Executive Director, Dr. Meg Lowman, visualizes the size of one ton of carbon dioxide, one of several forest conservation issues featured at Copenhagen climate change meetings, 12/2009

TREE Foundation Annual Report 2010

Compiled by Dr. Meg Lowman, Executive Director

Annual Meeting -- October 25, 2010 at 5 PM, Board Room of Cavanaugh & Co, Accountants, Sarasota FL

(PDF version of report available on www.treefoundation.org)

25 October 2010 Cavanaugh & Co Board Room, 2381 Fruitville Road Sarasota 34237

AGENDA

1. Welcome and introductions by President Aaron

2. Approval of minutes and re-election of Board members and officers

3. Executive Directors report by Meg Lowman

4. International report by Dr. David Jarzen, Research Associate

5. Tree-house report by Carolyn Johnson

6. Development report by Taylor Jamrok, VP for Development and Student-in-Training

7. Treasurers report by Mike Pender

8. Web report by David Martin

9. 10th birthday updates by Gerri Aaron

10. Student scholarship reports - Bryson Voirin, Angelique Giraud, Christine McCormick, Taylor Jamrok, Megan McAvoy, Soubadra Devy

9. Other old business

10. New business for 2011 by Meg Lowman

11. Fellowship meeting at Michaels-on-East

Officers, Directors and Research Associates 2008

Thomas Lovejoy, Ph.D., Honorary Chairman of the Board
Biodiversity Chair, H. John Heinz III Center for Science, Economics, & Environment
Washington DC

Gerri Aaron, President of the Board
1255 North Gulfstream Avenue
Sarasota FL 34236

Joel Fedder, Vice President of the Board
3590 Mistletoe Lane
Longboat Key FL

Michael Pender, CPA and Treasurer
Cavanaugh & Company
2381 Fruitville Rd
Sarasota FL 34237

Laura Peters, Secretary
409 Vanderkloot Dr
Osprey FL 34229

Elizabeth Booth
127 Bishop Ct
Osprey FL 34229

Carolyn Johnson
Old Oak Drive
Sarasota FL 34239

Susanne Rodriguez
2718 Casey Key Drive
Nokomis FL 34235

Dan Bennett, Exploration Chair
Past President, The Explorers Club
Naples FL

DC Randle, Research Associate (non-voting)
K-12 science educator
2874 Riverbank Dr NW
Isanti MN 55040

Bryson Voirin, Research Associate (non-voting)

Graduate student research associate
Max Planck Institute
Germany

Dr. Soubadra Devy (non-voting)
Research Associate
Ashoka Trust for Ecology and the Environment (ATREE)
Bangalore, India

Dr. Alemayehu Wassie Eshete, (non-voting)
Research Associate
Foresty Department
Addis Abba, Ethiopia

Dr. David Jarzen (non-voting)
Research Associate
Senior Scientist, Museum of Natural History
Gainesville FL

Dr. Leon Kaganosky (non-voting)
Research Associate
New College of Florida

Margaret Lowman, Ph.D., Executive Director
Director, Nature Research Center
NC Museum of Natural Sciences
Research Professor, NC State University
11 West Jones St.
Raleigh NC 27601

Robert Richardson, Board Chair Emeritus
2055 Wood St.
Sarasota FL 34237

Michael Brown, Legal Counsel
888 Second Street
Sarasota FL 24236

Student Interns (Center for Canopy Ecology)

Dayna Lazarus	Salome Grasland
Elizabeth Crate	Erik Wallimaa
Pamela Montero Alverez	Guillermo Sanchez
David Mitre	Marcos Oversluijs Vasquez
Ricardo Rifulgo	Angelique Girrard
Hannah Wilkins	Charissa Jones

TREE Foundation – Statement of Purpose
Mission- tree research, exploration and education (T.R.E.E)
Vision – that the next generation will have the benefits of sustainable forests both locally and globally

Who we are – a non-profit devoted to environmental education of citizens about trees and the ecosystem services they provide to human health, and on-the-ground conservation actions to conserve forests around the globe

Core competency – We leverage our expertise, professionals, and partnerships to inspire global actions through research, education and partnerships for global forest conservation; and we engage local actions through environmental education programs, especially for youth.

Values
Diversity – TREE focuses on programs that are inclusive of many ages, cultures, and geographic regions, with special attention to inclusivity of local, Florida-based audiences; and uses diverse outreach technologies to disseminate our messages.
Outreach – TREE prioritizes education outreach to families, policy-makers, and youth as a core value for all programs.
Passion – TREE is passionate to inspire forest conservation and serve as a catalyst for environmental solutions.
Sensitivity – TREE works with a small environmental and economic footprint, and respects the values and views of other cultures in all aspects of our work.
Sustainability – TREE seeks sustainable solutions to forest conservation through its education and exploration programs. We aspire to leave the world a better place for the next generation.

TREE FOUNDATION

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

TREE Foundation Annual Report 2010

Happy 10th anniversary of the TREE Foundation! And happy 10th birthday to the Myakka River State Park canopy walkway. This year marks some landmark dates in our organizational history, as well as entering a critical decade for bringing environmental education to both the public and to policy-makers. Thank you to all our TREE donors for your generous support of TREE Foundation in 2010, and especially for your enthusiasm to sponsor programs that link kids to nature, foster education about forest ecosystems, and stimulate environmental education for local and global communities.

This marks a banner year for our foundation dedicated to tree research, education, and exploration. TREE has grown in all its mission activities: local, national, and global. Our donations have exceeded all previous years, and our mission continues to fill an enormous void in Florida and beyond. We continue to receive over 30,000 hits per month on our website, indicative of a large virtual following as well as our existing supporters that include donors, students, schools, institutions and environmental organizations. TREE's leadership is also expanding into the virtual arena, reflecting the twenty-first century workforce. First, Executive Director Meg Lowman was recruited to set up a nationally-acclaimed, cutting edge science education program for the state of North Carolina. As the new Director of the Nature Research Center, Meg will continue to advocate for TREE programs including science education outreach, science communication to public audiences, and increased environmental literacy. She will continue to advise her thesis students and other New College efforts as requested. Meg will keep an address in Florida and continue to oversee important activities such as our tenth anniversary celebration, maintenance of the Myakka walkway, education outreach, and climate change advising of the state CFO, Alex Sink. With emerging technologies, TREE joins other organizations in their virtual membership and decision-making. Of a similar nature, our Honorary Board Chairman, Dr. Tom Lovejoy, was appointed the Biodiversity Chair of the Heinz Center for Science, Economics and the Environment (stepping down from the role of President). Tom will also split time as Professor of Environmental Sciences at George Mason University in Virginia. TREE now has a new dimension of its "local but global" mantra.

To cover our expanding programs, TREE is proud to announce a new partnership with undergraduate environmental students. We have created a new title, Vice President of Development, to be occupied by one outstanding New College undergraduate interested in learning more about non-profit governance. In exchange for volunteering with TREE, our first Vice President, Taylor Jamrok, will learn the nuances of grant-

writing, fund-raising, and board governance. We look forward to this win-win mentoring opportunity! Welcome, Taylor!

Local TREE Programs

1. **Linking kids and families to nature – Walkway signage**
   Two main environmental education programs continue to prosper and thrive at the local level. Our flagship project, the Myakka Canopy Walkway, is undergoing a "conservation face-lift" with new and more updated signage. First, the canopy walkway sign was updated with new locations of walkways around the world. Second, a conservation sign was added along the exit trail, giving visitors a take-home message about how their own behavior can contribute to forest conservation. This sign is printed in English and Spanish to insure broad outreach to a diverse visitorship. A third sign explains what forests do for us, and educates the public about the importance of forests.

2. **Environmental education – Brochures**. TREE revised and printed 20,000 new brochures as a donation to Myakka River State Park, so that every visitor learns about the importance of forest canopies during his/her adventure in the treetops.

3. **Children's treehouse** We continue to partner with the Crowley Nature Center, having raised over $10,000 to contribute to a match for a new tree-house on their site. Crowley has generated great enthusiasm among their board, and has also engaged an architect who is creating their site design. . This project represents a second flag-ship project for TREE, following in the footsteps of our successful canopy walkway at Myakka River State Park. With the downturn in the economy, construction of the treehouse is postponed until 2011, awaiting a matching grant solicited by Crowley staff.

4. **Rain Forest Canopy Exhibit** –The National Science Foundation canopy exhibit continues its productive lifespan, circulating to schools and festivals. One New College student used the exhibit as a focal point for his environmental education thesis, and the exhibit "lived" at Pine View Elementary School in Osprey, Florida for several months. The exhibit will travel to North Carolina, where an anticipated 1 million visitors will view it in 2011.

5. **Python Rapid Response Training Course** – TREE partnered with the Longboat Key Garden Club to host an invasive python rapid response training course for Florida government employees and citizens. Over sixty participants attended the half-day course, and received information about capturing pythons safely, thereby removing them from living in Florida ecosystems and invading natural ecosystems. Dr. Lowman worked with students to create a mathematical model of python invasion northward, based on data from the Florida Everglades. Not only was the model presented to Sarasota County commissioners to guide policy making, but the students also presented a poster at the scientific meetings of the Ecological Society of America in August.

6. **Student Research** – One TREE-sponsored college senior completed his thesis on the "Ecology of Lichens in the Myakka Forest Canopies". In addition, our former Panamanian intern, Guillermo Sanchez, was accepted for a Science Journalism masters program in Panama – congratulations! We are currently fund-raising for a new intern from the Peruvian Amazon and another from Ethiopia.
New College student Angelique Girrard received support to attend the national Ecology Education Summit in Washington DC, as part of her thesis research on environmental education in America. Bryson Voirin continues his cutting-edge research on sloth ecology in Panama as a PhD student at the Max Planck Institute, and receives continued support from TREE for his canopy access and expertise. Charissa Jones received support to attend the Ecological Society of American meetings, and has been accepted with full scholarship for graduate school in environmental studies at Antioch New England. Christine Rohal was funded to produce the educational brochure about medicinal plants in the Amazon, which was distributed to the local shaman near our canopy field site in Peru, to assist in funding the continued training of the next generation of shamans. Christine McCormick pursued studies of cave ecology, in particular endangered bats. Elizabeth Crate received funding for ecological research in the Amazon rain forest canopies. Forest Hayes and Michael Dexter received funding to produce a local bird guide to the water birds of Myakka River State Park. They presented a box of brochures to the Friends of Myakka at their monthly meeting, for future distribution to teachers and educators using the park.

7. **Virtual nature** – Out website continues to attract over 30,000 hits per month, making it a "go-to" place for information about forests, and a highlight for many student assignments. Dr. Lowman continues to be extremely busy answering middle school students who write from around the country with questions regarding rain forest conservation and environmental inspiration. Taiwan sent an official delegation to tour our walkway in June, and many other groups contact TREE for similar information. TREE also partnered this year with the Audubon Society and Green Mountain Digital Inc. to trial a new PDA (hand held digital) field guide about Florida wildlife for both students and citizens. In addition,

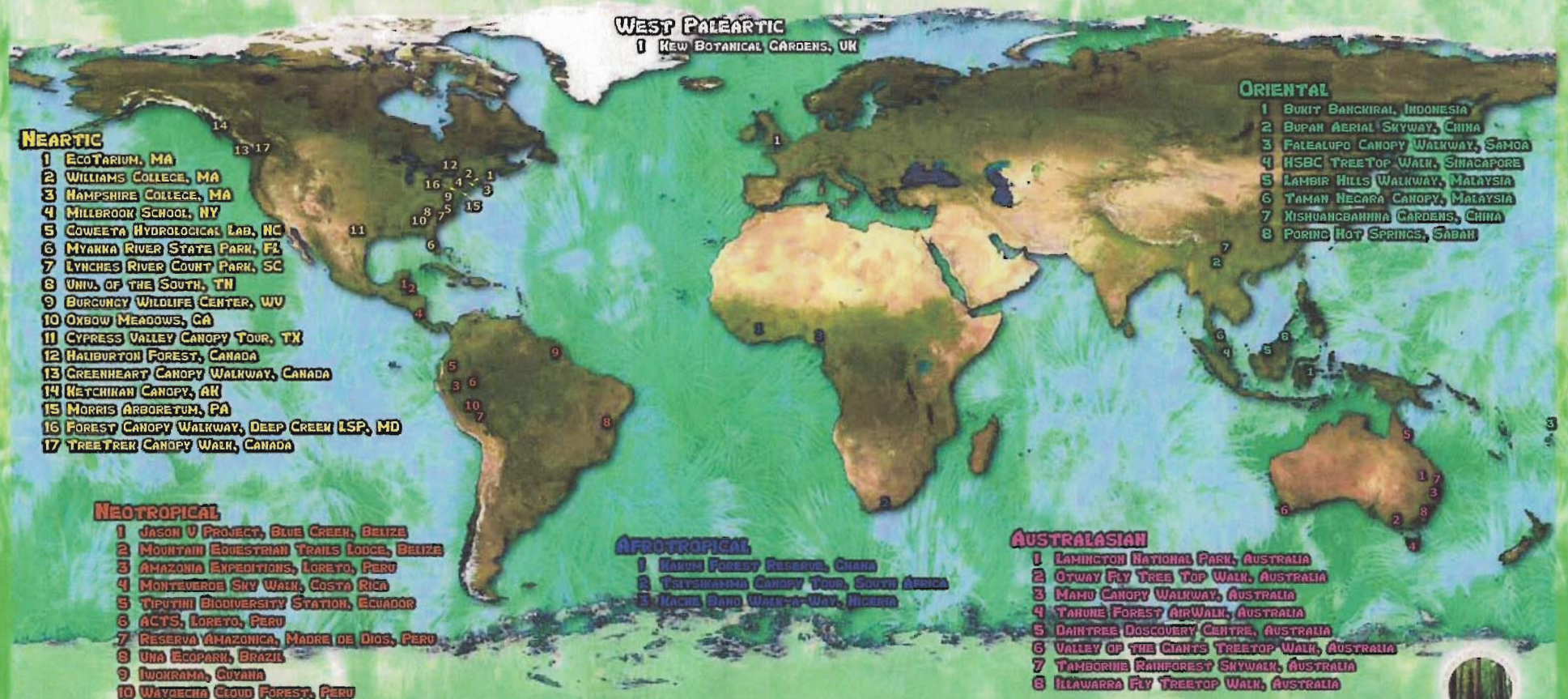
TREE also launched a bird field guide for Myakka canopy walkway region, created by New College students, as a continued effort to inspire visitors about the natural world in Florida. TREE continues to sponsor local third and fifth grade science classes who are monitoring the health of bromeliads (air plants) from the walkway. Check out their progress on our website: www.treefoundation.org . As part of TREE's mentoring activities, New College undergraduates mentor elementary students and also learn firsthand about science education by assisting younger students.

8. **Training the next generation** – TREE continues its vital sponsorship of student research on tree canopies and environmental issues. The third and fifth grade students at Pine View Elementary School are supported for their continued environmental monitoring of bromeliads at Myakka River State Park canopy walkway (check out their drawings and data on the TREE website).

9. **Educating the local community about the environment**. TREE continued its sponsorship of a community lecture, with world-acclaimed climate change photographer Gary Braasch (www.worldviewofglobalwarming.org), who presented his work including time-lapse of glacier melt, the fate of fisherman in Tuvalu, and the scientists around the world who are passionately measuring indicators of climate change. Gary's talk was inspirational to both citizens and to the college students in particular. In addition, TREE provided the content for more than 10 local ecology lectures.

10. **Birthday planning.** For TREE's 10th anniversary, we partnered with Turner Landscaping (www.turnerlandscaping.com) to launch our decadal project called "1000 Trees in Year 10". This not only celebrates the birthday of TREE and of our canopy walkway, but is appropriate in this United Nationals proclaimed Year of Biodiversity at a global scale. For this project, TREE is soliciting local groups who need trees on their campus – schools, art museums, road medians, and city parks – and will work with Turner to bring in four-foot high live oaks (Quercus virginiana), plant them during the rainy season. To date, TREE has donated trees to New College in honor of its 50th anniversary, to North Port for their Tree Walk, to Venice High School; tree donations are pending with Myakka River State Park, Booker School, and several community parking lots. In addition, we hope to host a "Sustaina-Ball" event in spring 2011, which will be a gala candlelight picnic at the Myakka canopy walkway.

Canopy Walkways of the World



Nearctic
1 EcoTarium, MA
2 Williams College, MA
3 Hampshire College, MA
4 Millbrook School, NY
5 Coweeta Hydrological Lab, NC
6 Myakka River State Park, FL
7 Lynches River County Park, SC
8 Univ. of the South, TN
9 Burgundy Wildlife Center, WV
10 Oxbow Meadows, GA
11 Cypress Valley Canopy Tour, TX
12 Haliburton Forest, Canada
13 Greenheart Canopy Walkway, Canada
14 Ketchikan Canopy, AK
15 Morris Arboretum, PA
16 Forest Canopy Walkway, Deep Creek LSP, MD
17 TreeTrek Canopy Walk, Canada

West Palearctic
1 Kew Botanical Gardens, UK

Oriental
1 Bukit Bangkiral, Indonesia
2 Bupan Aerial Skyway, China
3 Falealupo Canopy Walkway, Samoa
4 HSBC TreeTop Walk, Singapore
5 Lambir Hills Walkway, Malaysia
6 Taman Negara Canopy, Malaysia
7 Xishuangbanna Gardens, China
8 Poring Hot Springs, Sabah

Neotropical
1 Jason V Project, Blue Creek, Belize
2 Mountain Equestrian Trails Lodge, Belize
3 Amazonia Expeditions, Loreto, Peru
4 Monteverde Sky Walk, Costa Rica
5 Tiputini Biodiversity Station, Ecuador
6 ACTS, Loreto, Peru
7 Reserva Amazonica, Madre de Dios, Peru
8 Una Ecopark, Brazil
9 Iwokrama, Guyana
10 Waqoecha Cloud Forest, Peru

Afrotropical
1 Kakum Forest Reserve, Ghana
2 Tsitsikamma Canopy Tour, South Africa
3 Kachi Bano Walk-a-Way, Nigeria

Australasian
1 Lamington National Park, Australia
2 Otway Fly Tree Top Walk, Australia
3 Mamu Canopy Walkway, Australia
4 Tahune Forest AirWalk, Australia
5 Daintree Discovery Centre, Australia
6 Valley of the Giants Treetop Walk, Australia
7 Tamborine Rainforest Skywalk, Australia
8 Illawarra Fly Treetop Walk, Australia

Tree Foundation


Bupan Aerial Skyway, China


ACTS, Loreto, Peru


Reserva Amazonica, Peru


Williams College, MA


Myakka River SP, FL


Kakum Canopy Walk, Ghana

Canopy Education and Conservation Programs: www.treefoundation.org

Design & Construction: Canopy Construction Associates – www.canopyaccess.com

Canopy Research Projects: Dr. Meg Lowman – Director of TREE – www.canopymeg.com

New Walkway signage at Myakka

4-1.

WHAT CAN YOU DO ?

Plant a tree

Reduce, Reuse Recycle

Read books about ecology and forest conservation

Use less energy

"No Child Left Indoors"
Parents, take your kids outdoors!

Drink shade grown coffee

Educate yourself and others
Learn about Florida's ecosystems

Experience Local, State and National Parks

Join conservation organizations and support environmental foundations

Boycott the exotic pet trade
when collected from the wild

Do Not Release exotic pets into State Parks
(or anywhere else!)

Eastern Screech Owl (*Megascops asio*) juveniles

Green Anole (*Anolis carolinensis*) sleeping in Bald Cypress (*Taxodium distichum*)

Take photos not specimens from State Parks

Viceroy Butterfly (*Limenitis archippus*)

Visit a butterfly house

TREE FOUNDATION

USE RESOURCES WISELY

Photos courtesy of Dr. Philip K. Wittman

4-2


Our Forests
what they do for us
Home to 50% of all species on Earth
millions of species yet to be discovered
Reservoir of Fresh Water
contain/recycle over 25% of liquid fresh water
Oxygen Production
produce > 20% of world supply
Soil Conservation
prevent silting of rivers and coral reefs
Medicines
produce > 50% of all pharmaceutical drugs
Flowers and Plants
floral, interior/exterior landscape
Food and Drink
nuts, fruits, fish, spices, juices, flavors, coloring
Clothing & Building Materials
natural fibers, hardwoods and lumber
Global Climate Control
regulate temperatures and weather patterns
Global Carbon Sink
sequesters greenhouse gas CO_2
Recreation
hiking, camping, bird watching
Genetic Library
undiscovered pest & disease resistance
TREE FOUNDATION

Would *You* Know What To Do With A Python?

Would You Know What *NOT* To Do?

To date, 7 large Pythons have been picked up in Key Largo, while many sightings have occurred in Islamorada, Big Pine and Key West.

We need your eyes to spot them so we can catch them before they breed/spread further.

10-foot Burmese from 18 Mile Stretch: 01/03/08

Python Patrol

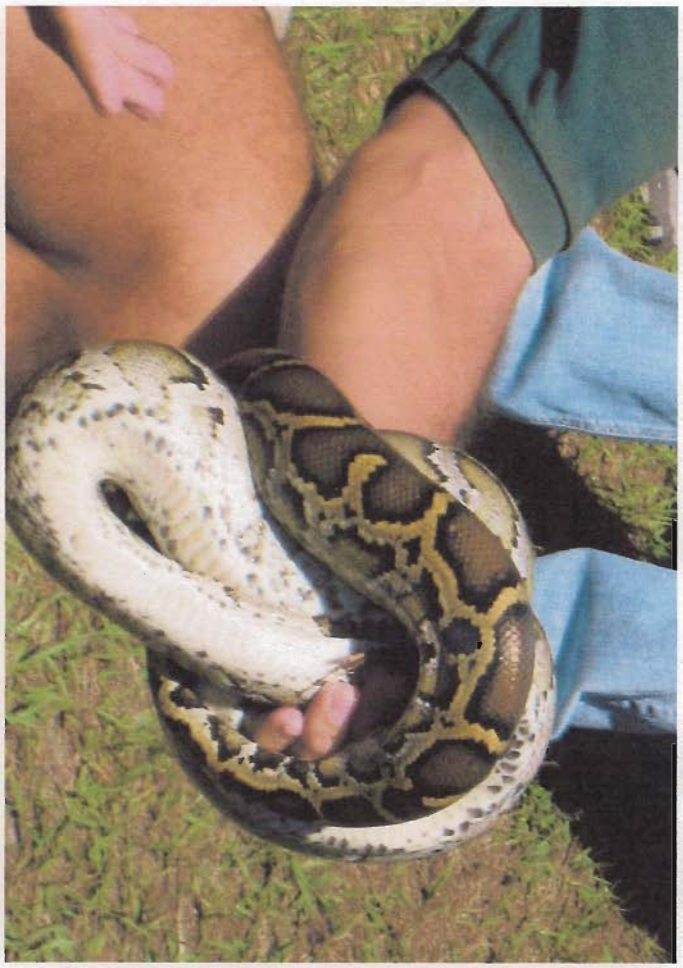
Thurs, Jan 24th, 2:30-4:30pm
County Commission Mtg Room
Monroe County Govt Center
MM48.5, Bayside

The Nature Conservancy
Protecting nature. Preserving life.™

For More Info, Find Keys Task Force on Yahoo Groups:
(http://tech.groups.yahoo.com/group/KeysTaskForce)

4-4

Python Rapid Response Workshop



4-5

Students learn how to capture pythons.

4-6

Poster exhibited at 2010 Ecological conference

An Exploration of Modeling the Spread of the Burmese Python, *Python mourus*

Margaret Lowman, Christopher Hart, Leon Kaganovskiy, Elizabeth Hamman, Angelique Giraud, Sarah McManus, and Ryan Tisdale

New College of Flori

Florida State workers learning to handle invasive pythons

Abstract

The development of an agent-based GIS model was attempted to fully understand the expansion of the python population. Relevant ethnological and physiological data on the pythons was evaluated and used to develop a model.

As a small, undergraduate institution without large computing power or large sets of data, we relied on publicly available data and open source software.

Overall, the project was a valuable learning experience on which New College students can continue to build an improved model as better data and programs become available.

The Python Problem

The state of Florida is a hotbed for invasive species from brazilian pepper to the infamous brown anoles. Burmese pythons were first introduced to the Florida everglades as a result of Hurricane Andrew in 1992 through the damage of zoos, pet stores and other places housing the snakes. Their population and range have since expanded exponentially to an estimated 20,000-30,000 snakes with pythons spotted as far north as Gainesville.

Invasive pythons, including the Burmese (Python molurus), African Rock (P. sebae) and Ball (P. regius) pose a considerable and growing threat to the stability and integrity of the Everglades ecosystem in South Florida. With an estimated 20,000-30,000 Burmese pythons in the Everglades alone (cite worksbop), their potential for further spread is cause for concern; however, the possible maximum spatial extent of their range is as yet unknown, and under debate.

Fig. 1 Current range of python molorus bivittatus. From 2008 USGS report on invasive pythons from 2000.

Project Aim

Given such limited data, the most pressing questions become:

•What are the best methods for determining the current state of the invasive populations, and predicting future conditions?

•Will the pythons stop at the frost line, or take advantage of refugia and water features to invade the north?

The aim of this project was to take a new approach towards the modeling of the range of invasive pythons by using an agent-based model. This approach takes into account factors other than thermo-tolerance and should provide a much better picture of the potential for the spread of invasive pythons.

As a small institution with limited technological resources we attempted this using open source software.

Issues with the Current Models

Current models rely heavily on climatic issues. Admittedly, climate is the largest determinant of where snakes can live. The suitable locations are shown in Figure 2. The actual invasion potential, however, depends more upon movement patterns and geographical issues.

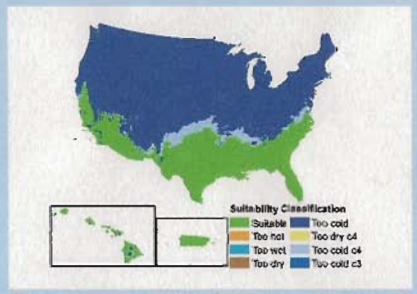


Fig. 2 Climatic model for suitable locations for the invasion of p. molorus. This model is based upon climate conditions in their observed homeranges in southeast Asia. From 2009 USGS report on invasive pythons

Based on this information, we believe an agent-based model will provide a much more realistic picture of the potential for the spread of invasive pythons

Student, Sarah McManus tries her hand at python wrangling

Python Data

Due to the cryptic nature of pythons little research exists on them in their native range. A good summary of data on the several species of pythons exists in a review paper written for USGS by Robert Reed and Gordon Rhodda in 2009 is a comprehensive compilation of all current knowledge on these pythons and is where much of our data was drawn from. This paper includes in it a compilation of the previous models of the python's expected range in the united states which we were attempting to improve upon.

Currently research is being carried out data from an ongoing project at the Savannah River Ecology Lab on Burmese, this study will undoubtedly help clarify some of the parameters that determine Burmese python climatic tolerance (Dorcas et al. n.d). Research on the snakes movement patterns is being conducted currently as well in the Florida everglades by the University of Florida (Harvey et al. 2009; Reed and Rodda 2009). This data will be essential to formulating an accurate model.

Methods

An agent-based model was developed using the open source modeling software RepastPy in conjunction with the open source GIS program OpenMap.

Development of the model required the assessment of ethnological and physiological attributes of the *Python molorus* and the formulation of relevant parameters (i.e. clutch size, movement patterns, death rate, etc.) for the models agent. These parameters act as a set of instructions for the agents.

The rest of the development of the model was simply a matter of programming the parameters, setting initial conditions and then finalizing and running the model.

Results

A functioning model was not the result of our experiment. A rudimentary code was created, however, our team was unable to run the model due to problems arising from compatibility of the software used.

RepastPy was used in conjunction with OpenMap to provide a model that could be accessed readily by individuals or small institutions lacking licenses for more expensive software. GIS data was unable to be loaded using these two programs, making it impossible for the model to be run.

Our team did obtain a better understanding of the parameters critical in understanding the potential for the spread of invasive pythons and are able to provide a qualitative assessment of the potential for the spread of invasive pythons.

Conclusions

The developed model was unable to be finished and run due to software compatibility issues. This is most like due to a lack of familiarity with the open source software used rather than issues with the software. Perhaps with more familiarity with the software the issues we encountered could be remedied.

A definite potential exists for the large range spread of pythons. Pythons are capable of travelling large distances, however, their movement seems to be motivated largely by reproduction. Invasion will most likely model the situation seen in Florida, through the release/escape of pythons and the subsequent establishment of a new breeding population rather than long range spread.

Restricting sales of pythons and education on the ecological impacts of the release of pythons may help lower the risk of further spread.

References

2009 and 2010 USGS reports on invasive pythons

Dorcas, M.E., Willson, J.D. and Gibbons, J.W. (n.d.) Burmese Python Research at SREL. Available at: http://www.bio.davidson.edu/people/midorcas/research/Pythons/SREL Python Project.pdf

Harvey, R. et al., 2009. *Resource Potential in South Florida: Scientific Support for Invasive Species Management*. Gainesville, FL: University of Florida IFAS Extension, Wildlife Ecology and Conservation Dept. Available at: http://edis.ifas.ufl.edu/pdffiles/UW/UW28600.pdf

Reed, R.N. and Rodda, G.H., 2009. *Giant constrictors: Biological and management profiles and an establishment risk assessment for nine large species of pythons, anacondas and the boa constrictor*. Reston, VA: U.S. Geological Survey. Available at: http://www.fort.usgs.gov/Products/Publications/pub_abstract.asp?PubID=22691

Acknowledgements

This work resulted from a Distributed Undergraduate Semester (Engaging Undergraduate Students in Ecological Investigations Using Large, Public Datasets), conducted through the National Center for Ecological Analysis and Synthesis, a Center funded by NSF (Grant #SB-0553768), the University of California, Santa Barbara, and the State of California. Fl. Tetons Mountain, Ecological Society of America

This project was part of a tutorial at New College of Florida based on invasive python work funded by the TREE Foundation

Climate Change

A Visual World View of Global Warming

NEW TOPICS NEW COLLEGE


Braasch


Lowman

Join us for a visual tour of the places in the world most affected by climate change, from the poles to our mountains and cities

TUESDAY • MARCH 9 • 4 PM

MILDRED SAINER PAVILION | 5313 BAY SHORE ROAD | SARASOTA, FLORIDA

Gary Braasch, explorer and environmental photojournalist
Meg Lowman, professor of biology and environmental studies; faculty host

Underwritten by the TREE Foundation

Gary Braasch is a world caliber environmental photojournalist who creates remarkable images and important documentation about nature, environment, biodiversity and global warming. *Time, LIFE, Discover, Smithsonian, National Geographic, Scientific American* and the United Nations have published his images. He received the Ansel Adams Award from the Sierra Club and the Outstanding Nature Photographer citation from the North American Nature Photography Association. Included in his presentation will be images from Florida and the Atlantic Coast, underscoring the local effects and dangers of rapid climate change. And having photographed and reported from the Copenhagen international climate negotiations last December, he will offer his perspective on the direction being taken by the world's nations in reacting to and reducing global warming.

BOOK SIGNING TO FOLLOW THE PROGRAM

Earth Under Fire: How Global Warming is Changing the World is a comprehensive look at the world wide effects of climate change, its implications, and what action is being taken about it. In dramatic photographs and quotes from world climate science leaders, this book shows how the earth is being changed right now. Called "essential reading for every citizen" by Al Gore, *Earth Under Fire* ends with a vision of how we can slow global warming and improve the lives of people everywhere.

Individual Lectures:
$15
Net proceeds benefit the New College academic program
(Free for New College students, faculty and staff)

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New College
Florida's Honors College
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4-3

Community Lecture

May 4 2010

www.heraldtribune.com

"They promis
any dope jokes
— Betty White,

Making a difference in the environment

HEATHER DUNHILL
OUT & ABOUT

After cocktails in the courtyard and hors d'oeuvres in the dining room of the Powel Crosley Estate, Dr. **Meg Lowman** was awarded Dictor Martin's 2010 World of Difference Award. She was honored for her steadfast dedication to the environment and the TREE Foundation, now in its 10th year.

After a welcome by co-host **Wayne Dictor,** TREE president **Gerri Aaron** introduced Meg with words of admiration. "I stand up here to introduce a prodigious and intrepid adventurer, researcher, teacher, writer, scientist of prominence, my mentor — wise beyond her years — and my adorable friend."

Other tributes of note that evening were made by the Honorable **Jon Thaxton,** Dr. **Mike Michalson, Mike Pender, Carolyn Johnson, Henry Rodriquez** and **Michael Brown**, as well as award presentation by co-host **Steve Martin.** In Meg's ebullient manner, upon acceptance she shared that everything she knows she learned by observing trees. Those lessons are: Stand tall and proud. Sink your roots into the earth. Be content with natural beauty. Go out on a limb! Drink lots of water. Remember your roots. Enjoy the view. Celebrate diversity and nurture it in your canopy.

2010 WORLD OF DIFFERENCE AWARD: Dr. Meg Lowman with Mike Pender and Gerri Aaron.

CORRESPONDENT PHOTOS / HEATHER DUNHILL

Doug Kerr, Isabel Norton and Marie Pender.

John and Alice Lowman.

ONLINE: For more photos from this event, visit We Spotted at heraldtribune.com.

Contact Heather Dunhill at hdunhill@gmail.com or c/o the Herald-Tribune, P.O. Drawer 1719, Sarasota, FL 34230.

Dictor-Martin Financial Firm honored Meg Lowman and TREE Foundation for their work on behalf of our environment

4-8

National and International Canopy Programs

11. TREE continues to sponsor the **Center for Canopy Ecology (CCE)**, with its records and archives about canopy walkways and other aspects of canopy ecology. During 2009-10, TREE and CCE co-hosted the 5th International Forest Canopy Conference in Bangalore, India. National Science Foundation funded this event, along with TREE and Ashoka Trust for Ecology and the Environment (an Indian NGO). The importance of this event cannot be underestimated, since approximately 250 Indian students attended and came away inspired to work harder on their country's forest conservation (www.canopy2009.org) . At the conference, Dr. Lowman was awarded the ACE Award by her colleagues (Achievements in Canopy Ecology). She also was featured in three newspaper articles featuring the conference and its scientists. In addition, Dr. Lowman was awarded a Fulbright Senior Specialist award to India for 2011. The Indian government has requested her expertise to help design important forest conservation programs in India and lead science education outreach events during her visit. A publication about the economics of canopy walkways, featuring our Myakka metrics, was published by the international journal, Biotropica. University of California Press has contracted a new canopy methods book with scheduled publication in 2011; and Springer Verlag has contracted to publish the canopy conference proceedings.

12. **TREE is leading forest conservation initiatives in Ethiopia and India.** During 2009, TREE funded a workshop to educate the bishops of Ethiopia, who are stewards of the country's last remaining forests otherwise known as "church forests". Due to the success of this seed funding, National Geographic funded a full-fledged expedition to survey the biodiversity of Ethiopia's church forests during August 2011. TREE partnered with National Geographic and the Orthodox Christian church leadership, but in addition, eight scientists volunteered their time and expertise to survey these unknown regions of our planet. Because church forests house water supplies, support biodiversity including pollinators of local crops, and represent important spiritual centers, they are an important legacy to the health and well-being of Ethiopian people. TREE continues to provide canopy textbooks to biologists working in global "hot-spots" that desperately need conservation expertise. For relatively small contributions, our efforts go a long way! Dr. Lowman is assisting with large-scale grant-writing conservation initiatives in both Ethiopia and India during the upcoming year.

13. **Ethnobotanical Knowledge - New** College students completed an ethnobotany brochure for the Amazon rain forest. Copies will be donated to several villages in Peru, so they can sell them to eco-tourists and create a revenue stream through sustainable forest conservation practices. Our partnership with Amazon Amigos, with its mission to create clean water supplies and educate Peruvian villagers about its importance for their children, continues to achieve great success for relatively little funding. Approximately $1500 will fund the infrastructure for a

simplified water-purification system in a local village. A third Amazonian intern, Willy Flores, hopes to train with our Center for Canopy Ecology in 2011, but was refused in his first attempt to obtain a Visa.

14. **Our emeritus director, Thomas Lovejoy** (formerly President of the Heinz Center for Science, Economics and the Environment in Washington DC) has transitioned to an endowed Chair in Biodiversity at the Heinz headquarters. In addition, Tom has accepted a part-time appointment at George Mason University's Environmental Studies department. Tom will be in charge of several global conservation programs this year as part of the United Nation's Year of Biodiversity, and he continues to represent TREE Foundation in his important global outreach. We welcome new Research Associate, **Dr. David Jarzen**, a world-acclaimed paleo-botanist who also directs important science education outreach programs at the University of Florida, Gainesville. In addition, **Mr. Dan Bennett,** philanthropist and business entrepreneur from Texas, joins our honorary board as part of the Ethiopian conservation team. Dan is helping us obtain fencing as a long-term effort to conserve Ethiopia's church forests.

15. **Sister Walkway in Taiwan** – Two Taiwanese naturalists applied and received a National Award to pursue "their dream." Fu Kuo-Ming had read Dr. Lowman's book in his native language, and dreamed of building a canopy walkway for his country. He won a coveted award to travel to Florida to learn about walkway construction from Dr. Lowman, and recently visited to pursue his dream.

16. **Education Summit** – TREE supported the Education Summit entitled, Environmental Literacy for a Sustainable World – Ecology and Education Summit held in Washington DC during October 14-16. This meeting brought together the leaders of over 200 environmental education organizations, with a goal to reduce redundancy, and share best practices among different stakeholders. The conference also integrated technology with real ecology, discussing ways that hand-held mobile technology can augment hands-on (muddy-boots) environmental education.

17. **Climate Change Conferences at Copenhagen** – Dr. Lowman attended the climate change meetings to write for the Herald Tribune, to blog/tweet/use new technologies for media communication, and to represent TREE. She met with the Bellona Foundation, spent time with GPC (Global Canopy Programme), and interfaced with forest conservation groups supporting REDD (Reduce Environmental Degradation and Tropical Deforestation).

18. **Nature's Secrets** – Dr. Lowman continues to write a science column in the Herald Tribune, which is also distributed on her website. The articles feature many of TREE's mission activities, including walkways and forest conservation both locally and globally.

TREE Foundation is grateful for your continued support of our local and global forest conservation projects. With a relatively small budget, we are proud of our activities, and our outreach to a large diversity of constituents. We continue to be the only foundation in southwest Florida dedicated to conservation of our trees, forest conservation and environmental education – so thank you for supporting this legacy to the next generation. To celebrate ten years, TREE is partnering with Turner Tree & Landscaping Company to plant 2 live oak trees for every $100 donated and 20 trees for every $1000 donated. In this way, your donations are not only educating the public about the importance of forests, but actually helping to keep Florida green!

Yours from the treetops,

M. Lowman

Meg Lowman
Executive Director

Gerri Aaron
President, Board of Directors

Save the Rainforest!

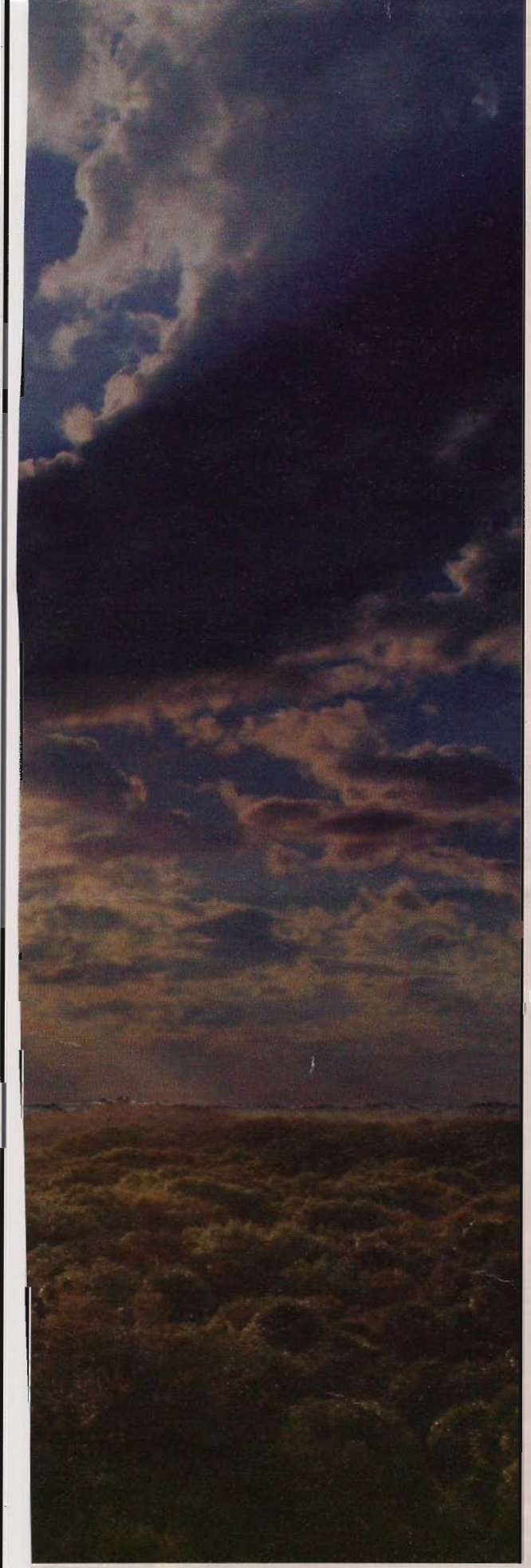
Dear Tree Foundation,

Thank you for the kiosk and scale model. I learned that a leaf cutter ants have a moss farm in their nests. I also learned that a white neck puffbirds eats the termites out of their nests and uses it for its own nest.

The kiosk was great, too. All the puzzles looked so cool and real The videos were also cool. The kiosk showed videos, that looked real.

Thank you again for the kiosk and scale model. I learned a great amount from the lessons with the scale model.

Sincerely,
Chloe Harris



BY GAYLE GUYNUP / PHOTOGRAPHY BY SALVATORE BRANCIFORT

There are nice views, and then there are *the* views.

In an area known for its glorious sunsets and waterfront vistas, views from some of the Gulf Coast's tallest and most strategically placed buildings can give us a bird's-eye-view of the place we call home.

Some views, of course, cause controversy, as communities on our Gulf Coast have attempted to put limits on just how high we can build. To the north and to the south, local governments and/or citizens have made efforts to protect those spectacular views from the intrusion of skyscrapers and other distractions.

Politics aside, it is hard to deny the beauty that abounds. So join us as we take you to the heights, to see as far as our eye can see.

The Myakka Canopy Walkway

The inspiration of tree-canopy scientist Dr. Meg Lowman, The Myakka Canopy Walkway extends approximately 25 feet off the ground, high in the Myakka State Park treetops. The walkway opened in June 2000, and includes a 74-foot-tall tower, as well as the 85-foot-long suspension bridge. Situated as it is in the midst of one of the most beautiful of Florida's state parks, this walkway is one of only a dozen of its kind in the world, and the only one situated in a subtropical forest.

7·2

Dear Meg Lowman, 3\9\10

My name is Marilyn Salguero and I live in Utah. I am twelve years old and in a wheelchair. I have heard you study plants, well I have a disease and I want to know what you've found. In case you want to know I have a rare disease with no name. If you write back I will appreciate it.

Sincerly,

Marilyn Salguero

7-3

Dear Ms. Meg Lowman, March 9, 2010

Our class read your story "The Most beautiful roof in the world". I thought that it was a really great book. I have a few questions for you...

Do you like your job? What does it feel like to climb trees in the rain forest? Dose it cost a lot of money to go to the rain forest? What types/kinds of animals do you see each day? Do you bring your kids; do they like it? Have you ever been stung or bitten by an animal?

P.S. You are an inspiration to me, you inspire me so please please write back...

Love,
Briaunna Stratton
6th grade West Kearns Elementary, Utah

7-4

3/9/10

Dear Meg Lowman,

I read yor story The Most beautiful roof in the world. I liked yor story. How old wer you when you first started climbing trees? Do you remember your first thought when you were inside the forest?

And I think your Job is Cool!

Sincerely

3151 Hernand37

7-5

Dear Meg Lowman, The whole 6th grade read the most beautiful roof in the world b.y Kathry Lasky. The book she made was outstanding. Its the most interesting story I ever read. Like you love plants when you were young. Plants are the most beautiful thing in the world. I like how you climb up the tree tops and how you look at ~~the~~ bugs and learn something new every time. There in are bridges that lead higher or lower to the trees and you climb up the tree with a Jumars. The new ~~stuff~~ you learn and new students you teach must be the most exciding life ever. All the animals you see in the walkways in the trees or by the Jumars. The howler monkey must be very loud. I have a question way do the howler monkeys live in the canopy. (Pleas awerser & write back.) How do the ants love to eat the new leaves than the old ones so you put a cover over the leaves you check it in the moring
How do you find new plants? I love things that you do.

Sincerely Danyele Rowley

(west Kearns Elementery.)

7-6

ENVIRONMENTAL LITERACY FOR A SUSTAINABLE WORLD

Ecology and Education Summit

October 14th – 15th, 2010
National Education Association HQ
Washington, D.C

PARTNERS

Ecological Society of America (coordinating partner)
National Education Association (host partner)
American Association for Advancement of Science
American Institute of Biological Sciences
Center for Embedded Network Sensing
Carey Institute for Ecosystem Studies
National Institute for Food and Agriculture
National Ecological Observatory Network
National Geographic Society
National Oceanic and Atmospheric Administration
National Wildlife Federation
North American Association for Environmental Education
National Environmental Education Foundation
USDA Forest Service

Purpose of Summit

Disseminate best practices in education

Reduce duplication of efforts

Coordinate strategies to build pathways of support for green careers for the next generation

Develop public policy and funding opportunities to advance environmental literacy

Accelerate the transformation of teaching and lifelong learning from K-gray in formal and informal settings

A National Dialogue and Strategy around

The major ecological and environmental changes and tipping points that demand integration of multidisciplinary natural and social science perspectives

The core indicators of environmental literacy that needs to undergird educational programs for a sustainable world

The role of technology, fieldwork and data

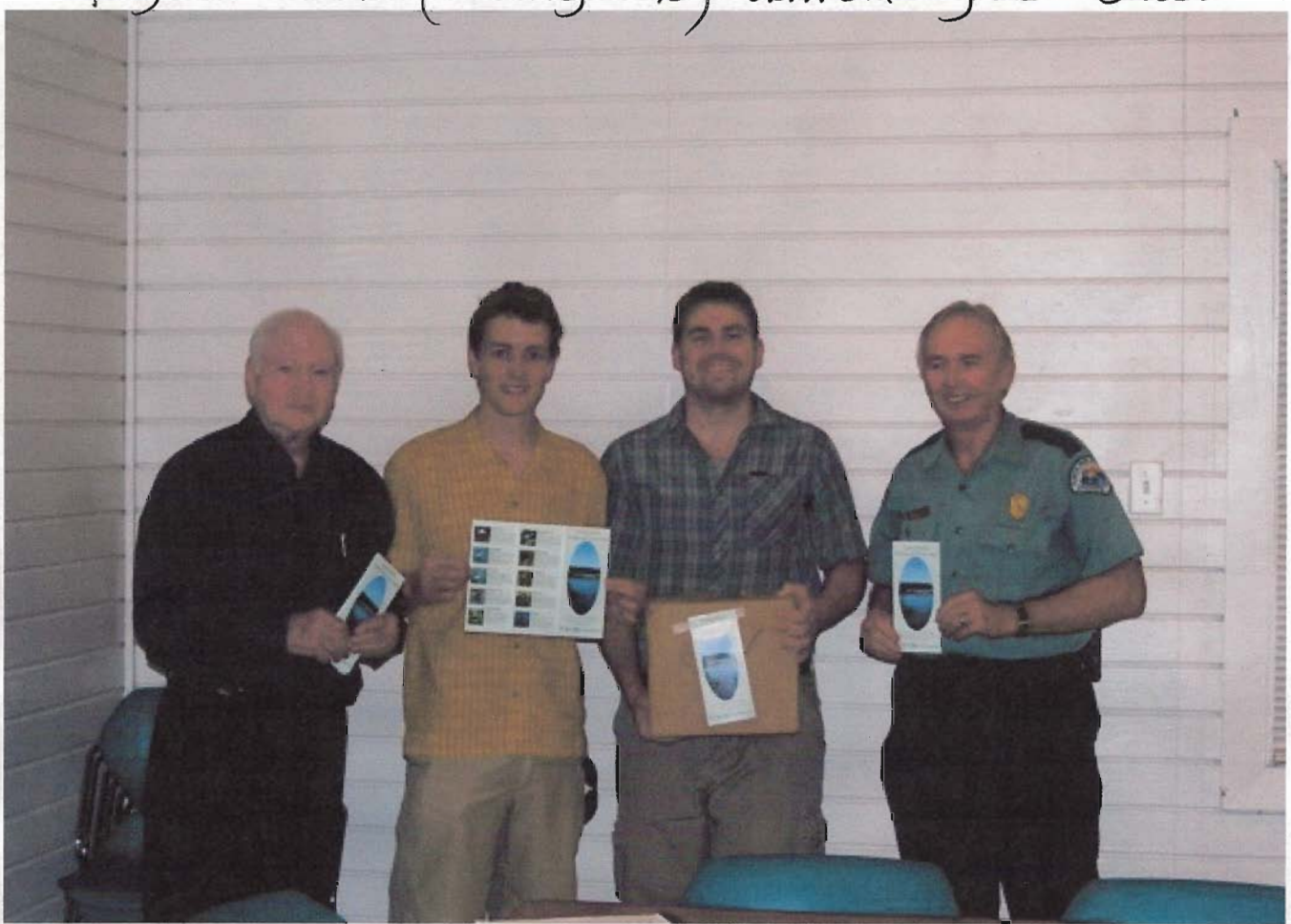
The implications for communities of practice

Counteracting persisting underrepresentation of minority communities in the environmental workforce

7-7

Ecological Society of America | 1990 M St NW Ste 700 Washington DC 20036 | phone 202.833.8773 | fax 202.833.8775

Angela Palmer (of England) exhibiting her "Ghost Trees"



7-8

New College students present Bird Guides to Myakka Friends

Exhibit shows trees' plight

12 JUL 2010

It has come to this — that the lover of art is one, and the lover of nature another, though true art is but the expression of our love of nature. It is monstrous when one cares but little about trees and much about Corinthian columns, and yet this is exceedingly common.

— Henry David Thoreau,
journal entry of Oct. 9, 1857

On July 9, 10 dead tree trunks went on display across the Atlantic Ocean at The Museum of Natural History in Oxford, England. These stark behemoths originated from the lowland tropical rain forests of Ghana, Africa, victims of a massive logging operation. On its global art-and-science journey, Ghost Forest (www.ghostforest.org) has traveled to three countries as an artistic depiction of the tragedy of deforestation.

MEG LOWMAN
NATURE'S SECRETS

Artist Angela Palmer rescued these trunks from their logging site, excavated the roots, cleaned off excess soil, loaded them on oversize trucks across Africa, and shipped them to London. More than 170 million people viewed them in Trafalgar Square, and millions more in Copenhagen, Denmark, during the global climate change meetings.

Throughout their global journey, the Ghanaian trunks silently proclaim an inspirational conservation message. As works of art, tree roots symbolize health because plants produce energy as the basis of all life; but the severed trunks also signify the death of a gentle forest giant. As a scientific display, the structures illustrate the enormous girth of tropical trees, the complex underground architecture of roots, and the enormous carbon storage potential of tropical trees. Both the art and the science convey meaning to this creative display.

When trees grow, they absorb carbon dioxide and give off oxygen, storing large amounts of carbon as wood. This carbon represents an enormous sink or storage compartment on the planet, making trees a great way to absorb excessive carbon dioxide emitted from human activities such as coal-fired plants, cars or agricultural practices. Planting trees is a great way to offset the carbon dioxide emissions. Conservation of mature forests (also called "old growth") is an effective way to reduce carbon in our atmosphere. In excessive quantities, carbon dioxide warms the planet in the same fashion as a blanket wrapped around a baby.

A new policy called REDD (www.reddmonitor.org) aims to create incentives to conserve forests and also reduce the impacts of climate change. "REDD" stands for Reducing Emissions from Deforestation and (forest) Degradation. REDD came very close to formal approval at the Copenhagen climate change meetings last December 2009. The policy encourages developed countries to pay developing countries to retain their forests alive instead of dead (as in the case of logging). Instead of profiting from timber, countries such as New Guinea and Costa Rica could be paid to retain their healthy forest stands for carbon storage and biodiversity conservation.

This outcome benefits all citizens, not just those who live in the tropics; in particular, the ability of rain forests to absorb carbon dioxide provides a global ecosystem service.

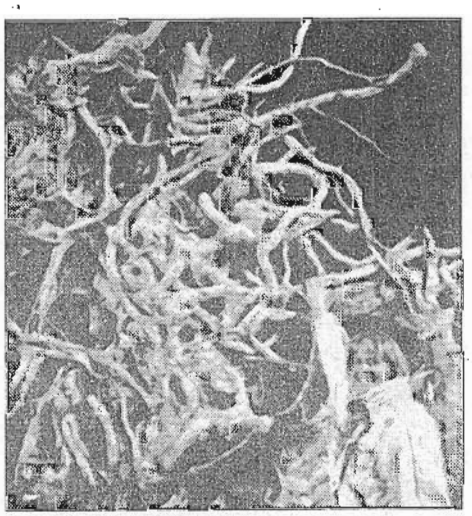
But REDD is not foolproof. Advocates are still wrangling with mechanisms to enforce it and to insure that payments actually go to the locals involved in forest conservation, not to bank accounts in Switzerland. But for now, it represents one of the most innovative proposals in climate change talks because it directly links economics to conservation.

Palmer hopes her trees will educate viewers about the plight of tropical rain forests. As she says, "It is the negative space around the trunks that conveys a sobering message about what is missing on our planet." Her trunks are symbolic of all rain forest trees on a global scale, where an estimated football field is destroyed every four seconds.

Palmer's passion for forests stems from her values, "I have three children and I don't want them to grow up saying that I knew but did nothing. When primary rain forest trees are gone, they are gone; and their loss has far-reaching consequences, impacting on climate, biodiversity and the livelihoods of indigenous people."

Despite the enormous carbon footprint to transport tropical rain forest trunks around the world, Ghost Forests may be the only tropical rain forest "trees" observed firsthand by many people. If Ghost Forest conveys the stark contrast of forests alive vs. dead, then Palmer will achieve what scientists have not communicated as effectively as artists.

Meg Lowman, longtime Florida scientist/ educator, is currently establishing the nationally acclaimed Nature Research Center at the North Carolina Museum of Natural Sciences, with its mission "to engage the public in understanding the scientific research that affects their daily lives."
Web: www.canopymeg.com



Artist Angela Palmer stands by a section of Ghost Forest. PROVIDED BY MEG LOWMAN

7-9

Travel 2 Learn

Students

Environmental Expeditions'

AMAZON RAINFOREST WORKSHOPS - 2010

Specially Designed for Students & Families

Dates: July 5-13, 2010 door-to-door Trip Cost: $1,887 land, plus in-country air ~$300, and int'l air ($650-1150)

Group Leaders - Dr. Margaret Lowman, New College of Florida - Sarasota and

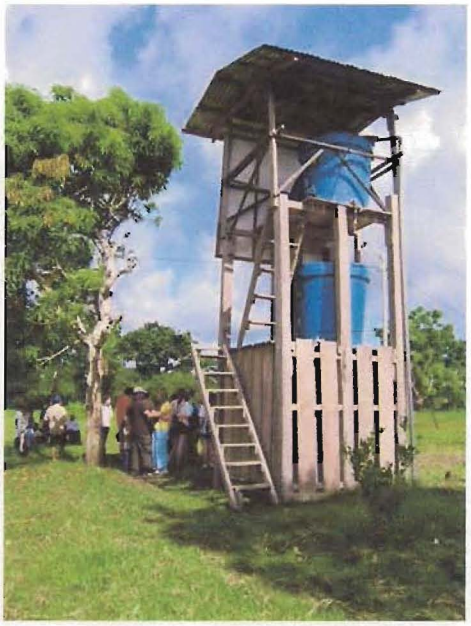
D.C. Randle, St. Francis High School

Other Faculty: Research Biologist - Dr. Stephen Madigosky, Widener University

Entomologist - Randy Morgan, Cincinnati Zoo

7-10

TREE Foundation and Amazon Amigos thank all of our global supporters!!



It was great to have New College students visit our water treatment plant at the village of Manco Capac at the end of January 2010.

How quickly a year passes and how much can be accomplished when we all pull together. In the year 2009, many projects were started and completed by the staff at CONAPAC plus on-going efforts to support and sustain what we have started in past years. For 2009 the following was accomplished:

1. Delivery of books & school supplies to 79 villages, for 130 schools with just about 5,000 students and teachers
2. Four, 3-day community and teacher workshops with volunteer leaders for approximate 500 people
3. 14, one day, community service projects with travel guests
4. Six new mini-water treatment plants
6. Seven, 2-day community water workshops
7. Major improvements and successes at Las Malvinas school, an urban, environmental teaching garden
8. A second mini-bakery in the community of Irlanda
9. More mini fish farms (piciposas)
10. A new website for CONAPAC www.conapac.org

Although the world-wide economic crisis continues to affect pleasure travel (and the Amazon rainforest is no exception), our donations and grants continue to arrive and strengthen our goals. With much to do but little time or money, our committed staff is happy and proud of the many things accomplished in 2009. CONAPAC receives donations from a variety of resources but our partnership with Amazon Amigos is a particularly special one. Thank you, Meg & Frances, for your incredible commitment to the rainforest; your creative energy; and your endless enthusiasm for the various projects and opportunities which CONAPAC offers your donor base!

Muchas gracias!!

Marcos Oversluijs & the CONAPAC Staff

Water Plant Photo by Dayna Lazarus
Photo of Marcos by Meg Lowman

7-11

⑨ Achiote - Annatto - Bixa orellana (fruit)

When crushed, the bright red seeds of this plant serve as a body paint or food coloring. The dye is also used as an insect repellant. The leaves successfully treat dysentery, hepatitis, tonsillitis and dermatitis. Fresh leaf stalks are soaked in a glass of water, creating a white liquid at the tip used to cure conjunctivitis. In some villages, Amazonians place the leaves in the corners of the house to ward off negative spirits.

⑪ Ojé - Medicinal Fig
Ficus insipida

This species treats intestinal parasites and worms. The patient drinks the sap mixed with juice, followed by many glasses of water to flush out the toxic organisms. Dosage is very important, especially for children, because too much sap will harm the intestines.

⑩ Santa Maria - Piper peltatum

The large leaves of this plant create a poultice to relieve fever or soothe headaches and toothaches. They are also placed on the swollen breasts of nursing mothers to reduce inflammation. After heating, the leaves are rubbed on a mother's belly to help expell the placenta after birth. When rubbed on the body, the leaves also repel ticks.

Did You Know?

FUTURE CURES - The rainforest is the oldest and most prolific chemistry lab in the world, holding untold solutions to the world's myriad diseases.

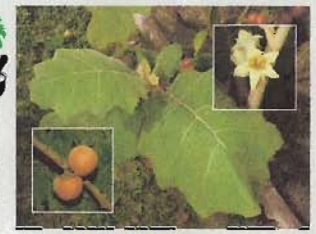
Did You Know?

DISAPPEARING FORESTS - The Amazon has lost more than 200,000 square miles of forest since the 1970s. This rapid deforestation threatens the loss of natural chemical diversity that took millions of years to evolve.

⑫ Cashu - Anacardium occidentale

A brew is infused from the bark and leaves to treat diarrhea. A teaspoon of the crushed cashu seeds is added to tea as a form of birth control. The latex of the seed's shell treats warts, scurvy and ringworm.

⑬ Cocona - Solanum sessiliflorum



The cocona fruit, high in vitamin C, has many advantages beyond its nutrition. The juice provides anti-diabetic effects, and also substitutes for insulin. The pulp of the fruit is applied to various skin irritations such as insect bites and scabies. The juice extracted from the leaf boasts antiseptic properties, and is often applied to wounds to accelerate healing. Cocona is also used to treat snakebite.

⑭ Breast Berry
Solanum mammosum

The unusual shape of this plant's fruit resembles the shape of a cow's udder, hence the name "breast berry," and is crushed and used for growths in the breast*. The seeds are rubbed directly on the body to cure scabies. This plant, while considered undesirable to eat, is often planted next to its more delicious relative, cocona, to trick animals who intend to feed on the more desirable species.

*(*doctrine of signatures)*

⑮ Ginger - Jengibre
Zingiber officinale

A mixture of crushed ginger root, sugar rum and honey treats rheumatism. When even more honey is added, the mixture is said to increase fertility in women who have difficulty conceiving.

⑯ Yuca - Manioc
Manihot esculenta

The juice of this staple crop is often mixed with rum and applied topically for children's skin problems, especially scabies. When added to water, the juice from the tuber is ingested to cure diarrhea.

⑰ Huito - Genipap - Genipa Americana

This plant is named after the Huitoto tribe who used the juice of the immature fruits as body paint for camouflage during hunting. The pure juice of the ripe fruit is administered to children with bronchial problems or arthritis. The juice of the unripe fruit alleviates stomach ulcers and aids with tooth extraction.

Did You Know?

UNTAPPED RESOURCE - Only about 5% of tropical plants have been scientifically tested for medicinal use.

⑱ Ajo Sacha - Wild Garlic - Mansoa alliacea

When crushed, these extremely potent leaves will treat bronchitis, asthma and sinus problems. Many bathe in garlic infused water to relieve body aches, fatigue, nervousness, fever and cramps. Some hunters rub themselves with the crushed leaves to disguise their human scent while hunting.

Thank You

Thank you for your contribution. Please use this acknowledgement window if you are making a donation in someone's honor.

To: _____

From: _____

In your honor, a donation of $ _____ representing a gift of hope for the Amazon Rainforest and its People has been made through

AMAZON AMIGOS

This brochure was made possible through contributions from the TREE Foundation, Environmental Expeditions, and Ecoprint. Donations may be made onsite with Explorama or through Amazon Amigos.

All proceeds of Amazon Amigos go to the non-profit Conservación de la Naturaleza Amazónica del Perú, A.C. (CONAPAC). Donations should be made payable to the TREE Foundation and addressed to Amazon Amigos, 9555 Fraser Avenue, Silver Spring, MD 20910.

amazonamigos.org
1-800-481-2624

About this Garden

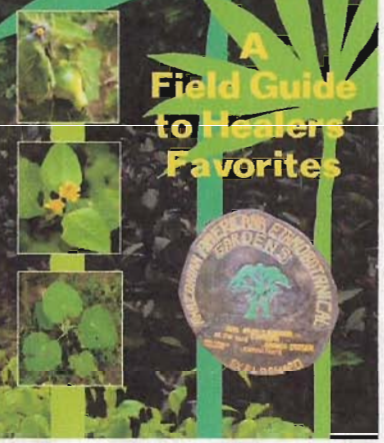
The ReNuPeRu Ethnobotanical Garden was conceived to conserve the wealth of indigenous knowledge and the bounty of medicinal plant diversity in the Peruvian Amazon. Through the support of Dr. James Duke and help of respected Peruvian botanist Rodolpho Vasques, over 250 medicinal plant species have been planted in the garden and labeled with scientific identification. A garden of this size and diversity requires extensive attention. Guillermo Rodriquez and Julio Morales are year round curators of the garden, devoted to its upkeep and to sharing their knowledge of the plants with visiting guests. Both Guillermo and Julio have a family lineage in traditional medicine. Guillermo is of Bora and Ocaina Native American descent. He inherited his love and knowledge of plants from his father, a Shaman and Curandero. Julio is originally from San Martin. He learned his extensive knowledge of medicinal plants from his uncle, also a Shaman and Curandero.

Credits: Writer - Christine Rohal | Editor - Margaret Lowman | Photographer - Philip Wittman | Design - Alan Zelina | Conceived and produced by Frances Gatz

ReNuPeRu Ethnobotanical Garden

Medicinal Plants of the AMAZON RAIN FOREST

A Field Guide to Healers' Favorites



New College student Christine Rohal's Ethnobotany Guide funded by TREE

7-12

Welcome

to the ReNuPeRu Ethnobotanical Garden!

Look around you at the many shades of green in this Amazon Rainforest. It is one of the most biologically diverse areas on the planet. Nature's creativity here offers hidden recipes for health and healing.

As you walk the paths of the ReNuPeRu Medicinal Plant Garden, this guide will help you appreciate how discoveries of nature's secrets from both indigenous Shamans and contemporary scientists have contributed to today's medical solutions.

Tinctures and oils on a Shaman's shelf

As many as 1,300 Amazonian plants have known medicinal applications, and over 235 of them are planted here! Where has this knowledge come from?

A Shaman's assembly of healing plants

Through keen observation and sacred ceremonies, long before scientific explanations were available, Shamans began experimenting with the chemical cornucopia that surrounded them. While identifying the best cures for their patients' most pressing mental and physical illnesses, they continue improving their knowledge with each generation.

Confronted with an ill patient, the Shaman begins his search for healing plants with a deep respect and honor of the rainforest, listening carefully to the spirit of each chosen plant. He harvests select portions of these plants, thanking each one with a ritual. Often the Shaman offers a sacrifice of tobacco around its roots, communicating to the plant that it has not been hurt in vain, but for the noble purpose of healing a life. His deep reverence for the rainforest and its bounty reflects the Shaman's greater role as a spiritual leader in his community.

We have all benefitted from the collective wisdom of Shamans. Over centuries, these indigenous people have been the gate-keepers of the forest's immense potential for medicinal healing. Their knowledge is the basis for many of our scientific discoveries.

Why is the rainforest one of the richest pharmaceutical labs in the world?

Notice the layers of leaves in the rainforest. Some are tattered and eaten, others are untouched. Over millions of years, plants have evolved with various strategies to keep from being eaten by insects and destroyed by pathogens. Manufacturing toxins and disease-fighting chemicals has been one of their most successful adaptations for defense. And we have discovered that some of these same compounds also address our own ailments and problems with pests.

How to use this guide:

You will find these icons next to the descriptions of each plant. These icons serve as quick references for important details about each plant.

Leaf · Root · Bark · Sap · Fruit · Seeds

The icons in this box represent the primary part of the plant that is used for healing.

Tea* · Poultice · Juice · Infusion · Bath · Rub

The icons in this box represent the primary method used in applying the medicine to the body.

*Though technically the word 'tea' refers strictly to the actual tea species 'Camellia sinesis,' in this brochure we use 'tea' to describe an infusion that is served as a hot beverage.

Important Plants to look for in the ReNuPeRu Garden

① Hierba Luisa - Lemon grass
Cymbopogon citratus

This highly aromatic plant has leaves used as a digestive aid for stomachaches and acid indigestion. A tea is made to reduce stress and to treat insomnia. The same dosage, when mixed with two limes, can reduce high cholesterol levels. A liquid extracted from the root relieves menstrual problems and also backaches or muscle spasms. The dry leaves are often burned to repel mosquitoes. Additionally, an extract of the leaves is an ingredient in the popular carbonated drink, Inca Cola.

② Jergon Sacha Fer-de-lance Plant
Dracontium peruvianum

This plant's large bulbous root is cleaned, cut into pieces and mashed to produce a sap used for the immediate treatment of snakebite. To be effective, a freshly harvested root must be used. Luckily, the plant is easy to identify because its bark has a pattern similar to a snake's skin*! This sap treats bites from bushmaster and fer-de-lance snakes, but is ineffective on bites from coral snakes. The dosage is very importanr because applying too much can kill the patient. A Shaman typically starts with a very low dosage and gradually increase it.

**doctrine of signatures (in botany, when a plant looks like something it cures)*

Did You Know?
DISAPPEARING KNOWLEDGE - As the younger generation leaves the rainforest to seek prosperity in the cities, the tradition of orally passing knowledge of medicinal plants to future generations is in jeopardy.

③ Boton de Oro Golden Button
Spilanthes acmella

This plant was given the name golden button because of its button-shaped yellow flowers. The plant is mashed into a juicy pulp and applied to insect stings. Its numbing qualities are useful for controlling external pains, especially toothaches.

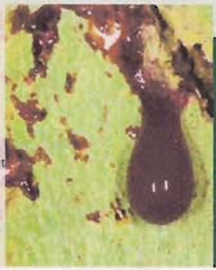
Did You Know?
MEDICINAL POTENTIAL – One-fourth of all prescription drugs are derived from plants. Natural components are the basis for 70% of new drugs.

④ Una de Gato - Cat's Claw
Uncaria guianensis

This well-known vine is recognized as a miracle plant because of its many uses. The bark, stem and leaves are used as a weak tea taken regularly to prevent illness. The bark is also an anti-inflammatory and a contraceptive. Different concoctions of the plant cures arthritis, rheumatism, stomach ulcers and internal wounds. Its use as a treatment for cancerous tumors is of particularly interest to western researchers. One study in Iquitos shows promising results in the treatment of AIDS.

⑤ Sangre de Grado Dragon's Blood
Croton lechleri

When applied to the skin and rubbed vigorously, the bright red sap of this plant turns white. Used as an anti-inflammatory, it accelerates the healing of wounds. It is commonly used in the treatment of external irritations ranging from insect and piranha bites to acne and psoriasis. The plant is added to women's baths after childbirth to prevent vaginal infection.



Did You Know?
NATURE'S PHARMACY - Half of all anti-cancer drugs introduced since the 1940s are either natural products or medicines derived directly from natural products.

⑥ Pichirina - Vismia
Vismia angusta

The orange latex of this tree, nicknamed "jungle iodine" is commonly used to treat sores and wounds as well as skin fungi, including ringworm. The sap is applied to newly born babies' umbilical cords for seven days after birth to prevent infection.

⑦ Ayahuasca - Soul Vine
Banisteriopsis caapi

A hallucinogenic drink is made from the bark of this plant drunk by Shamans in tribal ceremonies. It is alleged to help in diagnosis, divination and telepathy. After consuming the brew, the Shaman communicates with the spirit world to learn a patient's illness and how to cure it. The vine also serves as a laxative and an emetic.

⑧ Chami - Sensitive Mimosa
Mimosa pudica

This plant is biologically unique because when touched, the leaves close to avoid predation. The leaves are used in baths as pain relievers, relaxants and to alleviate muscle spasms. The dried leaves are made into tea to cure insomnia. Women drink the tea also during menstruation to serve as a contraceptive.

Let the Bugs find the Drugs!

[illegible]

7-13

Taiwan "Dream Award" winner visiting The Myakka Walkway, with his inspiration to construct one in Taiwan 7-14

30 Dec 2009

Thanks for Earth's blessings

Environmental studies students at New College share their personal thoughts of thanksgiving as they look back at 2009 and contemplate the new year of 2010.

It is our task in our time and in our generation to hand down undiminished to those who come after us, as it was handed down to us by those who went before, that natural wealth and beauty which is ours.

— President John F. Kennedy

It is only a little planet
But how beautiful it is.

— Robinson Jeffers

As we look to the New Year, I hope that all of my readers will pause to express thanks for all of Earth's blessings. Despite the "gloom and doom" of current environmental and economic headlines, we have so much for which to be thankful. I asked the environmental studies students at New College to share their personal thoughts of thanksgiving as they look back at 2009 and contemplate the new year of 2010.

MEG LOWMAN
NATURE'S SECRETS

Here are the voices of our youth:

1. I am thankful for the thousands of people dedicating their lives to preserving our Earth and ensuring the prosperity of future generations.

— Forest Hayes, Gainesville, Fla.

2. I am thankful for my freedom.

— Michael Gonzalez, Miami

3. I am thankful for bull-headedness, perseverance, and unabashed enthusiasm.

— Brittney Champagne, Tampa

4. I'm thankful for clean water, plentiful food and shelter, and an environment and family and friends supportive of academia and social/environmental change.

— Elizabeth Hamman, Carbondale, Ill.

5. I am grateful for the opportunity to keep learning and to continue being empowered.

— Carla Abad, Argentina and Miami

6. I am thankful that everything is so darned interesting, and that there are other folks as curious and excited as I am.

— Sarah McManus, North Carolina

7. I am thankful for the privileges I have been given in life by my family.

— Michael Dexter, Sarasota

8. I am thankful for increasing environmental awareness. Thanks to books from Michael Pollan, Tom Friedman, E.O. Wilson and many more, the public is becoming increasingly aware of the impacts they have and of the things they can do to better the world. Let's keep it up!

— Marilyn Payne, Atlanta

May all of my readers find a similar joy and appreciation at the holiday season as is expressed by these young, hopeful voices. It is heartening to share their attitude of optimism and appreciation as we begin the new year of 2010.

In my first book, "Life in the Treetops" (1999, Yale University Press), my final words to young readers offered advice about attitude:

"One of the most meaningful insights that I have acquired along my life's journey is that it takes the same amount of energy to complain as it does to exclaim — but the results are incredibly different. Learning to exclaim instead of to complain has been my most valuable lesson."

Ten years later, my sentiments remain the same.

Margaret Lowman is director of Environmental Initiatives at New College of Florida. Web: www.canopymeg.com

7-15

Inspiring women in science

Well-behaved women rarely make history. — Laurel Thatcher Ulrich

MEG LOWMAN

NATURE'S SECRETS

Each year, in my Conservation Biology class at New College, I conduct a pre-quiz to assess student knowledge of the sciences. One question asks students to name three famous women scientists, as well as three famous male scientists. The list of men is consistently filled with a diverse array of prominent names. But despite the fact that New College attracts the top students throughout Florida and the country, almost none can list three women scientists. More than 80 percent fail to list even one.

Approximately 15 percent cite Marie Curie, and usually a handful proudly scribble Jane Goodall. Rachel Carson gets an occasional mention, and a few individuals write down the name of their professor (likely the most savvy students hoping to earn a higher grade?).

Most high school — as well as college — textbooks give many more examples of distinguished male scientists than females. Although more men than women have historically pursued science, female students need role models to inspire career choices. This may in part explain why women still fall significantly behind as compared to their male counterparts in many science-based careers.

A recent survey of the 10,000 members of the professional Ecological Society of America indicated that women earned on average two-thirds of the salary of men in the equivalent position. Even more disturbing, women occupied only 10 percent of the leadership positions in the field, thereby leaving an enormous talent pool untapped. The invisible glass ceiling still exists in science, and breaking it will require more than simply listing famous women scientists in textbooks, but creating role models in the work force to inspire the next generation.

Of note, a quick glance at the history of two of Sarasota's distinguished undergraduate colleges, Ringling College of Art and Design and New College, as well as my alma mater, Massachusetts' Williams College (in existence since 1793), reveals that no woman has ever been president — yet. At my beloved New College, men currently occupy seven of the top eight leadership positions. One hopes this does not transmit a subtle signal to the next generation of women seeking role models for academic careers.

So who are the top women scientists of the world? Last year, New Scientist magazine conducted a poll, asking readers to name the most inspirational female scientists of all time. The results: 1. Marie Curie; 2. Rosalind Franklin; 3. Hypathia of Alexandria; 4. Jocelyn Bell Burnell; 5. Ada, Countess Lovelace; 6. Lise Meitner; 7. Dorothy Hodgkin; 8. Sophie Germain; 9. Rachel Carson; and 10. Jane Goodall. Within America, Jane Colden is sometimes called our first great woman scientist. How many readers recognize all of these names?

To refresh our memories, Marie Curie was a European physicist who shared two Nobel Prizes for her work in radioactivity. Chemist Rosalind Franklin laid the groundwork for the discovery of DNA (although two men received the Nobel Prize). Hypathia was a mathematician and astronomer in Roman Alexandria who lived from 370-415 A.D. Astrophysicist Jocelyn Burnell co-discovered pulsars, but her male colleagues got the Nobel Prize. Ada, Countess Lovelace was a theoretician in the 19th century whose ideas laid a foundation for the development of computers. And Jane Colden was one of America's most distinguished 18th-century botanists, and one of the first to name plants according to the Linnaean System, including gardenias (which she named after "garden"). Thanks to Google Search, readers can check out the remaining top five on this list. And please promise to share this information with daughters or grandchildren who might aspire to become scientists!

Margaret Lowman is director of Environmental Initiatives at New College of Florida. Web: www.canopymeg.com

Marie Curie tops a poll of inspiring women in science. Curie, along with husband Pierre, first isolated the two radioactive elements radium and plutonium. She was born Marie Sklodowska in Warsaw in 1867. AP ARCHIVES

7-16

26 JUL '10

Nature fine-tunes denizens

Instructions for living a life:
Pay attention.
Be astonished.
Tell about it.

— Mary Oliver, poet

Make no mistake, modern technology is beyond the comprehension of most ordinary humans, but we depend on it every day. Our ancestors could not imagine that, in three short hours, one can fly from the humid subtropics of Florida to the cool, alpine hills of Vermont. Airplanes are just one of myriad 20th-century technologies that we take for granted. I recently experienced that time-machine-like transformation from the red mangroves of Sarasota Bay to the evergreen hemlock forests of Stowe, Vermont.

MEG LOWMAN
NATURE'S SECRETS

Eagerly hitting the trail for an early morning walk, I was confronted by a charismatic denizen of the Northern temperate forest: a chipmunk!

He trembled in haste among the leaf litter, gulped ravenously, and darted hurriedly to consume all of the digestible needles within reach. Pausing to observe this elegantly striped creature devour a breakfast of pine needles, I was struck by his frantic attitude. Was he envisioning the next snowfall? Or was an enemy about to pounce?

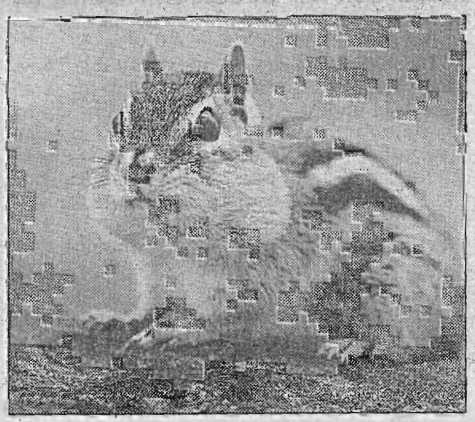
As a scientist, I could not help but compare his behavior to the animals of subtropical Florida. Casually taking a bite here and there, armadillos poke around the sandy banks; exotic wild boars sniffle and wrestle with leaf litter, but rarely engage in a full-fledged feeding frenzy a la chipmunk style; egrets strategically stand still for long periods of time during a fishing expedition, as compared to the frantic extraction of caterpillars from rotting tree trunks by Vermont woodpeckers.

A geographical law of nature was unfolding before my eyes. Closer to the poles, animals experience relatively short summers; in a sense, they need to "make hay while the sun shines." Nesting and feeding activities are confined to an abbreviated period of extremely frenetic activity. Animals closer to the poles must eat, grow, mate, rear young, and gain weight before winter — condensed into a relatively short summer season. This chipmunk was the embodiment of animal behavior in the temperate zones. In contrast, near the equator, organisms undergo life-and-death activities throughout 12 months, with less emphasis on one short season.

I mused on this incredible benefit from technology. I can eat breakfast with a chipmunk, frantically stuffing his cheeks with delicious pine boughs; and with luck (i.e., FAA air traffic control willing), have dinner watching a subtropical pelican float casually on the water between fishing expeditions. Like a Stradivarius violin, every animal is finely tuned to perform perfectly within its environment. But what happens when that environment changes suddenly? How will the current trends of rapid warming, loss of water tables, or sudden clearing of forests affect the survival of natural populations? How does the sudden onslaught of oil affect creatures in the Gulf?

With such rapid changes wrought by human activities, the laws of Mother Nature are put to the test.

Meg Lowman, longtime Florida scientist/ educator, is now establishing the nationally acclaimed Nature Research Center at the North Carolina Museum of Natural Sciences, with its mission "to engage the public in understanding the scientific research that affects their daily lives."
Web: www.canopymeg.com



How will the current trends of rapid warming, loss of water tables, or sudden clearing of forests affect the survival of natural populations? SHUTTERFLY PHOTO

7-17

28 June 2010

Finding oil spill solutions

That God had a plan, I do not doubt.
But what if His plan was, that we would do better?
— Mary Oliver, poet, from "Watching a Documentary about Polar Bears Trying to Survive on Melting Ice Floes"

From the standpoint of industrial efficiency, it's too bad we can't simply drink the petroleum directly.
— Michael Pollan, from "The Omnivore's Dilemma"

Although it is tempting for residents around the Gulf Coast to limit their conversations to complaints about the oil spill, it is even more important to talk about solutions, and educate ourselves about the scientific process of "ecosystem restoration."

Employing the best solutions is critical to the future of jobs, economy, ecology, tourism and quality of life in Florida and throughout the Gulf states. Insisting on the best solutions to this catastrophe will require citizens with a sound education of restoration ecology. This science is defined as "restoring the natural cycles to a disturbed or damaged landscape."

In a nutshell, here are 10 ways to clean up oil from water bodies. While each has potential benefits, most restoration processes also involve drawbacks:

1. Manual shoreline cleanup — Although time-consuming and requires training, this is a great way to utilize large teams of volunteers.

2. High-pressure washing — Pressure-cleaning can actually damage more delicate organisms, but may be effective for sea walls, boats and other surfaces.

3. Natural recovery — Eventually Mother Nature will do the best job of any restoration actions, but she requires a relatively long timeline, perhaps beyond our lifetimes.

4. Dispersants — Chemicals break down surface oil effectively, but they actually break the oil into smaller particles which can enter the food chains and contaminate ecosystems for generations.

5. Burning — If oil slicks are collected into thick mats, burning reduces the chance of onshore oil, but the resulting black smoke and particulates produce a different type of pollution.

6. Booms and skimmers — This labor-intensive equipment is very effective with few side effects, but is best used near the source before the oil disperses. Booms can be effective in keeping oil away from delicate areas such as bird rookeries, public beaches, or harbors; but placement is tricky and uncertain.

7. Absorbent materials — Pads, bark-chip mats or other large sponge-like substances can absorb oil, but then require removal themselves as toxic waste.

8. Vegetation cutting — Removing marsh grass or other oily vegetation usually does more harm to the integrity of the ecosystem than the benefits of a relatively small amount of oil removal.

9. Mechanical removal — Bull-dozing and hauling away oily sediments such as blackened beach sand are appropriate for heavily soiled areas, but usually does more harm to the ecosystem over time than the short-term aesthetic benefits.

10. Use less oil — The most powerful action for cleaning oil spills is to avoid them altogether. One important solution is embarrassingly missing from most regional, and even national, conversations: conservation of fuel.

Americans may be missing the biggest educational solution or teaching moment of the Gulf catastrophe if parents and policymakers overlook these three important words: Use less oil.

Margaret Lowman is director of Environmental Initiatives at New College of Florida.
Web: www.canopymeg.com

7-18

Ref.No ORDA/S-1/1-01
Date 4/8/2010

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Organization for Rehabilitation and Development in Amhara (ORDA)

Head Office Tel. 058/2200985/2201411 Fax 0582200987 P.O.Box 132 Bahir Dar , Ethiopia.
Liaison Office Tel. 011/5504455/5510622 Fax 0115517244 P.O.Box 8122 Addis Ababa, Ethiopia.

To: Margaret Lowman (PhD)

Director of Environmental Initiatives

New College of Florida

USA

Re: Professional Assistance

We have been doing ecological research on the woody diversity of church forests which are the last refuga of Ethiopian dry afromontane forest in the northern highlands of Ethiopia. The main purpose of the research has been understanding their ecological status and designing the conservation mechanisms of these forests. In a continuation of this effort we are planning to undertake the invertebrate diversity of these forests.

Therefore we kindly request your good office to send us volunteer experts and identify the specimens in the following terms:

1. The relevant collector is permitted to collect and take dead insect specimens out of Ethiopia and for the type specimens, singletons and any additional specimens to be held and preserved by your institution;
2. In return the collectors will agree to provide us with details of any identifications and locations from which specimens were collected as well as reports on the outcomes of the project; and
3. Patents and Benefits (other than academic and research knowledge) that may be acquired from the outcome will be sole property of the specific church which owned the forest where the specimen is collected.

Thank you in Advance

Wuletaw Hailemariam
Executive Director

7-19

Kew Gardens, England, has followed the lead of TREE Foundation, and installed a canopy walkway on their grounds. The visitorship has sky-rocketed, with families and children inspired about tree canopies when they visit this new treetop walk outside London.

Deccan Herald 27th Oct

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7-24

'Rapid changes in ecology'

International meet on forest canopies deliberates conservation strategies

BANGALORE: Some of the best brains in the world have come together in Bangalore to discuss forest canopies and explore the ways of combining disciplinary approaches to the pertinent questions on environment, social and conservation relevance.

DELIBERATING FUTURE: IISc Centre for Ecological Sciences Chairman Raman Sukumar (extreme right) sharing a word with Florida New College Director Margaret Lowman at 5th International Forest Canopy Conference at IISc in Bangalore on Monday. Conservation Biologist Thomas Lovejoy and University of Massachusetts, Boston Professor Kamal Bawa are also seen. DH PHOTO

The six-day fifth international conference on canopy began at JN Tata Auditorium, IISc on Monday.

Ashoka Trust for Research in Ecology and Environment, Bangalore (ATREE) in association with a host of organisations has organised the conference, which is a first to be held and hosted in Asia.

Forest canopies are home to 75 per cent of earth's biodiversity and their micro-climates are unique. Canopy science has made advances only in the last two decades, with the installation of crane technology that enables access to non-climbing experts also. However, India which has vast biodiversity, does not have such facility for access and thus still is dependent on single-rope access method.

Decrease in forest cover

In his presentation on 'Forest Canopies in 21st century - Challenges and Prospects for Progress', Prof Kamaljit S Bawa, President, ATREE, said that though it is subtle, rapid changes have been taking place in forest ecology in India. The need of the hour is to link the study of climate change and its effect on biodiversity. As per the Forest Survey of India report, dense forest cover has decreased by 2.04 pc from 3,95,169 sq kms in 2001 to 3,87,126 sq kms in 2005. But open forest has increased by 12.04% during the same period.

Bawa said that India and China should collectively respond and collaborate in taking measures to check rapid climate change in the Himalayas.

The survey conducted by him and his students for four months in 2008 in the eastern Himalayas showed that the natives were aware of climate change and its effect on the mountain range. The survey included 300 households. About 70 pc of the respondents said that they have noticed early on set of summer as well as erratic monsoon.

"People believe that snow is melting rapidly. And, nearly 60 pc of the households said that species were flowering earlier. In addition, birds were moving to higher altitude and were also seeing new pests. The people are knowledgeable about the climate changes taking place", he said to stress his point as to why India and China have to pay special attention to conserve the Himalayas.

Thomas Lovejoy, renowned conservation biologist who coined the term biodiversity, in his key note address, explained how the forests in Western US forests were witnessing warmer summers and early snow melts. There was a need to revise conservation strategies, limit greenhouse gas concentration, revise the energy base for society, and reduce/eliminate deforestation.

In addition, Lovejoy said that efforts should be made to minimise climate change impacts by reducing other stresses.

The next five days of the conference will see talks by environment experts Nalini Nadkarni, Vojtech Novotny, Meg Lowman among others. For details log on to www.canopy2009.org

Data on Western Ghats

Ecologist and biologist Prof K N Ganeshaiah and his team uploaded a host of data including qualitative assessments of plants in the Western Ghats on to Jeevasampada module of www.ibin.co.in The page has primary data on plant resources on the Western Ghats. This is one of the largest ground-based exercise done in any part of the global hotspots to collect primary data on the plant resources, Ganeshaiah said.

DH News Service

The Hindu
27th Oct 09

7-22

Indian canopies are least explored, say experts

Staff Reporter

BANGALORE: The niche field of "canopy science" or the study of forest canopies – which sustain 75 per cent of the Earth's biodiversity – may have come of age globally but forest canopies in India remain largely unexplored, according to Gladwin Joseph, director of the Ashoka Trust for Research in Ecology and the Environment (ATREE).

Lack of technology such as crane installations and ropeways meant that the country's biodiversity hotspots in the Western Ghats, Andaman and Nicobar islands and forests of the Northeast remained inaccessible to scientists, Dr. Joseph said at the inauguration of the Fifth International Canopy Conference on Monday. Several countries including Malaysia, China, Brazil and Madagascar are investing in technology to aid the science, he added.

The six-day conference organised by ATREE brings together scientists from across the world who would present their research on forest canopies in different countries, their relationship to conservation, sustainable development and climate change.

In his keynote address on climate change, American conservation biologist Thomas Lovejoy said that the phenomenon was "no longer a matter of anecdote but statistically robust".

Tropical glaciers in Mount Kilimanjaro, for instance, were melting at a rate that suggested that they would disappear by 2015, he said.

Changes had been recorded in flora and fauna too with plants changing their flowering pattern, migratory birds migrating earlier or ceasing to migrate altogether, added Dr. Lovejoy, who is credited with coining the word "biodiversity".

Kamal Bawa, professor at University of Massachusetts, U.S. and founder of ATREE, said the Himalayas, where eight of the world's largest rivers originated, was most vulnerable to climate change. In the Eastern Himalayas, 74 hydropower projects were currently running, a number proposed to increase to 429, he said.

A WORD OF CAUTION: *Kamal Bawa (left), Professor, University of Massachusetts, Boston, Founder and President of the ATREE; Thomas Lovejoy, renowned conservation biologist; Margaret Lowman, Director of Environmental Initiatives and Professor of Biology and Environmental Studies at New College of Florida; and Raman Sukumar, Chairman of the Centre for Ecological Sciences, IISc., Bangalore; at the fifth International Canopy Conference in Bangalore on Monday.* – PHOTO: K. GOPINATHAN

Public lectures

On Tuesday, Meg Lowman, professor at New College of Florida, United States, is scheduled to deliver a public lecture on "Life in the treetops – exploration and discovery in forest canopies around the world".

Mark Moffett of Smithsonian Institution and the National Geographic will speak on "adventure among ants – a global safari with a cast of trillions" at another public lecture on Friday.

Western Ghats flora at fingertips

Staff Reporter

BANGALORE: Students and researchers can access all the information they ever wanted about the plants of Western Ghats – starting from their distribution, status to identification features and images. A new page on the Indian Bioresources Information Network website provides comprehensive data on Western Ghats flora collected during one of the largest field-based studies. The webpage was inaugurated on Monday at the Fifth International Canopy Conference organised by Ashoka Trust for Research in Ecology and the Environment.

7-23

HIMALAYAS ARE IN DANGER

Biodiversity specialist Margaret Lowman speaks on the threat to Himalayas, pluses and minuses of hot-air balloon experiments and the importance of canopy science

GAYATRI NAIR

For 30 years, she has designed hot balloons and walkways for tree-top exploration to solve the mysteries in the world's forests, with special expertise on the links between insect pests and ecosystem health. Margaret Lowman, Director of Environmental Initiatives and Professor of Biology and Environmental Studies at New College of Florida, has worked on canopy science to protect biodiversity. In an exclusive interview with Bangalore Mirror, she says Himalayas are facing a grave danger and the natural wall needs immediate attention. Here are excerpts:

Are Himlayas facing a potential danger from receding glaciers?

Himalayas are the hotspot for biodiversity. I agree with Prime Minister Manmohan Singh on his call for saving the Himalayan eco-system. Singh had expressed concern over anecdotal evidence that glaciers may be receding. In fact, I visited Himalayas along with 50 scientists last year to study that. If we leave the mountains without any precuationary measures, it may lead to danger. It is high time we get the best ecologists, economists and engineers to keep the mountain alive.

Which are the places in India you found interesting for your study?

I happen to visit forests across the world from Cameroon to Australia for my research. I found the Amazons very attractive for its sheer diversity so are the Western Ghats in India. The forests are both special and exciting because of the vast bio-diversity.

Why you are inclined towards canopy science?

I hail from Elmira, a small town near New York. As I did not have much to do there, I developed a liking for nature. I chose Biology in my degree and Ecology for Masters and did Ph D in Botany from Australia. There, my career advisor told me that if I wanted to study trees, the most rational thing to do is to climb, map and understand them. That's how I was introduced to this aspect of science.

Is it important to climb trees to learn canopy ecology?

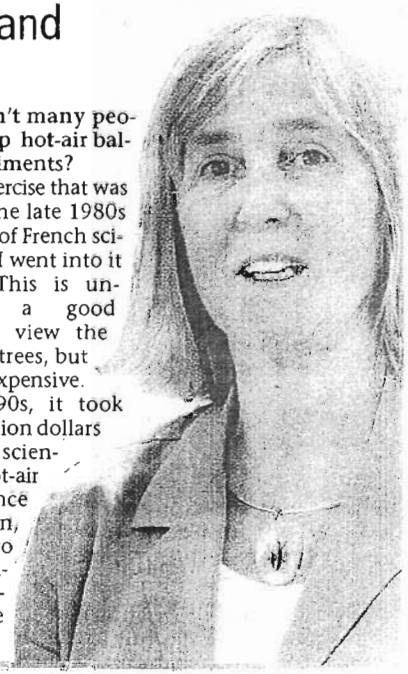
Yes, one needs to reach the top of the tree to learn canopy ecology.

> **IT IS HIGH TIME WE GET THE BEST ECOLOGISTS, ECONOMISTS AND ENGINEERS TO KEEP THE MOUNTAIN ALIVE**

Climbing till the middle of the tree will not teach anything. The most active part of the tree is its top that receives sun rays directly and has insects feeding on the leaves. That is why the leaves, fruits, and even birds' nests are up there. Once you learn the top part, you get to know about everything. Moreover, there are millions of insects living up there and to know about the tree and the ecology around it is important to learn about insects too.

Why haven't many people taken up hot-air balloon experiments?

It was an exercise that was started in the late 1980s by a couple of French scientists and I went into it in 1991. This is undoubtedly a good method to view the tops of the trees, but it is a very expensive. In the 1990s, it took about a million dollars to send 50 scientists on a hot-air balloon. Since its inception, only four to five such balloon expeditions have taken place.

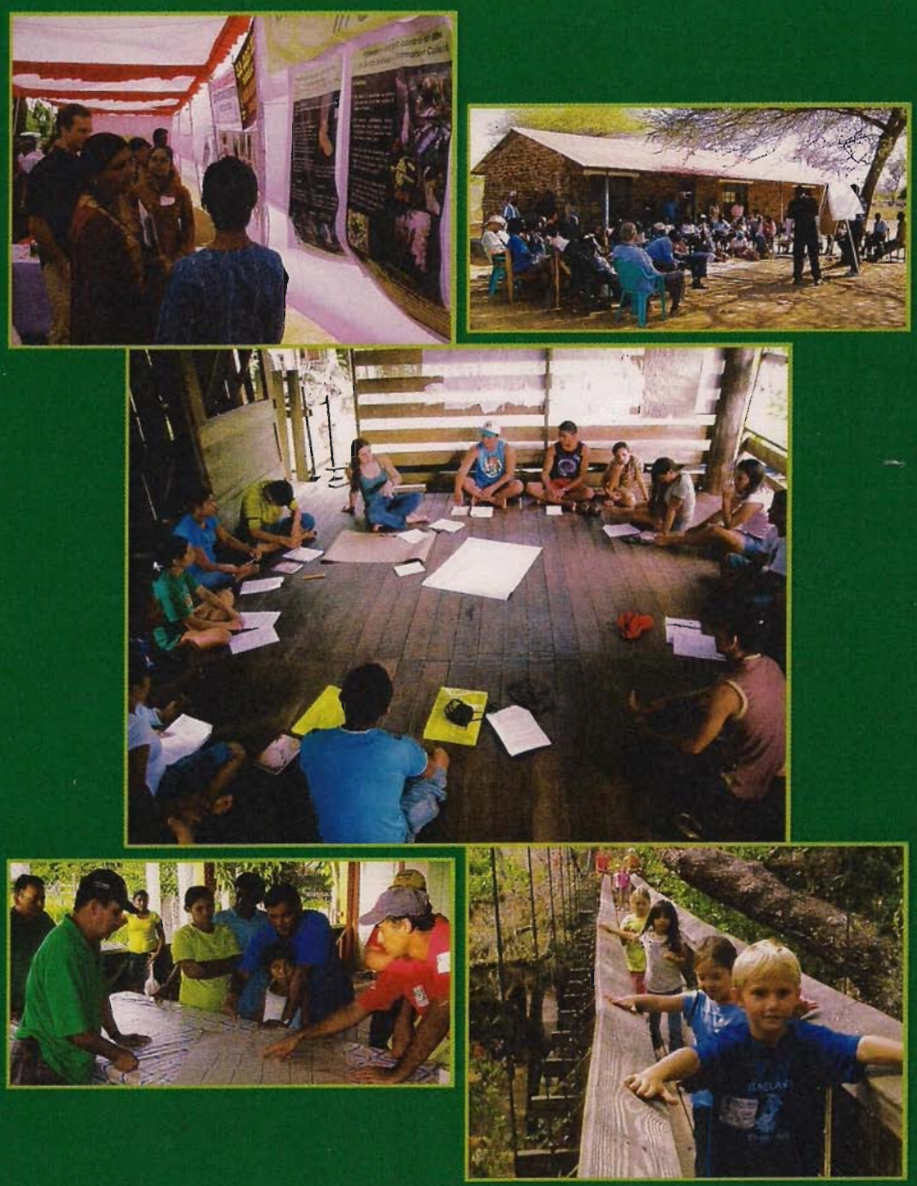


BIOTROPICA

THE JOURNAL OF TROPICAL BIOLOGY AND CONSERVATION

Volume 41 • Number 5 • September 2009

Special Section: Sharing Ecological Knowledge:
Conquering the Research-Implementation Gap



The Association for Tropical Biology and Conservation Inc.

Wiley-Blackwell

BIOTROPICA 41(5): 545–548 2009 10.1111/j.1744-7429.2009.00562.x

Canopy Walkways for Conservation: A Tropical Biologist's Panacea or Fuzzy Metrics to Justify Ecotourism

Margaret Lowman[1,2,3]

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[2] TREE Foundation, PO Box 48839, Sarasota, FL 34230-5839, U.S.A.

DESPITE EXTENSIVE SCIENTIFIC RESEARCH undertaken in tropical ecosystems over the last few decades, approximately half of tropical forests have been destroyed and rates of deforestation continue to accelerate worldwide (Curran *et al.* 2004). Thousands of indigenous cultures and millions of local people need these deteriorating forest resources for their livelihoods, and the challenges of tropical forest conservation looms as a global priority (Laurance & Perez 2006). Meanwhile, the conventional metric used to gauge the success of professional academics in tropical biology is the publication of technical papers, which seems all too disconnected from the metrics of forest conservation. A new consciousness is sorely needed (Leiserowitz & Fernandez 2008; but see Webb 2005, Büscher 2008). Most tropical biologists admittedly enter the profession with a hope to contribute to conservation of these systems, but their hundreds of thousands of hours dedicated to field research and publications do not seem proportional to reversing conservation. If conventional business formulae were applied to tropical research, a likely outcome would be downsizing the industry. New metrics that incorporate conservation benchmarks and facilitate sharing best practices between professional scientists and local stakeholders could foster forest conservation through actions that create sustainable economies.

Canopy research appeared to offer an ideal case study to examine the socioeconomic plus scientific metrics of success, with its spin-off ecotourism operations such as skywalks and ziplines providing data sets to quantify their benefits to local stakeholders (Lowman 2004a). In short, can canopy access tools contribute to local economies and stimulate forest conservation? And second, can projects that promote forest conservation provide acceptable metrics to gauge success among scientific researchers (see also Garnett *et al.* 2009, Sunderland *et al.* 2009)?

Canopy ecology is a relatively new component of tropical forest research, with a toolkit of creative access techniques developed over the last two decades (Lowman 2004b). Business ventures involving canopy exploration are often incorporated into large-scale eco-developments that include bird-watching, education-based nature tours, spas, and holistic medicine (Weaver 2001). These ecotourism opportunities usually meet with generic approval under the guise of 'green businesses'. In this commentary, I grapple with the apparent oxymoron of working as a biological researcher yet building canopy walkways to achieve conservation. Such structures are not the conventional metrics of academic success, but can conservation actions gain traction as metrics of success in our admittedly rigorous academic community of scientists?

Ranging in cost from US$100 to US$3000/m, canopy walkways generate revenues for local stakeholders, and provide ecology education to a broad visitorship (Lowman & Bouricius 1995, Lowman 2004b). Over 20 canopy walkways currently operate in tropical forests around the world serving research, education, and ecotourism (Lowman 2009). Most sites are operated by local stakeholders without sophisticated spreadsheets to quantify their operations. Some sites received initial grants from NGOs or other well-meaning organizations in developed countries to undertake construction in the name of conservation, and others attract 'operators' from developed countries that spawn additional ecotourism activities, thereby making the metrics of the canopy attraction impossible to analyze in isolation.

The first canopy walkway in the world was built in Lamington National Park, Queensland, Australia, at O'Reillys Rain Forest Lodge (Lowman *et al.* 2006). In a developed country such as Australia, one would expect a rigorous business plan calculating the economic success of this structure. However, when asked to provide metrics about the economic success of his skywalk, owner Peter O'Reilly commented, 'I am certain that the canopy walkway contributed greatly to the increase in visitors to our lodge. But it is impossible to isolate the walkway from other amenities that were built simultaneously—improvements to the road, our liquor license, expanding the dining services, and better marketing. We could not create metrics to assess it (canopy walkway) in isolation, but we locals felt strongly that it was critical to our ecotourism success'.

In short, the Australians could not generate enough data to satisfy even a brief note in a journal, but yet they are intuitively confident that their walkways aided conservation. If an expertly run business in a developed country cannot provide accurate metrics about the exact formulae for commercializing rain forest conservation, then how can indigenous villages do so?

Today, over 1.6 billion people from all cultures and all walks of life participate in different avenues of tourism, spending over US$2 trillion (Hawkins & Lamoureux 2001). On a global scale, ecotourism is growing because of its international appeal, educational opportunities, and social appeal to advocate a conservation ethic. As human-dominated ecosystems become the norm,

Received 12 January 2009; revision accepted 23 January 2009.

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ecological research and its education outreach through ecotourism become critical at both continental and local scales to inspire the sustainability of earth's dwindling resources (Palmer *et al.* 2005, Peters *et al.* 2008). Canopy research promotes forest conservation at three scales: through biological discoveries published in the scientific literature, by offering innovative sustainable economic opportunities for local stakeholders such as canopy walkways, and through educating a broader visitorship through ecotourism. Despite the existence of over 20 canopy walkways around the world for research and education, and several dozen more for ecotourism alone, accurate records are not often kept by local operators. In addition, local labor and materials mask the true costs of the structure; other amenities cloud the ability to isolate economic metrics; and the broader-scale impact of educating a global audience of visitors is not easy to quantify. Although Büscher (2008) reminded conservation biologists not to ignore their 'rigorous empirical research' training, should we sometimes rejoice about conservation 'wins' such as canopy walkways despite a lack of rigorous data sets to justify their existence (see also Sunderland *et al.* 2009)?

AMAZON CASE STUDY

In the Amazon, tropical rain forests are disappearing at unprecedented rates. But the Amazon provides essential ecosystem services on a global scale: pollination, flood control, carbon sequestration, regulation of fresh water, regulation of atmosphere, amelioration of disease, genetic libraries that include food and other biodiversity, and prevention of soil erosion (Foley *et al.* 2007). Almost 10 yr ago, nearly 15 percent of the Amazon basin was already cleared (Nepstad *et al.* 1999). Perhaps more urgently than other tropical forests, economic incentives for local stakeholders to conserve forests in the Amazon represent a win-win.

In 1993, a canopy walkway was constructed along the Sucasari tributary of the Rio Napo downstream from Iquitos, Peru (Table 1). Hardwood canopy trees were utilized as supports for a series of 13 connected bridges, at a cost of approximately US$100/m (P. Jenson, pers. comm.). With the use of local labor and materials, this cost was significantly less expensive than structures built on telephone poles or other imported structures that can cost up to US$3000/m (http://www.canopyconstruction.com). Explorama Lodges, partnering with CONEPEC (a Peruvian conservation group), maintains this canopy walkway as an ecotourism and research destination called Amazon Conservatory for Tropical Studies (ACTS). In 2007, 2625 eco-tourists paid US$150 to tour the canopy, totaling US$393,750 (with approximately US$30/person distributed to travel agents). The remaining profit (estimated at US$315,000) and associated services provided jobs for approximately 212 local villagers representing over 100 families (P. Becur & P. Jenson, owners of Explorama Lodge, pers. comm.). Over 8000 visitors come to Explorama annually; by rough calculations at US$150 per visitor, gross revenues for the walkways exceed US$1 million. This not only employs local people but also provides career livelihoods from ecotourism instead of logging (Fig. S1). Even more difficult to quantify, this cadre of international visitors return to their home countries with a first-hand education about the complexity of tropical rain forests. The ACTS walkway also inspired a major science education program called the Jason Expedition, where approximately 3 million middle school students around the world studied canopy ecology via satellite technologies (Lowman *et al.* 2006; http://www.jason.org). As a consequence, the ACTS walkway is now the destination of choice of countless teachers, families, and school groups (http://www.environmentalexpeditions.org). The metrics are fuzzy, but the conservation success is evident.

TABLE 1. *Metrics for three canopy walkways illustrating the variability with regard to obtaining accurate metrics from which to gauge success. Potential benefits: 1 = conservation education; 2 = income; 3 = employs locals; 4 = reduced logging or clearing pressure. Potential drawbacks: 1 = destruction of local ecosystems; 2 = extinction of species; 3 = addition of human infrastructure; 4 = no drawbacks observed.*

Site	Samoa	Peru	Florida
Initial cost	US$75,000	US$250,000	US$120,000
Visitors	~240/yr	> 8000/yr	> 298,749/yr
Revenue/yr	~US$12,000[a]	US$1.2 million[b]	~US$750,000[c]
Major benefits	2, 3, 4	1, 2, 3, 4	1, 4
Drawbacks	4	4	3
Reference	Elmqvist *et al.* (1993)	P. Jensen & P. Betencur, pers. comm.	Lowman *et al.* (2006)

[a]Walkway organizer Paul Cox estimated a revenue of US$12,000/yr. With a fee of US$50 per visitor, the estimated number of visitors was calculated based at 240.

[b]Explorama charges US$150 for a one-day trip to their walkway. If 8000 lodge visitors paid this fee, the revenue would be US$1.2 million. But again, this revenue has many ancillary costs attached. A better metric might be to cite employees, '200 families who do not earn their living by cutting down trees to provide their food or earn their money to survive' (Peter Jensen, co-owner of Explorama Lodges).

[c]Approximately 300,000 visitors come to the park in 2005; if each car holds two visitors, the revenue (at US$5/carload) is estimated at US$750,000. Obviously many factors such as weather and family size and marketing will influence these estimates. Hence, even at a state park in a developed country, it is difficult if not impossible to calculate the isolated economic benefits of one ecotourism operation in the midst of a region with existing tourism. In short, rigorous metrics are hard to come by.

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FLORIDA CASE STUDY

North America's first public canopy walkway was constructed in Florida in 2000 (Table 1). Similar to tropical rain forests, the subtropical hammocks of Florida are declining due to human activities, and hence conservation education was an important goal. Built in 10 d, the Myakka River Canopy Walkway cost US$90,000 for a 33 m bridge (approximately US$3000/m) connecting two platforms, plus approximately US$30,000 for a tower (Lowman *et al.* 2006). Maintenance has been minimal with the exception of graffiti cleaning (P. Benschoff, pers. comm.). Perhaps the biggest success of the Florida canopy project was a significant increase in park visitorship. During a decade where visitors to both state and national parks declined precipitously (Louv 2005), the Myakka state park visitorship increased by at least 26 percent from 236,552 in 1995 to 298,749 in 2005, including repeated visits by local schools, churches, and other citizen groups to the walkway. On weekends, volunteers have logged up to 200 canopy visitors/h (totaling over US$500 in gate fees at US$5/car and assuming two people/carload). Despite best efforts, even Florida state government math was fuzzy for the skywalk. Issues such as staff shortfalls, weather, cutbacks in park infrastructure, and inability to separate walkway visitors from fisherman or boaters precluded a rigorous analysis. Like its Australian counterpart, the Myakka walkway has proven enormously successful in education outreach (http://www.treefoundation.org).

Despite its shortfall in rigorous metrics, canopy access has been embraced by local stakeholders as an economic opportunity for forest conservation. Two priorities are important as tropical forests continue to undergo deterioration: (1) promote a new ethic, whereby biologists are encouraged to contribute their tools and discoveries to inspire sustainable economic ventures for local stakeholders; and (2) configure metrics for success in conservation activities in terms of socioeconomic as well as scientific acceptance. When constructed and operated locally, canopy access systems may inspire useful outcomes: to facilitate critical ecological research, to bolster local economy, to inspire environmental education, and ultimately to encourage forest conservation at both local and global scales.

ACKNOWLEDGMENTS

Thanks are due to the operators of the canopy access sites in Western Samoa, Peru, and Florida who scrambled to collect some metrics for their ecotourism operations, despite the enormity of this request. Also, thanks to the following community foundations: TREE, Triad, Gulf Coast, Selby, Schoenbaum, and Seacology, who have funded canopy walkways and outreach to foster conservation and education in local communities.

SUPPORTING INFORMATION

Additional Supporting Information may be found in the online version of this article:

FIGURE S1. Willy Sanchez Flores, a local villager from the Rio Napo region in Peru, supports his family with employment as a fulltime guide for a growing local ecotourism industry centered around the canopy walkway.

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THE OPR
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LIVE YOUR BEST
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Let Your Life Take Flight

To quote one of O's favorite philosophers, Eckhart Tolle: **"Life is an adventure, not a package tour."** It's easy, though, to look at your dreams and see only the obstacles to realizing them. Stepping off the well-worn path and veering into the unknown is scary...and wonderful! 7-30

Photograph By Chris Craymer

This month we're celebrating adventure. By that, we don't mean dropping everything and lighting out for Everest but rather something simpler: letting your curiosity out for a romp. Taking your passions for a spin. Adventure is a new class, a road trip, a conversation with a stranger. It's expanding your horizons, even if only by an inch.

Adventure is anything that excites and stimulates, charges or recharges. Exploration and discovery are not just the province of a few brave, adrenaline-soaked souls—they delight us all. Adventure *is* life: Go live it!

7-31

Some months she could barely come up with the gas money to drive the 140 miles round-trip to the University of Central Arkansas, a trip she made four or five days a week. She worked odd jobs to pay for basics like groceries. "My house got pretty dirty because I'd ignore it to get schoolwork done," Gwen says. "So then I'd stay up all night to catch up on my housework. The kids got told 'no' more than 'yes,' because I was a starving college student." But in 2005, when Gwen walked across the stage to pick up her diploma, she could hear her children screaming: "Go, Mom! Go!" Later her daughter, Jordan, asked her what *cum laude* meant. Gwen was crying as she answered: "It means your mama did really good."

A year after she ea…gree, Gwen saw a po…fisheries job on mons…back was, I had to be…months at a time," sl…seemed the fulfillmen…to be out on the ocea…biology fieldwork. …money: $130 a day to st…raise each time she c…work. Gwen's ex-husl…the kids, although not…in front of them, for b…

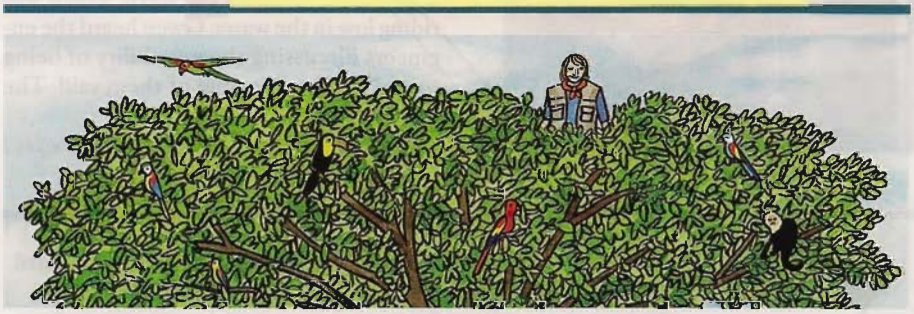
Gwen was torn bu…dream was finally with…to Alaska for three mo…ing alongside a crew o…them recent immigra…

ex-cons, during the summer and winter fishing seasons. After each stint, she'd present her data to the National Marine Fisheries Service in Seattle, then take a few months off before heading north again.

"MAYDAY. MAYDAY. MAYDAY. THIS IS the *Alaska Ranger*." Gwen stood in the wheelhouse listening in as Silveira made the first call to the coast guard. "We are a factory trawler," he reported. "We're 184 feet in length, black hull, white trim." It was 2:46 A.M.; the ship was about 140 miles west of the nearest fishing port, Dutch Harbor, in the Aleutian Islands, and 920 miles west of Kodiak, Alaska, where the coast guard picked up the call.

…pants, long…ad already…ne survival…ven if she…around at…wore only…e barefoot…nits.…wler. Each…e net into…e bottom…back up,…froze the…e, Pacific…onboard.…oat, Gwen…ized safety…ational ›

Oprah's Big Experience #2 ↓



{Big Experience #2}

SEEING THE WORLD FROM THE TOP OF A 16-STORY TREE

"It's like climbing to outer space. There are millions of undiscovered creatures in every nook and cranny. Some are two feet long, some smaller than a raindrop. At 165 feet up, I'm the first to see rain on the horizon. There are 1,000 shades of green, and I usually can't see the forest floor. Sometimes I stay overnight, and it's too much fun to sleep. The tree's strong architecture is very protecting. The swaying lulls me like I'm a baby. At night the insects chew and chirp—it's a symphony by Mother Nature, Times Square in the forest."

—

Tropical rainforest canopy biologist and conservationist Margaret D. Lowman, PhD, who began taking her two children up with her into the treetops when they were 4 and 6 years old

Ladies First

Thirty-four who dared to push the envelope.

600 B.C. TO 200 B.C. Tribes of statuesque women (and men) roam the Eurasian steppes. The fearsome Amazons of myth? Not exactly. But archeological evidence suggests that among these nomads, the women were the warriors.

CIRCA 39 Dynamic sister duo Trung Trac and Trung Nhi amass a Vietnamese army in a revolt against Chinese rule. For four years, they lead the rebellion.

CIRCA 395 Fabiola, a Roman aristocrat whose divorce and subsequent remarriage were condemned by Christian society, founds a hospital for the poor and other outcasts of her city. It's likely one of the first hospitals in the Western world.

CIRCA 1001 Murasaki Shikibu begins writing *The Tale of Genji*, an epic portrait of court life (twice as long as *War and Peace*), considered by many to be the greatest masterpiece of Japanese literature and possibly the world's first novel.

1429 Peasant girl Joan of Arc commands the French army in a series of victorious battles to liberate her homeland from the English; she is burned at the stake for her trouble.

CIRCA 1579 Grace O'Malley, a swashbuckling Irish pirate known for raiding ships, fights off an English government expedition sent to stop her.

CIRCA 1613 In her graphically violent painting *Judith Slaying Holofernes*, Italian artist Artemisia Gentileschi slays the ideal of submissive womanhood: Her heroine is fierce, powerful, and ruthless.

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5th International Canopy Conference 2009

Forest Canopies: Conservation, Climate change and Sustainable use

October 26th - 31st, 2009, Bangalore, India

Forest canopies are the least explored habitats in the world. They not only support high terrestrial biodiversity, but also represent a critical interface between the atmosphere and the earth. Forest canopies also provide goods and services to support diverse human activities. Thus interactions between forests and humanity offer opportunities to explore sustainable use of such resources, particularly for sustaining local livelihoods. Sustainability is vital for environmental policies to foster conservation, sustainable use and mitigation of and adaptation to climate change. This demands the integration of canopy science with natural science, social science and information technology.

The 5th International Canopy Conference in 2009 will bring Biologists, Climate change Scientists and Socio - Economists together to build inter-disciplinary links in canopy science that will foster increased understanding of this unique subset of forest ecosystems.

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11 Oct 2010

Virtual and real nature

There is one important difference between ecology and many other fascinating sciences and games: unsolved problems of chess, astronomy, or mathematics will not change if we ignore them. Our activity or lack of activity can alter the state of ecology.

— Lawrence B. Slobodkin, 2003

Achieving environmental literacy is vital in the 21st century. As global environmental challenges loom at an unprecedented magnitude, we are fast approaching tipping points that threaten to irreversibly damage Earth's living systems.

Yet, never before have humans had such a wealth of technology to achieve solutions at their disposal, allowing collaboration from virtually anywhere in the world, drawing ideas from multiple disciplines to process and analyze countless data points, and teaching the next generation to view our world in exciting, novel ways that inspire environmental stewardship.

Environmental scientists must seek to balance cellular vs. organismal biology, virtual models vs. real-time data, and science blended with policy. Future stewards will need skills in assessing, predicting, managing, and communicating the dramatic ecological and societal changes. However, a major stumbling block in training the next generation of practitioners is the challenge of effectively integrating technology with fieldwork.

While most senior ecologists were inspired by their training in the field, younger scientists are more familiar with virtual ecosystems through gaming, social networking, and computer models, sometimes leading to so-called "nature-deficit disorder."

How can environmental practitioners blend "hands-on" fieldwork with "cutting-edge" technology? This conundrum is the subject of ongoing debate. Those born after 1980 spend more time indoors with electronic devices than going outdoors to experience nature firsthand.

On a positive note, new programs are emerging to integrate virtual and real environments. The National Ecological Observatory Network (NEON) will conduct continental-scale environmental monitoring in situ, and their large databases will be accessible to students, citizen scientists, and policymakers (neon.inc).

At the North Carolina Museum of Natural Sciences in North Carolina, the new Nature Research Center, with its mission "to engage the public in understanding the scientific research that affects their daily lives," will house state-of-the-art research laboratories, accessible to the public, a three-story Daily Planet immersion theater, broadcasting field science from remote sites via video-streaming, and dedicated virtual and real meet-the-scientist activities (naturesearch.org).

Got TREES?

TREE Foundation is celebrating the 10th birthday of the Myakka Canopy Walkway by giving away 1,000 trees. If your nonprofit or community group would like 4-foot-high live oak trees, please contact Laura Peters at llpeters@comcast.net with your order. Co-sponsored by Turner Tree & Landscaping, TREE Foundation wishes everyone in Southwest Florida a shaded future!

These two examples illustrate the changing landscape for ecology education, and how technology can, and must, advance environmental literacy.

What does this mean for a 21st-century classroom? Today, we have the tools and digital resources for an education process unbounded by walls, where large volumes of information are readily available at our fingertips, or increasingly, in our pockets. Hand-held technologies such as smartphones and iPhone applications are increasingly available for educational use.

The big challenge for ecology education is not a lack of information, but a relevant context that will motivate the next generations of scientist to take up the challenges of ecological stewardship. Linking healthy ecosystems to economics and human health is one important stepping stone. Ecological services provided by nature range from food and energy to clean air and water. Nature shapes and is shaped by communities where people reside, and sustainability is best achieved by a blend of hands-on and virtual science education experiences.

Assignments and projects that require students to get outside, to develop curiosity, and to test hypotheses are an essential part of any curriculum, helping students appreciate the scale of environmental issues, and how ecosystem health integrates with human health to foster sustainability. If students confront local environmental issues that affect their daily lives and then use virtual simulations to illustrate large-scale applications, then STEM (science, technology, engineering, and mathematics) education becomes more relevant.

Building bridges between the virtual and real environments, among scientists and citizens, and spanning ecology and economics are some of the central issues in this month's Ecology and Education Summit entitled "Environmental Literacy for a Sustainable World" (esa.org/eesummit), organized by more than 20 national organizations. Stay tuned as scientists work with economists, educators, and policymakers to create and implement an action plan to raise ecological literacy throughout our communities.

Meg Lowman, longtime Florida scientist/educator, is now establishing the nationally acclaimed Nature Research Center at the North Carolina Museum of Natural Sciences, with its mission "to engage the public." Her column will be appearing monthly on these pages. Web: www.canopymeg.com

TREE HOUSE

THE FIRST MULTI-LEVEL OUTDOOR LEARNING CENTER

EDUCATION, EXPLORATION, AND RESEARCH

ENGAGING EDUCATION

Interact with learning tools! Binoculars, telescopes, learning boards and microscopes all enhance the hands-on TREE House experience.

OUTDOOR AWARENESS

Draw attention and interest to the parks, preserves, and wildlife institutions in our unique Florida ecosystems.

ATTRACT NEW VISITORS

Like the Myakka Canopy Walkway, TREE House will attract visitors on a local and global scale.

TREE FOUNDATION

TREE HOUSE

WHAT IS TREE HOUSE?

TREE Foundation Inc. is developing the first multi-level outdoor learning center; a community "TREE House" in Sarasota, Florida. This project will promote environmental education and conservation while offering an outdoor structure for people of all ages interested in a hands-on learning approach to the environment and Florida's unique ecosystem.

WHO WILL LEARN AT TREE HOUSE?

TREE House is a multi-level outdoor learning center aimed at helping connect children, students, Florida residents and tourists alike to the environment in an enjoyable and educational manner.

Combining the amusement of an outdoor playground with numerous learning tools such as binoculars, telescopes, learning boards, and microscopes, TREE House will draw people's attention to the outdoors.

LEND A HAND: DONATE TO TREE

Thank you for your interest in supporting TREE Foundation. You can help us today through a donation by mail or visiting:

www.treefoundation.org/donate

Checks and money orders can be sent to:
TREE Foundation, Inc.
P.O. Box 48839 Sarasota, FL 34230-5839

TREE: EDUCATION, EXPLORATION AND RESEARCH

In June of 2000, Tree Foundation helped create the Myakka Canopy Walkway in Myakka River State Park. Today the twenty-five foot tall and eighty-five foot long walkway - along with a seventy-four foot tall tower - helps draw 250 to 300 thousand people to Myakka River State Park annually. Since 2000 TREE Foundation has continued to pursue environmental education projects like the canopy walkway on both a local and global scale. TREE House will continue this environmental initiative.

IT'S FOR THE KIDS

TREE House will serve as the go-to destination for youth education. As both an outdoor classroom and a field trip site, TREE House will connect kids of all ages to the environment and foster an interest in learning like no other educational tool.

TREE Foundation Website Updates (October 2010)

Over the last year the TREE Foundation website has benefited from some updated design enhancements, new content, and visibility on popular social networks such as Twitter, Facebook, and YouTube. Below are a few examples of what's new on the TREE website. (Screen captures of the new content are located on the second page.)

- **1 – Canopy Education Section**
  This section contains a growing list of games, posters, graphics and other material to assist teachers and students with rain forest ecology teaching and outreach.
- **2 – Bromeliad Monitoring**
  The third grade class at Pine View monitor the bromeliads at Myakka River State Park throughout the school year for signs of weevil feeding. The students take notes and submit drawings of their observations. The data is then posted on the TREE website.
- **3 – TREE's 10th Anniversary**
  During the celebration of the TREE Foundation's 10th Anniversary, a tree-planting project was launched. For every $100 donated to the Myakka canopy walkway or TREE's environmental education program, two trees would be planted. Donations are able to be made using the website's online donation system.
- **4 – Copenhagen Climate Change Summit (COP15)**
  As Meg traveled to Copenhagen for the United Nations Framework on Climate Change Convention, her daily experiences were tracked via blog, Twitter, and Facebook.
- **5 – Church Forests of Ethiopia**
  Meg's daily adventures during her recent trip to Ethiopia to survey the biodiversity of the church forests were posted on the website, blog, Facebook and Twitter. Photo galleries and videos were added to enhance the content. Other technologies used included Google Earth and YouTube Playlists.

1 - Canopy Education Section

CANOPY EDUCATION

Below you will find a list of games, posters, graphics and more that may assist teachers and students with rain forest ecology teaching and outreach. (These can be downloaded, but please be sure to acknowledge Dr. Meg Lowman and National Science Foundation for their use, and do not use them for sales purposes.)

- Organisms of the World – This poster illustrates biodiversity worldwide. The relative size of the organisms represents their biomass (translation: weight) on the planet. In other words, beetles comprise the largest weight of any group of organisms on Earth! In comparison, human beings are a relatively small amount of the weight of all organisms on Earth. Enjoy studying the relative importance of different organisms according to their biomass
- Cycles PDF – This poster illustrates the major ecological cycles for rain forests. This poster is printed in English and also in Spanish (coming soon), depending on which is most useful for your classroom. Nitrogen, water, energy and carbon all represent important cycles in forest ecosystems.
- Rain Forest Benefits PDF – Rain forests have important benefits to people all over the globe, even those of us who live far away from these ecosystems. Look around your classroom and household-- you will find many ways that rain forest products affect your everyday life. Memorize at least 5 major functions of rain forests, and discuss these with your science class.
  (Spanish Version PDF)
- Bromeliad Beetle Poster PDF – This poster illustrates research on the bromeliad beetle, called the Nutmeg Beetle, in the canopies of Amazonian Peru. This beetle was discovered during Jason X and is written up in the book, Its a Jungle Up There (written by Meg Lowman and her 2 sons, Edward and James Burgess – published by Yale University Press, 2006). In scientific conferences, students often create posters to display to other students and scientists in order to share discoveries and ask questions.

Additional activites and educational tools are available on the Out on a Limb exhibit activites page here.

2 - Bromeliad Monitoring

Pine View Weevil Watchers

Pine View Third Grade Class
Osprey, Florida

Instructor: Denise Fugere

THE MISSION

An evil weevil (Metamasius callizona) has spread across south Florida, and along the way, has been eating up Florida's native bromeliads! The weevil must be brought under control; and to do that, we need to know what the weevil and the bromeliads are doing, out in the real world.

So your mission is to go to Myakka River State Park and locate a tree with bromeliads. You are to observe these bromeliads throughout your third grade school year. Watch for the weevil! Look for signs of weevil attack on your bromeliad; look on the ground around your tree for fallen bromeliads, and search them for weevils! Maintain a sharp eye, and take good notes on all of your observations.

THE DATA

- Class of 2008-2009
- Class of 2007-2008
- Class of 2006-2007
- Class of 2005-2006
- Class of 2004-2005
- Class of 2003-2004
- Class of 2002-2003
- Class of 2001-2002

3 - TREE's 10th Anniversary

1000 TREES for 2010

April 19th, 2010

TREE Foundation is celebrating its 10th birthday in 2010, as well as the 10th anniversary of our flagship project, the Myakka River State Park canopy walkway. Over the past 10 years, thousands of visitors have learned about forest canopies by walking through the treetops, and hundreds of thousands of additional visitors to our websites have learned about forest conservation. In honor of our decadal birthday, TREE is launching a tree-planting project for southwest Florida. Beginning on April 22 (Earth Day), TREE is partnering with Turner Tree and Landscape of Bradenton, Florida to plant out four-foot high native live oak trees (*Quercus virginiana*) at sites that need greening. For every $100 donated to the canopy walkway or to TREE's environmental education programs, two trees will be planted in your honor. This project will not only add much-needed canopy shade to southwest Florida, but it will also boost our environmental programs with your generous contributions. Thank you, Turner Tree and Landscape, for this partnership!
Thank you for your support of Tree Research, Education and Exploration!

Donation information

4 - Copenhagen Climate Change Summit

Windmills offshore from Copenhagen

Meg stands in front of an inflatable earth representing one ton of CO2 emissions

The lunch area of Bella Center

President of COP 15, Connie Hedegaard addresses the Parties in a plenary session

Demonstrations in Copenhagen

5 - Church Forests of Ethiopia

Conservation of Ethiopia's Church Forests

May 26th, 2010

The ecology of Ethiopia is vastly understudied and also degrading rapidly due to human activities. Much of the natural landscape has been cleared for agriculture, with one notable exception: the sacred landscapes surrounding churches. These church forests comprise local as well as global "hotspots" as critical conservation areas for a large portion of Ethiopia's remaining biodiversity. Vegetation surveys of church forests indicate that church forests house a large proportion of the endangered plant species of Ethiopia. Church forests provide important ecosystem services to local people, including fresh water, pollinators, honey, shade, and spiritual value. In January 2009, we forged a partnership with the Christian Orthodox clergy to conserve their church forests.

We propose two goals: 1. to survey the biodiversity of insects in Ethiopian church forests, creating relatively inexpensive, replicable protocols that can be utilized by local children; and 2. to fund simple perimeter delineation (aka, fences) thus preventing further shrinkage of church forests from human activities. Further, we will place special focus on assessing the ecosystem services that insects contribute to these remaining fragments of tropical forest ecosystems, creating a strong case for local conservation initiatives. Throughout our field work, we plan to engage local Sunday school children as future stewards of these church forests, utilizing the church infrastructure to educate and inspire local stakeholders about their local biodiversity. Results of the ecological surveys will be published in appropriate international journals, but a conservation plan utilizing the church (especially Sunday school children) as a focal group will also be disseminated, reflecting a culturally-sensitive solution.

More info: Biodiversity of Ethiopian Church Forests Summary 2010 PDF

Debresena church forest- South Gondar, Ethiopia
(Picture from Google earth)

Ethiopia Trip Sponsors: National Geographic, TREE Foundation, and NC Museum of Natural Sciences.

Ethiopia Church Forests 2010 Video Playlist: