Minister of the Environment, to report on the trip and how we were received. He told us that he was happy to meet us, that he had been selected as minister by the people, that he himself is from the equator region, and that he would do whatever he could to preserve the forest. He assured us that very soon we would have a signed contract for 25 years preservation with all the documentation in order and could renew at the end of that period.\*

# Web Report

## Website Visibility by Search Engines

"tree canopy biology"

CanopyMeg.com is #2 out of 4,640,000 results.

"ethiopia church forests"

CanopyMeg and TREE Foundation are #1 and #2 out of 3,480,000 results.

"canopy explorers"

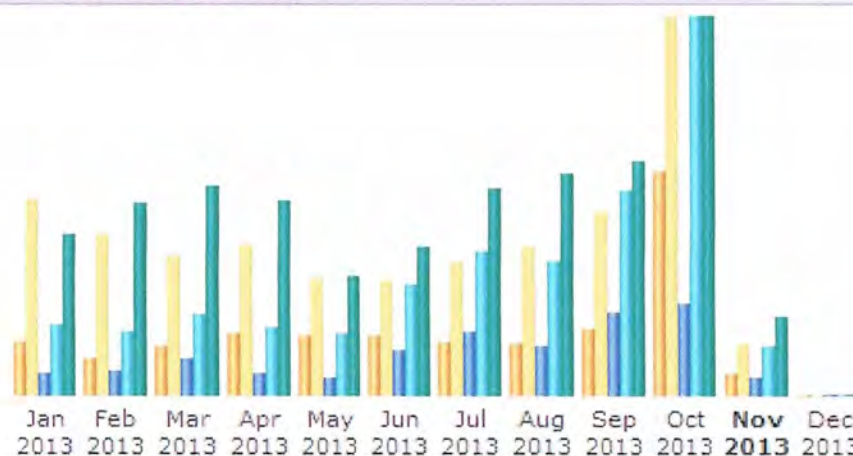
CanopyMeg and TREE Foundation have the top 5 spots out of 743,000 results.

Reported period Year 2013  
First visit 01 Jan 2013 - 00:07  
Last visit 08 Nov 2013 - 14:36

|                      | Unique visitors                                       | Number of visits                | Pages                         | Hits                            | Bandwidth                     |
|----------------------|-------------------------------------------------------|---------------------------------|-------------------------------|---------------------------------|-------------------------------|
| Viewed traffic *     | <= 26,155<br>Exact value not available in 'Year' view | 63,231<br>(2.41 visits/visitor) | 475,529<br>(7.52 Pages/Visit) | 1,367,485<br>(21.62 Hits/Visit) | 31.25 GB<br>(518.26 KB/Visit) |
| Not viewed traffic * |                                                       |                                 | 620,128                       | 730,526                         | 10.14 GB                      |

\* Not viewed traffic includes traffic generated by robots, worms, or replies with special HTTP status codes.

### Monthly history



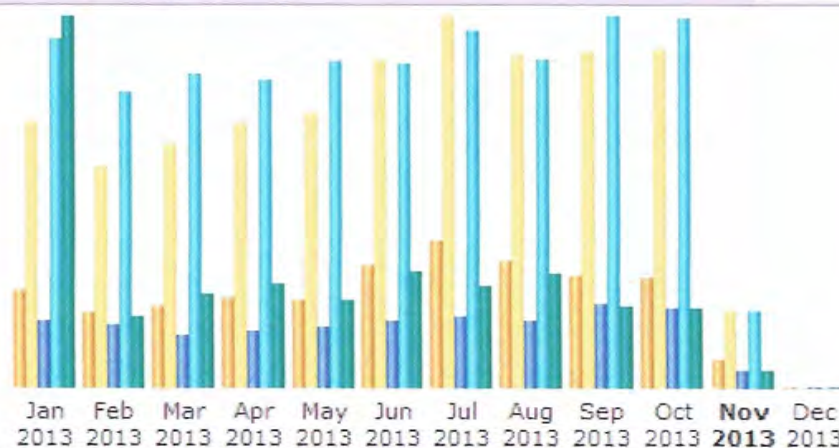
| Month    | Unique visitors | Number of visits | Pages   | Hits      | Bandwidth |
|----------|-----------------|------------------|---------|-----------|-----------|
| Jan 2013 | 1,876           | 7,003            | 22,680  | 70,872    | 2.34 GB   |
| Feb 2013 | 1,308           | 5,707            | 23,985  | 63,892    | 2.79 GB   |
| Mar 2013 | 1,742           | 5,018            | 36,630  | 80,605    | 3.05 GB   |
| Apr 2013 | 2,178           | 5,378            | 21,441  | 69,121    | 2.83 GB   |
| May 2013 | 2,136           | 4,130            | 17,074  | 62,750    | 1.75 GB   |
| Jun 2013 | 2,123           | 4,067            | 45,767  | 110,873   | 2.15 GB   |
| Jul 2013 | 1,909           | 4,752            | 64,421  | 144,500   | 3.03 GB   |
| Aug 2013 | 1,807           | 5,304            | 50,327  | 132,890   | 3.22 GB   |
| Sep 2013 | 2,330           | 6,534            | 82,658  | 204,655   | 3.43 GB   |
| Oct 2013 | 7,978           | 13,487           | 91,750  | 377,571   | 5.51 GB   |
| Nov 2013 | 768             | 1,851            | 18,796  | 49,756    | 1.15 GB   |
| Dec 2013 | 0               | 0                | 0       | 0         | 0         |
| Total    | 26,155          | 63,231           | 475,529 | 1,367,485 | 31.25 GB  |

Reported period Year 2013  
 First visit 01 Jan 2013 - 00:02  
 Last visit 08 Nov 2013 - 04:51

|                      | Unique visitors                                                 | Number of visits                       | Pages                                | Hits                                   | Bandwidth                             |
|----------------------|-----------------------------------------------------------------|----------------------------------------|--------------------------------------|----------------------------------------|---------------------------------------|
| Viewed traffic *     | <b>&lt;= 26,190</b><br>Exact value not available in 'Year' view | <b>74,292</b><br>(2.83 visits/visitor) | <b>209,956</b><br>(2.82 Pages/Visit) | <b>1,051,188</b><br>(14.14 Hits/Visit) | <b>99.20 GB</b><br>(1400.17 KB/Visit) |
| Not viewed traffic * |                                                                 |                                        | <b>493,191</b>                       | <b>674,128</b>                         | <b>18.89 GB</b>                       |

\* Not viewed traffic includes traffic generated by robots, worms, or replies with special HTTP status codes.

## Monthly history



| Month           | Unique visitors | Number of visits | Pages   | Hits      | Bandwidth |
|-----------------|-----------------|------------------|---------|-----------|-----------|
| Jan 2013        | 2,366           | 6,426            | 20,287  | 107,393   | 29.80 GB  |
| Feb 2013        | 1,853           | 5,365            | 19,091  | 90,587    | 5.69 GB   |
| Mar 2013        | 1,962           | 5,933            | 15,956  | 96,850    | 7.56 GB   |
| Apr 2013        | 2,155           | 6,431            | 17,269  | 94,408    | 8.28 GB   |
| May 2013        | 2,140           | 6,675            | 18,905  | 100,445   | 7.00 GB   |
| Jun 2013        | 2,962           | 8,012            | 20,343  | 99,742    | 9.35 GB   |
| Jul 2013        | 3,572           | 9,018            | 21,669  | 109,775   | 8.21 GB   |
| Aug 2013        | 3,073           | 8,115            | 20,654  | 101,197   | 9.14 GB   |
| Sep 2013        | 2,711           | 8,211            | 25,727  | 113,977   | 6.54 GB   |
| Oct 2013        | 2,701           | 8,237            | 24,606  | 113,375   | 6.30 GB   |
| <b>Nov 2013</b> | 695             | 1,869            | 5,449   | 23,439    | 1.33 GB   |
| Dec 2013        | 0               | 0                | 0       | 0         | 0         |
| Total           | 26,190          | 74,292           | 209,956 | 1,051,188 | 99.20 GB  |



## Help Conserve an Ethiopian Church Forest

Our CHURCH FOREST project offers local dollars for local people to build stone walls around their forest. Find out more.



### New Book



#### Treetops at Risk

Challenges of Global Canopy Ecology and Conservation  
Lowman, Margaret; Devy, Soubadra; Ganesh, T. (Eds.)  
2013. XIX, 444 p. 100 illus., 78 illus. in color.

[Read More](#)

[Purchase from the Publisher](#)

Uses the major findings of the 5th International Canopy Conference as a platform for organization

Assembles a global authorship to examine past accomplishments and future initiatives critical in forest conservation

Presents articles that represent future priorities and advancements for canopy science in the next decade

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Donate



Donate to TREE Foundation to help us with our conservation, education and exploration efforts. Learn about other donation options and fundraising projects [here](#).

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### Forest Canopy Methods Book



New forest canopy book available!  
*Methods in Forest Canopy Research*  
from University of California Press.

[Read More](#)

### Go Conscious Earth



Find out how TREE and Go Conscious Earth are helping preserve the Nsoli Na Mato Rainforest in the Democratic Republic of the Congo and how you can help!

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### Sloth Research & Conservation



The Pygmy three-toed sloth is one of the world's most endangered animals and the TREE Foundation has established a special fund to support canopy research on sloths.

[Read More](#)

### Church Forests of Ethiopia



Dr. Meg Lowman with the support of TREE Foundation has lead a team of researchers and conservationists to Ethiopia on a mission to help save the Church Forests of Ethiopia.

[Read More](#)

### REU Canopy Explorers



NSF project for undergraduates studying canopy ecology, especially micro-arthropods and water bears, with half of the students as mobility-limited students.

[Read More](#)

### Latest Posts



#### Name a Species, Save a Forest - New tardigrade species

Name a Species! Save a Forest! A great legacy gift! This new tardigrade species is of the genus *Doryphoribius*, a group characterized by the gibbosities, or lumps, on their backs...

[Read more](#)



#### Student award "Appreciation for the Natural History of Insect Pests"

The award: \$500 awarded annually to one recipient. Sponsored by the TREE Foundation in Sarasota, FL. Who is eligible: University students regardless of their geographic location. Due date: Each year on December...

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#### Lowman to study coffee forests in Ethiopia as Fulbright Specialist

Dr. Margaret D. Lowman, research professor in the College of Sciences at North Carolina State University and senior scientist at the North Carolina Museum of Natural Sciences, will teach and...

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Conservation of our planet's botanical resources and ecosystems



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## Student award "Appreciation for the Natural History of Insect Pests"

[Home](#) → [ANNOUNCEMENTS](#) → Student award "Appreciation for the Natural History of Insect Pests"

**The award:** \$500 awarded annually to one recipient. Sponsored by the TREE Foundation in Sarasota, FL.

**Who is eligible:** University students regardless of their geographic location.

**Due date:** Each year on December 31st.

**Selection criteria and conditions:** The selection committee will award \$500 to the student who in the given year publishes the most interesting and inspiring research paper on insects which are usually regarded as pests. For details, please see: <http://www.ambrosiasymbiosis.org/2012/03/award-opportunity/>



Like this bizarre *Cyclorhipidion spurlinum*, a newly discovered ambrosia beetle from New Guinea, many insects belong to groups called "pests", but the actual organisms are a source of wonder to an observant entomologist.

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On October 11, 2013 / [ANNOUNCEMENTS, AWARDS](#) / [Comments Off](#)

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## REU Canopy Explorers

Home → Projects → REU Canopy Explorers

### REU: Wheelchairs & Tardigrades In the Canopy



#### The Research Project

This is a three-dimensional research project to define the taxonomy and distribution of tardigrades (water bears) in the canopy and the herbivory of insects on a North American deciduous forest. The project is a fast-paced, tree-climbing, data-collecting, rapid-analysis and results-oriented internship. It is not for the timid. The plan is to climb and collect in the cooler mornings and spend the hotter afternoons and evenings processing specimens in the labs. Weekends include visits to local cultural sites and water bear hunts.

Students will be professionally trained to ascend into the canopy. There they will measure the impact of micro and macro invertebrates on the habitat and establish a baseline from which change can be measured. This is the cutting edge of ecological analysis in a world affected by climate change. Students will learn to use remote sensing, GIS, HPLC, GC-MS, and an EA scanning electron microscope to document the microenvironment.

Students will be employed for the summer. They will collaborate with the principle investigators to prepare their data for presentation and publication. They will also meet and network with the scientists and graduate students at the North Carolina Museum of Natural Sciences, University of Kansas Microscopy and Analytical Imaging Lab, Kansas State University long-term environmental research site, and the Missouri Botanical Garden. Students may attend a regional, national, or international meeting and present their results.

Students will be part of a small team of young scientists who are defining and establishing a base line for the condition of the temperate forests before global warming completely exerts pressure for the forests and canopy to change.

#### The Hypothesis

Unlike in the tropics, there are no differences in the animals or plants that live at different levels of deciduous trees in temperate forests.

To test this hypothesis students will conduct vertical transects at multiple sites on various species of trees. Field collections will be moss, lichen and leaves.

Based at the new Boyd Center at Baker University in Baldwin City, Kan., the project will explore the canopy of the transition zone between the eastern deciduous forest and the tall grass prairie blomes.

In the lab, students will extract, identify and quantize the animals (water bears) found in each sample and learn to create scanning electron microscope images.

Students will analyze the chemistry of the habitat (moss/lichen) with GC, Mass, spec, and HPLC for its influence on the interstitial aquatic environment in which the animals live. The leaves of the trees will be analyzed for insect herbivory.

The data will be mapped with GIS to predict other places where similar populations might exist. The data will establish a baseline from which change caused by global warming can be measured in the future.

Students will use professional tools such as PowerPoint to present their findings at the North Carolina Museum of Natural Sciences and regional meetings. They will also have the opportunity to produce manuscripts for publication.

#### Opportunity for the Ambulatory Disabled

This canopy-based REU project offers students of all abilities equal opportunity to explore and learn. Students can discover new species, new ecologies and new limits and reach new heights.

Designed for eight students, four with ambulatory disabilities and four without, this project is based on the idea that a wheelchair is not a limit to good field biology. To explore the canopy we climb ropes not trees, and in the lab we use microscopes, computers and minds, which have no limits.

Learn more at the Baker University website for this project: <http://www.bakeru.edu/canopy/>

#### Contact:

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[mccord@ncf.edu](mailto:mccord@ncf.edu)

### Latest REU Canopy Project Updates



#### REU Canopy Explorers Update

The team of Pam Donwath and Meg Lowman (who spear-headed original ADA efforts in Sarasota FL over many years) took to the trees...

[Read more...](#)



#### New Species of Water Bear Discovered by NSF REU Canopy Explorers

A new species of water bear was discovered by our NSF REU team of mobility-limited students in the canopy - in a Kansas...

[Read more...](#)



#### REU student schedule - August 4-10

Below is the latest tardigrade workshop schedule for REU Canopy Explorers during August 4-10: REU Student Schedule - August 4-10, 2013 Activity MNS staff Where Sunday 4...

[Read more...](#)



#### REU Canopy Explorer Testimonial - Rebecca Tripp

Rebecca Tripp's testimonial, with photos, about choosing and participating in the REU Canopy summer research program: Growing up on the rugged coast of Maine...

[Read more...](#)

65.



## Name a Species, Save a Forest – New tardigrade species

[Home](#) → [NAME A SPECIES](#) → Name a Species, Save a Forest – New tardigrade species

Name a Species! Save a Forest! A great legacy gift!

This new tardigrade species is of the genus *Doryphoribius*, a group characterized by the gibbosities, or lumps, on their backs and their unique claw pattern. Their appearance is armored and strong, and the species was found in the heart of America, in temperate deciduous forest canopies.

The current bid for naming this species is \$3000 — additional bids are accepted, closing on November 1 2013. Funds for this contribution will go toward conservation of Ethiopian church forests.

To make a bid or for more information, e-mail us at [info@treefoundation.org](mailto:info@treefoundation.org)



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On October 13, 2013 / [NAME A SPECIES](#) / [Comments Off](#)

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66.



## Update on Wojji and Debresena church forests in Ethiopia

[Home](#) — [RESEARCH](#) — [CHURCH FORESTS OF ETHIOPIA](#) — [Update on Wojji and Debresena church forests in Ethiopia](#)

Woji church forest now has walls. In 2013, the local people worked with their priests to make a conservation wall around this forest. TREE Foundation made a donation to the church to thank them for their stewardship.

Alemayehu provides this update:

*"The last three days I was out for extensive visit to Debresena and Wojji. Both sites they have done excellent job.*

**Debresena:** *They have finished making all round walls. Of course still we need more height. But I am happy they finished it. We have discussed they will make a gate for it like Zhara.*

**Woji:** *They are advancing more than my expectation and as a result they have got back quite extensive amount of land. Even to the extent that illegal houses are demolished with consensus of the local people. Now they have made 80% of the total perimeter with 70 cm of height. Their idea is once they finished demarcating this year, then next year they will increase the height. (Now all farmers are engaged in their crops-rain has started. I am so happy about this progress and the way they do it. The forest is already showing some improvement as big cattle are out.*

*I am so happy finally we are bringing some visible difference in Ethiopian church forests. All happened because of TREE. Thank you.*

### Woji Church Forest Photos



### Debresena Church Forest Photos



Amharic Translation:

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Mon, July 8, 2013

**የኢትዮጵያ ኦርቶዶክስ ቤተክርስቲያን የሥራ እንቅስቃሴ አዋር ሪፖርት**

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**ዋጃ:** በዚህ ፕሮጀክት የተመለከትኩት የሥራ እንቅስቃሴ ከጠበቅሁት በላይ ሆኖ

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On July 15, 2013 / [CHURCH FORESTS OF ETHIOPIA](#), [MAILBAG](#), [RESEARCH](#) / [Comments Off](#)

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67.



## Church Forest documentary film to be released 2014

Home → RESEARCH → CHURCH FORESTS OF ETHIOPIA → Church Forest documentary film to be released 2014



Church Forest Preview from Greg Vander Veer on Vimeo.

*Church Forest* reveals a mystical world where priests and scientists struggle to come together, despite vastly different beliefs, to save the last forests of Northern Ethiopia. Through stunning religious ceremonies, humorous moments with eccentric scientists, revealing macro-photography, and traditional Ethiopian music, *Church Forest* is a film about the multifaceted importance of the forest and the struggle of humans to reconcile their beliefs for a common cause. TREE Foundation's Executive Director, Dr. Meg Lowman, was the catalyst of this conservation effort, and also the link for the film-makers to take on this effort. We all collectively hope that media, plus science and religion, will combine to achieve success in saving Ethiopia's precious church forests.

The feature-length documentary film will be released in 2014 and the filmmakers are currently raising money to finish post-production. We believe this film will not only be instrumental in creating an international movement to save the church forests, but will also teach a powerful message of collaboration that is universally important. Please visit [www.churchforest.com](http://www.churchforest.com) or email us at [churchforestmovie@gmail.com](mailto:churchforestmovie@gmail.com) to donate or become involved to help bring the inspiring message of *Church Forest* to the world.

Like 1 Tweet 1 Share / Save

On April 14, 2013 / CHURCH FORESTS OF ETHIOPIA, MULTIMEDIA, RESEARCH, VIDEO / Comments Off

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21 AUG 2013

# Wheelchairs in the trees

"Twenty years from now you will be more disappointed by the things you didn't do than the ones you did do. So throw off the bowlines. Sail away from safe harbor. Catch the trade winds in your sails. EXPLORE, DREAM, DISCOVER."

— Mark Twain

It is often assumed that wheelchair dependency hinders a career in field biology; however, scientists at New College of Florida are part of a national research team proving otherwise. With federal funds from the National Science Foundation, mobility-limited college students are tackling unanswered questions about what lives in the tops of temperate forest trees, research that is preparing them for careers as forest ecologists or field entomologists.



MEG  
LOWMAN  
NATURE'S  
SECRETS

The project's team leaders are three diverse scientists who hope to inspire underserved students to seek careers in field biology.

One leader of this research team, Dr. Elzie McCord of New College, is an expert in insect pests and other small creatures that co-inhabit the forest foliage with water bears. As a newly trained arborealist (explorer of forest canopies), McCord recently climbed into the treetops to expand his research program. The second team leader, Dr. William Miller of Baker University, Kansas, is one of the world's few scientists who can identify water bears. And the third team scientist (your dedicated columnist!) tackles the canopy ecology questions. In field biology, we can accomplish more as a team than by working individually.

By studying water bears in canopies, our students are part of cutting-edge scientific discovery using new methods to better understand the world around us.

To access the treetops, students do not need to ambulate along a walking trail, but simply sit in a harness and propel themselves upward out of their wheelchairs, using hardware developed by mountaineers called single rope techniques. Once airborne, our arborealist team samples tardigrades, commonly called water bears or moss piglets.

Although these microscopic animals were the first creatures to survive in outer space, back on Earth they are little known, little studied, and easy to find. Water bears

prefer to live in water droplets or other moist places such as moss or leaf surfaces, but they can survive extreme climatic conditions by reverting to a resting phase called cryptobiosis.

On Animal Planet, they earned distinction as the world's most extremophile critters! Water bears can survive the vacuums of outer space, pressure six times greater than the deepest ocean trenches, and temperatures higher than boiling water or just above absolute zero. They can go without food or water for more than 100 years.

In their summer research projects, undergraduates are asking questions about water bears. Do more live in the top versus the bottom of a tree? Are there one species or 100? Are they common? Do they prefer leaf surfaces, lichen, moss or bark habitat? Or do they live on more savory surfaces such as the spinach and lettuce in your garden?

This research program not only offers unique experiences for mobility-limited students, but it also provides an opportunity to discover new species and explore an unstudied region of the planet.

One participant, Rebecca, lost the use of her legs after a car accident in childhood. When asked about her first canopy climb as part of this summer research experience, she said, "Learning to climb has been such an empowering and rewarding experience. It has shown me that I am far more capable than I ever gave myself credit for, and has only reinforced my endless awe and deep appreciation of nature."

Want to learn more about water bears? Our expert research team of arborists will host a water bear scavenger hunt at the International Tree-Climbing Jamboree in Atlanta Oct. 11-13 ([www.treeclimbing.com/rendezvous](http://www.treeclimbing.com/rendezvous)). All welcome, including mobility-limited citizens!

Patty Jenkins, executive director of Tree Climbing International, who became mobility-limited through polio in her youth, will host this conference, which includes recreational climbing workshops and scientific talks, plus a scavenger hunt for new species of water bears.

Not surprisingly, scientists will go to great lengths (and heights!) for new discoveries.

Meg Lowman, a longtime Sarasota-based scientist and educator, is director of the Nature Research Center, North Carolina Museum of Natural Sciences, and research professor at North Carolina State University. Email: [meg.lowman@ncdenr.gov](mailto:meg.lowman@ncdenr.gov)

116 Sep 2013

# IListen, iLearn with a PDA



Nature's Secrets  
Meg Lowman

*If you can't explain it simply, you don't understand it well enough.*

**Albert Einstein**

New PDAs (personal digital assistants or hand-held computers) are flooding the market with their myriad sound bytes, applications (apps), and jargon. As the proud owner of an iPhone, I must admit that its ever-changing, innovative uses (other than conventional telephone-calling) are not only addictive, but seem to provide just about every service under the sun except washing the dishes (maybe that is next?).

My iPhone provides navigation, locates restaurants and even makes reservations; files hundreds of addresses; updates weather reports for any city in the world; and houses photo albums, music, a to-do list, a calendar of appointments and, of course, emails – all in one pocket-sized, battery-operated gadget.

In its emerging role as a community forum, the N.C. Museum of Natural Sciences recently hosted a conference called Mobile Data Collaboration, with a theme of inspiring partnerships between industry and science to solve environmental problems using hand-held technologies. The forum, funded by the U.S. Department of Agriculture, was standing-room-only as scientists, consumers, app designers, students and industry came together to discuss the complex challenges of coordinating data gathered by mobile technologies. For example, the USDA hopes to detect invasive species by harnessing citizen scientists to photograph strange insects observed eating their trees or vegetable gardens. Project Budburst, based in Boulder, Colo., collects nationwide observations of budburst and flowering activities to document changing climatic conditions.

And new apps range from traffic congestion reports to personal health assessments.

The outcomes of this conference were threefold: that the front end of any app needs to be simple and enticing to generate widespread public use (translation: make it fun!); that the back end of an app needs to easily download data, so federal and state agencies can save time and money yet gather accurate information about environmental issues such as invasive species; and that leveraging strategic partnerships is crucial for the launch of a successful app.

In the case of USDA, the museum is an ideal partner that could expand the audience of users to include K-12 as well as more than 1 million visitors per year. For health-related apps, logical partners include the medical profession and health clinics.

With their diverse functions, PDAs are sophisticated new tools for scientific research and for solutions generated by citizens. One of my favorite iPhone apps is called iBird Pro: It stores more than 1,000 bird songs, range maps and photographs; over time, users contribute to a large data base on bird distribution. Through mobile technologies, young people who learn science predominantly via computer may rediscover the joy of going outdoors where they can combine their love of virtual technologies with real nature.

Meg Lowman, Ph.D., a forest canopy expert, is senior scientist at the N.C. Museum of Natural Sciences and research professor at N.C. State University.

70

7 OCT 2013

# Scientific magic of fall foliage



Nature's Secrets  
Meg Lowman

*If one really loves nature, one can find beauty everywhere.*

## Vincent van Gogh

There are a few awe-inspiring events hosted by Mother Nature that every child deserves to see – snow falling, sunset on a beach, birds flying, lightning ... and fall foliage.

The miracle of fall foliage is a special punctuation mark in the seasonal story of trees. Throughout the temperate forests of North America, red and yellow hillsides appear almost magical each autumn. In North Carolina, the onset of fall foliage spawns economic, emotional and biological activities. Foliage forecasts are featured on some local telecasts because these botanical events create major tourist attractions for visitors to our state.

Life within the phylloplane ("leaf surface") is more complex than anyone but a botanist could imagine. A leaf represents one of nature's most extraordinary and complex factories. It houses the only machinery on Earth that manufactures sugars from sunlight. Called chloroplasts, these small units of green tissue create energy which forms the basis of all life on our planet. Green plants, especially trees with their thousands of leaves, accomplish this highly productive process both quietly and efficiently: no fanfare, no noise, no toxic wastes – just nature's chemistry.

The green coloration of foliage is derived from a pigment called chlorophyll housed within the chloroplasts of each green leaf. Chlorophyll is the main substance that leaves employ to absorb light for photosynthesis, that complex process in which plants turn sunlight into sugars as the basis of all food chains. During spring and summer, chlorophyll pigments mask the presence of orange, yellow and red pigments that are also present within leaf tissue. These accessory pigments assist in photosynthesis by capturing additional energy from sunlight that chlorophyll pigments can not efficiently absorb.

When fall temperatures become cooler, leaves stop manufacturing chlorophyll, and no longer reflect green light. This exposes the underlying pigments of orange and yellow carotenoids and red anthocyanins for a brief period before the leaves fall.

This protective process that allows trees to drop their leaves during winter – it's called abscission – is essentially a shut-down valve that facilitates energy conservation for the tree. The end result of this chlorophyll die-back is hillsides of gorgeous fall coloration. Mother Nature is a practical and efficient manager of her foliage. Trees lose their leaves when conditions become harsh, and then grow a new set when spring arrives.

No human-constructed factories can compete with the elegance and efficiency of a leaf. Its machinery is the basis of all life on Earth. Its annual coloration is an inspiration for literature and art, as well as for science.

Meg Lowman, Ph.D., a forest canopy expert, is senior scientist at the N.C. Museum of Natural Sciences and research professor at N.C. State University.

21 OCT. 2013

# Plan offered for next 100 years of ecology



Nature's Secrets  
Meg Lowman

*Teach your children well.*  
Crosby, Stills, Nash & Young

The year 2013 marks the 100th birthday of the British Ecological Society, so the International Congress of Ecology recently met in London to mark this auspicious occasion. Like many scientific professionals, ecologists reluctantly come away from their field sites or computer screens to exchange expertise on new tools, best practices and future priorities. But centennial conferences are once-in-a-lifetime events. What were the concerns of 3,000-plus global ecologists, as they spent a week discussing priorities for the next 100 years?

In her keynote address, BES president Georgina Mace, professor at University College of London, summarized the changing links between humans and their environments, explaining how past generations focused solely on preserving species and beautiful landscapes.

Only more recently are ecologists beginning to view conservation with an economic lens, defining the dollar values of fresh water, minerals, plant-based medicines and carbon storage as part of conservation planning. These products are called ecosystem services, whereby healthy natural landscapes provide benefits to humans. She explained that we need to acknowledge conservation is directly tied to humans, and environmental solutions need to be human-driven.

In addition to the pervading consensus that ecology needs human drivers to promote sound decision-making, three other major priorities took center stage at the conference.

One was the announcement of a new manifesto for forest conservation. Acknowledging that past efforts to conserve tropical forests have not succeeded, 50 global forest ecologists co-authored a white paper declaring a new forest management paradigm — that leadership should be placed in the hands of local communities to minimize continued degradation of global forests. The manifesto also prioritized placing new technologies in the hands of local leaders for effective solutions.

Another priority for the next 100 years of ecology is citizen science, whereby non-scientists collect information for larger-scale environmental monitoring.

Emerging mobile technologies have made citizen science one of the fastest-growing, most innovative aspects of ecology, and ecologists are capitalizing on its popularity.

Perhaps most important for ecology's future, a third priority was recognizing the next generation of scientists.

A newly launched group called the International Network of Next-Generation Ecologists provided inspiration, energy and enthusiasm for the future of the discipline. As one of a handful of North Carolinians at this meeting, I believe the future is in good hands.

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