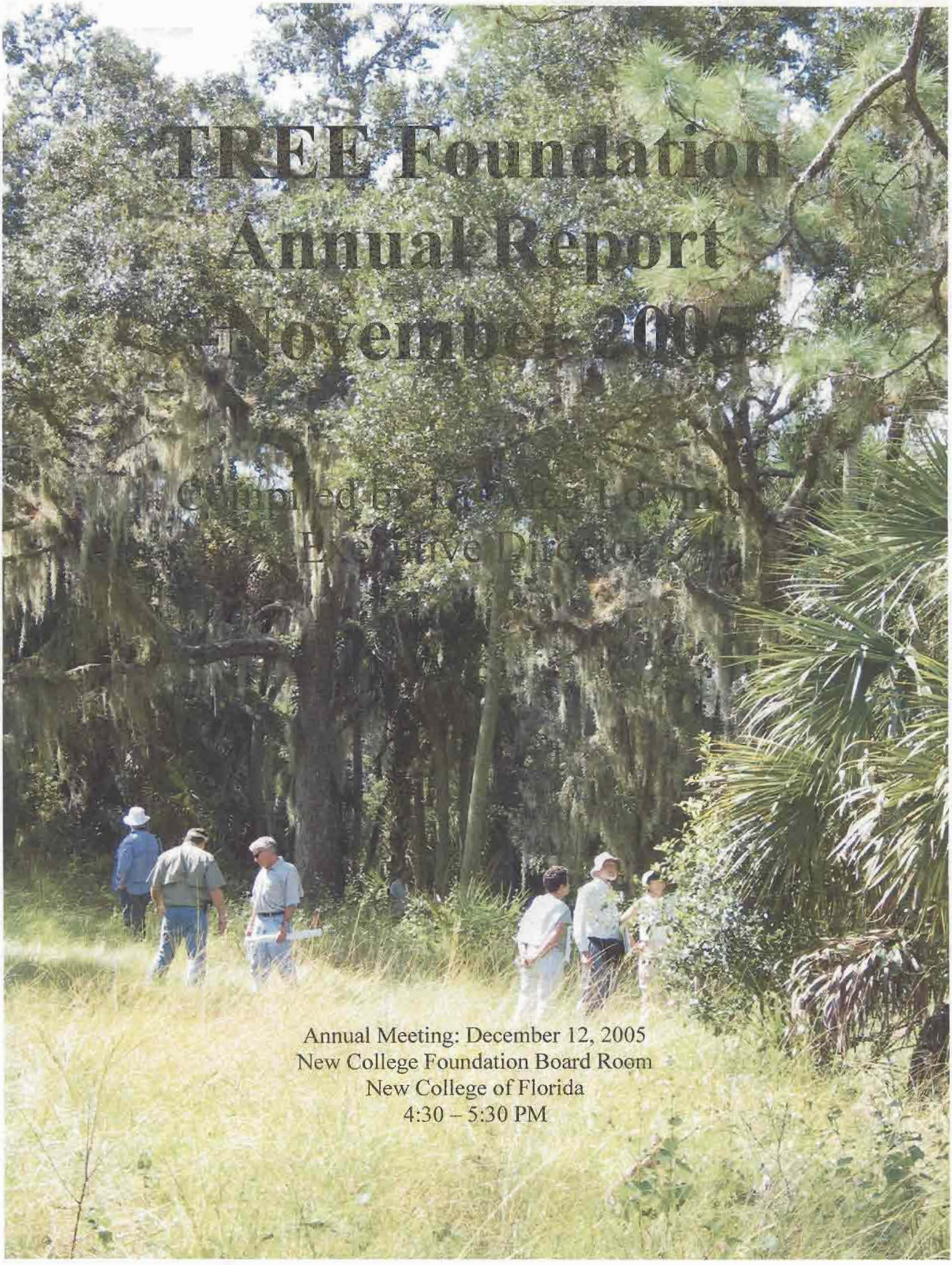

TREE Foundation
Annual Report
November 2005

Compiled by [illegible]
Executive Director

Annual Meeting: December 12, 2005
New College Foundation Board Room
New College of Florida
4:30 – 5:30 PM

TREE FOUNDATION

President, Gerri Aaron • Executive Director, Margaret Lowman, Ph.D.

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Director of Environmental Initiatives
Professor of Biology and Environmental Studies
New College of Florida
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Sarasota FL 34243

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

SUMMARY This has been a wonderful year for the TREE Foundation, as our programs in tree research, education and exploration expand and bear fruit. During our initial burst of activity in 1999-2001, the Foundation built the Myakka canopy walkway, initiated education programs in the canopy, and funded travel for 24 disadvantaged youth to the Amazon. During 2004-2005, we have successfully received grants from the TRIAD Foundation, National Science Foundation, Community Foundation, and New College of Florida. Our programs have expanded significantly to reach thousands of residents, students and public visitors to natural areas of southwest Florida. Our publications have been read by thousands of readers, scientists and policy-makers comprising an international audiences. Our new offices have opened on the campus of New College, and a small infrastructure is now in place to mazimize our outreach with very little overhead.

Under the leadership of President Aaron and Executive Director, Dr. Meg Lowman, we are expanding in all three major areas of our programs. Never has the need for science outreach been so great among student and public audiences, and never has the mission to discover the secrets of our forest ecosystems been so urgent. We are grateful to our supporters who have made TREE undertakings so successful.

Local Canopy Ecology Activities

1. Led 10 educational walks for the public on forest ecology, and trained over 20 student guides; obtained Community Foundation grant to purchase AV equipment for outreach lectures
2. Hosted workshop funded by TRIAD Foundation to create Biological Field Station in southwest Florida, with focus on canopy ecology and land use studies; obtained Economic Development funding to undertake green design architecture workshop in 2006

International Canopy Ecology Activities

1. Hosted two interns from tropical countries – Panama, Peru
2. Attended 4th International Forest Canopy Conference in Leipzig, Germany during July 2005 with 3 students; and Ecological Society of America in Montreal, Canada during August 2005 with one student.

Public Science Outreach about Forest Canopies

1. Hosted two community lectures – Dr. Mark Moffett on Forest Canopies and Dr. Dayna Baumeister on Biomimicry
2. International Center for Canopy Ecology – maintenance of files, office and education outreach programs at new office in Keating Center, New College – funded by TRIAD Foundation
3. Canopy exhibits – obtained $75,000 from National Science Foundation to construct a canopy exhibit and kiosk to circulate to regional schools, science museums, malls and festivals
4. Undertook newspaper column to educate public about natural history

LOCAL Canopy Ecology Activities

1. Led over 10 hikes ranging from 25 – 150 participants per hike to Red Bug Slough, Myakka River State Park, Carlton Reserve with approximately 20 trained student naturalists assisting from New College conservation biology and environmental education classes. A special ecology workshop was hosted for local middle school science teachers. Hike topics included:

It's a Bug's Life
Canopy Access Techniques
Leaf Detectives – Learning about Nature from Leaves
Natural History of Red Bug Slough
The Ecology of Florida Forest Canopies
Insect Sampling for Everyone

See attached:

- press release,
- survey data from one hike,
- feature newspaper article about student-led hikes,
- tabulation of canopy outreach lectures
- SOS (student outreach for schools) program summary whereby approximately 20 New College students have trained as naturalist guides and environmental education volunteers for local programs
- Grant acceptance letter from Community Foundation

2. Hosted workshop funded by TRIAD Foundation to create a Biological Field Station in southwest Florida, to attract intellectual capital to this region which is very understudied as compared to other national ecosystems; and additional funding to host a green architecture design workshop in 2006.

See attached:

- List of science advisory committee
- Agenda for meeing
- Map of county natural land areas
- Synopsis of slide presentation on Sarasota Field Station
- Newspaper column on Sarasota Field Station

SCGOVNEWS

Sarasota County Communications | scgov.net | 941.861.5000 | TV 19

Sept. 12, 2005

Media Contact: Pat Haire, (941) 861-6713, cell (941) 650-2850, phaire@scgov.net

Project Contact: Deborah Zeilman, (941) 861-6222, dzeilman@scgov.net

Take a Walk on the Wilder Side with Meg Lowman this Fall

For the second consecutive year, New College Professor of Biology and Environmental Studies Dr. Meg Lowman, in association with Sarasota County Natural Resources, will conduct a series of nature walks. Lowman, along with her students of Conservation Biology at New College, will demonstrate how scientists measure the landscape and sample insects, bird songs and the treetops of southwest Florida.

Three walks will be offered in September and October:

- 11 a.m. Saturday, Sept. 17, *It's a Bug's Life—Biodiversity in Our Own Back Yards,* at Red Bug Slough Preserve, 5200 Beneva Road, Sarasota. Walkers will meet in the parking lot on Beneva Road.

- 2 p.m. Wednesday, Oct. 5, *Life in the Treetops–Nature at the Canopy Walkway,* at Myakka River State Park, 13207 State Road 72, Sarasota. Walkers will meet in the parking lot of the park's walkway.

- 11 a.m. Saturday, Oct. 29, *A Bug's Eye View–Life Around a Wetland,* at Carlton Reserve, 1800 Mabry Carlton Parkway, Venice. Walkers will meet outside the ranger's hut near the main parking area.

According to Professor Lowman, the hikes are being offered at different times this fall to accommodate a range of guests, from seniors to families and students. Lowman said the hikes will not be cancelled for rain, unless lightning threatens.

Walks are limited to 50 people, so call to reserve a space. If a walk is filled, guests may choose the next available walk. Walkers should bring a light jacket, camera, sturdy shoes, a hat, sun screen, bug repellent and drinking water.

For more information or to reserve space, contact the Sarasota Call Center at (941) 861-5000 and ask about Professor Meg Lowman's upcoming nature walks.

-end-

Survey Data

Red Bug Slough Nature Walk, September 17, 2005

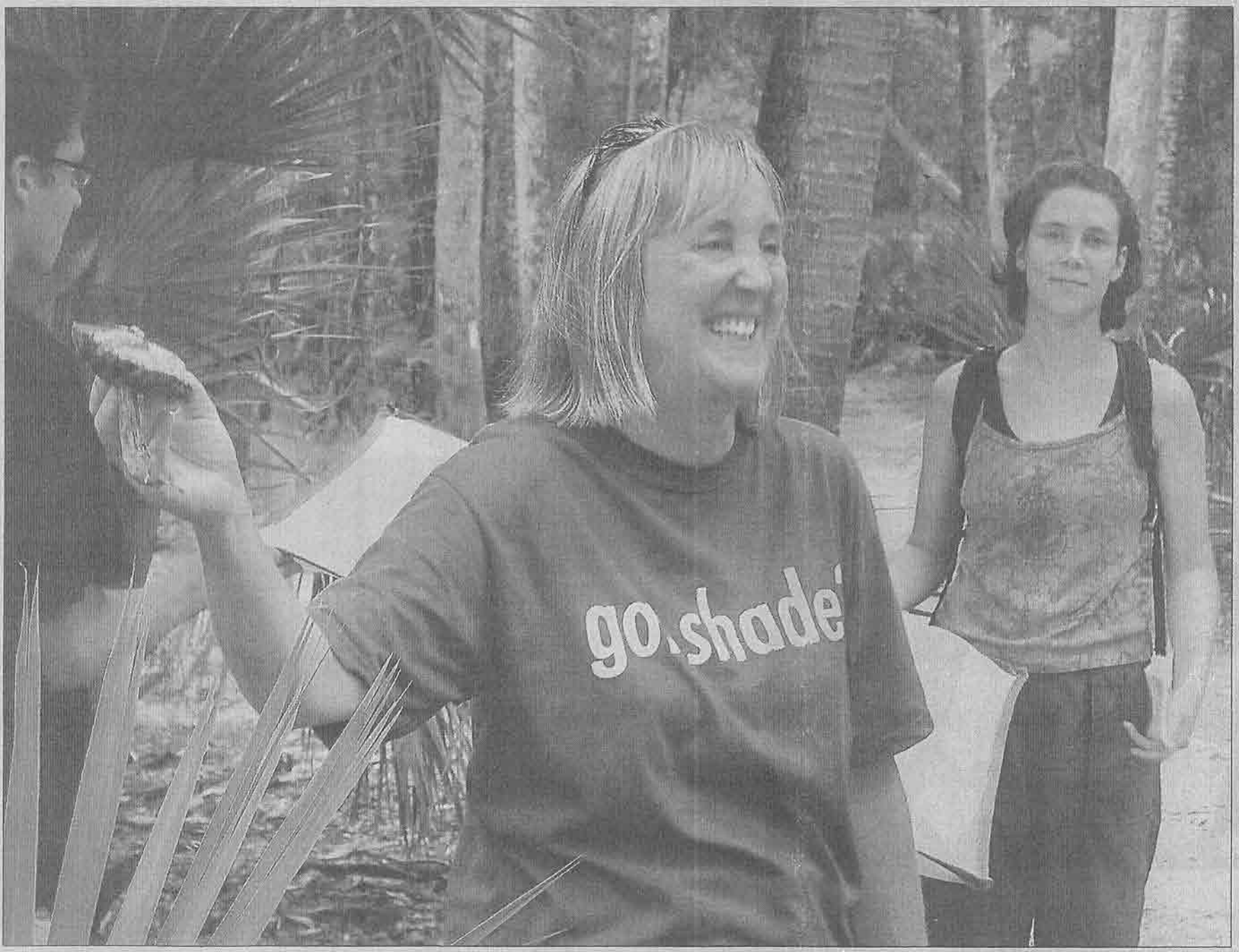
75 participants

Averages:

- Knowledge Before Walk: 2.9
- Knowledge After Walk: 4.2
- Rank Program: 4.3

Comments:

- I learned a lot and want to go again.
- Very good.
- I learned a lot.
- Would like longer time, more than 1 hour.
- I learned a lot and it was great.
- Excellent for adults and children longer, more in depth walks in the cooler season would be well attended, I'm sure.
- Loads of fun!! Great for kids, adults too - a wonderful way to learn about a special ecosystem.
- Dr. Lowman was wonderful, as usual, and her students were great guides for the public including young children.
- Great for all ages.
- Enjoyed very much.
- Excellent - I want to know more about the habitat in this area and you have piqued my curiosity.
- Sign up school volunteers or inmates to weed the invasive vines.
- Meg and her students were great!
- Prepare the field guide pages of plants with text on the facing page rather than on the backside of the photos.
- A great way to learn about what we've got right in our backyard - easily accessible and enjoyable for all ages.
- Enjoyed tree-climbing demo. Great book on growing upon isolated ranch country in Montana and married into that patriarchal society is *Breaking Clean*, like Australia! Great idea!
- This was great. I want to come out in another season.



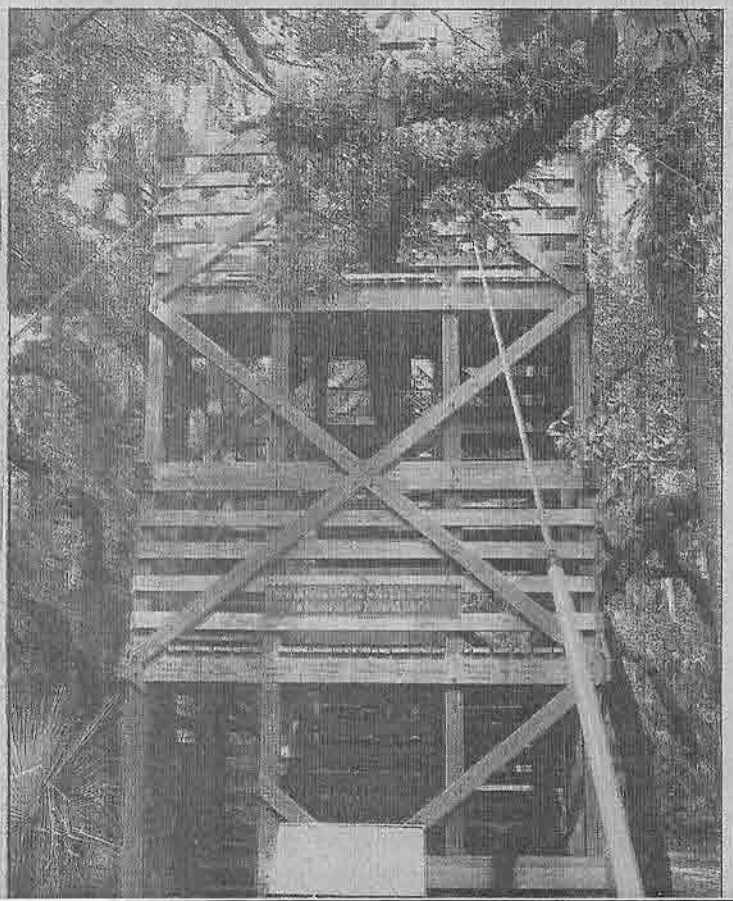
Dr. Meg Lowman of New College holds up a mushroom that appears to have been dined on by either a turtle or some other animal.

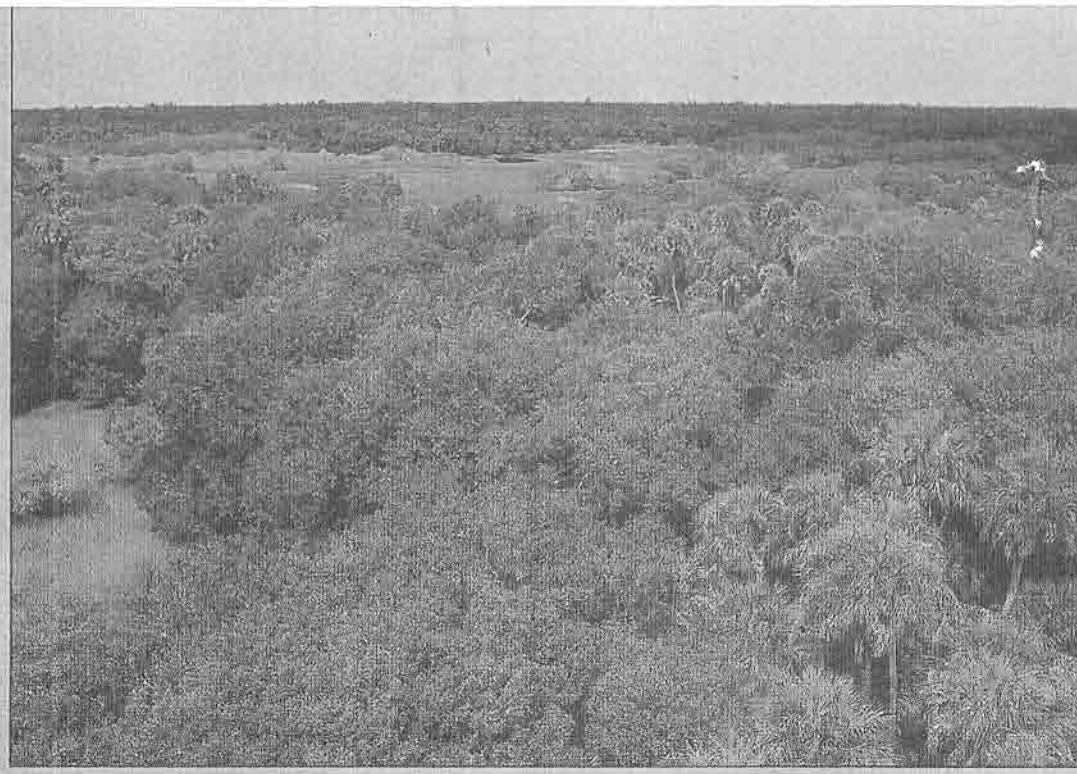
New College nature walks reveal local area's environmental treasurers.

When Dr. Margaret Lowman came to Florida, she was surprised to find out how much still isn't known about the biology of native Florida, and how even less is known about what lives above us.

Lowman, also known as "Canopy Meg," has been on a crusade to bring more attention to these areas that she is fascinated by. By exposing local residents to it, awareness is soon to be widespread.

"It was very surprising to me to discover that very few scientists had focused on professional research in the southwest Florida terrestrial ecosystems," she said. "Perhaps we underestimate the value of having a large university for attracting professional research.





If one's brave enough to climb the tower at Myakka River State Park, then he or she is rewarded with this incredible view.

"In this case, Sarasota County has never had a large university to bring in the intellectual capital that would be useful to make observations and monitory change in our important natural systems. It's a local treasure," said Lowman, a professor of biology and environmental studies. "We're getting a chance to study local things."

Lowman takes students from her conservation biology class from New College out to several state parks and lets them educate the public on local biology.

Lowman shares her knowledge to educate and share the wealth of these beautiful natural areas.

The canopy

Lowman was responsible

NATURE WALKS WITH MEG LOWMAN

Lowman's next nature walk will be A Bug's Eye View — Life Around a Wetland, at Carlton Reserve, Oct. 29, 1800 Mabry Carlton Parkway, Venice. Meet outside the ranger's hut near the main parking area. Walks are limited to 50 people, so call to reserve a space. If a walk is filled, guests may choose the next Nature Walk available. Bring a light jacket, camera, sturdy shoes, a hat, sunscreen, bug repellent and drinking water.

"We do indeed look at all the insects of the wetlands and surrounding vegetation," Lowman said. "Participants may need to get their feet wet since oftentimes it is knee deep in a few spots when traveling around this low-lying Carlton Reserve."

For more information or to reserve space, call New College of Florida at 359-4365 and ask about Lowman's nature walks.

walkways in South America.

"There's a whole treasure trove of research up there," she said.

Lowman studies epiphytes and other things living up in the trees. Some examples are orchids, Spanish moss and

treetops in the forests of othe continents, she settled in a the director of Marie Selb Botanical Gardens.

Lowman realized tha Florida's forests were a imperiled as many of the leg endary rain forests. Littl

NATURE from page 1B

"Education is most valuable when knowledge is shared, not when it is kept within," Lowman said. "By sharing their newfound knowledge about Florida natural history, the students become empowered to do more community service and to become better environmental stewards of these wonderful places."

She began studying Myakka's treetops with traditional methods that included ropes, ladders and pulleys. Then she devised a plan to build a walkway through the treetops, as had been done at several of her previous research stations.

By building a canopy walkway at a popular state park, she could not only carry out Selby's research objectives but also entrance the general public with conserving our planet's forests. Lowman had seen the declining interest of students in the sciences.

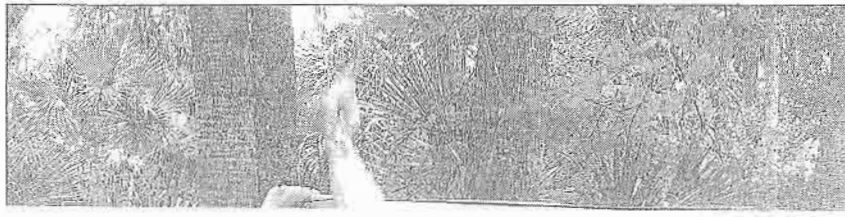
If teachers could involve their students in actual research projects at the walkway, not only would valuable data be gained, but perhaps the experience could forever change the way the students perceived the sciences and their natural world.

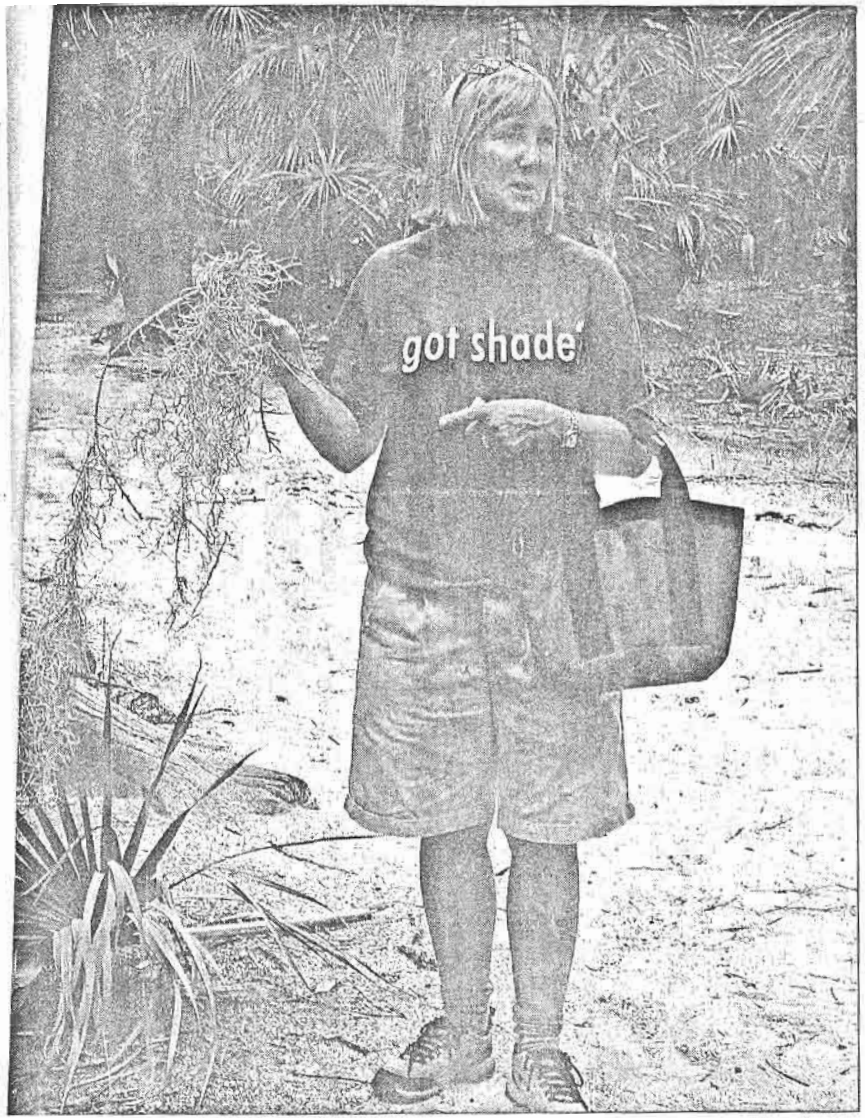
The Myakka Canopy Walkway provides easy access to observe life in the treetops of an oak/palm hammock. As an outdoor laboratory for research and education, it is a place for discovery and opportunity for visitors to Myakka to see its canopy inhabitants up close.

A conservation biology class from New College, headed by Dr. Meg Lowman, leads visitors to the canopy walk at Myakka River State Park.

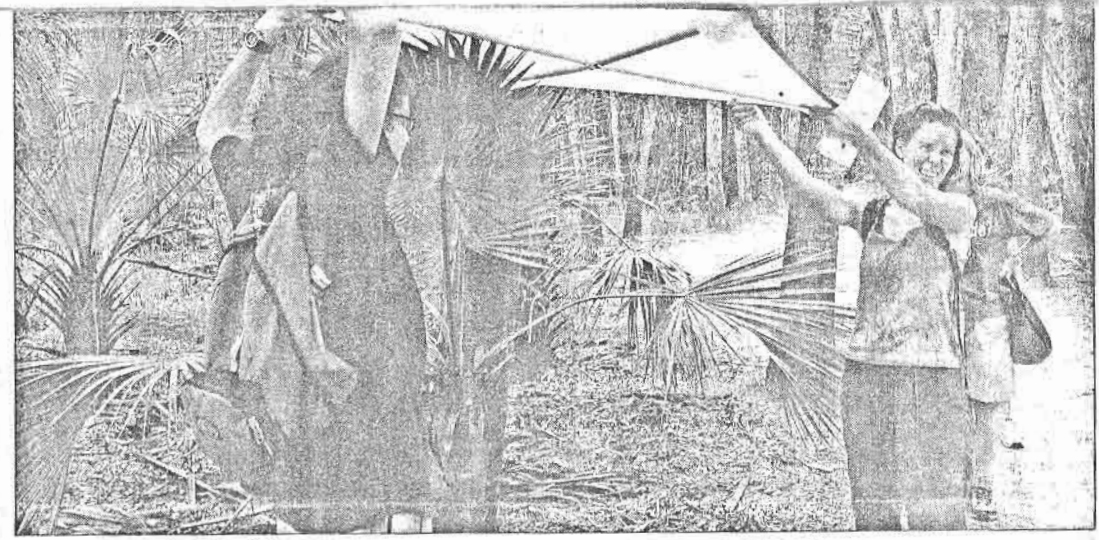
According to the TREE Foundation, the walkway is suspended 25 feet above the ground and extends 85 feet through the hammock canopy. A tower soars 74 feet in the air to present a spectacular view of treetops, wetlands, and the prairie/hammock interface. Visitors can look down on eagles, hawks, vultures and other birds in flight.

"Fifty percent of life on earth lives in the tops of





professor at New College, gives free guided walks in local parks.



Mikail Peterson and Amara Cocilovo demonstrate how a beating tray is used to collect specimens from trees.

trees," Lowman said to a group at Myakka River State Park. "We really missed the mark by having to walk on the ground."

The walkway proved its practical value with a shocking discovery a few months after it opened. An exotic weevil from Central America accidentally released in Ft. Lauderdale about 1990 had arrived in southwestern Florida. Wherever the weevil invades, it decimates bromeliads. Myakka is providing valuable information that may thwart the weevil.

The Myakka walkway is the result of a unique partnership among Selby Gardens, Friends of the Myakka River, TREE Foundation, and the Florida Park Service. The structure was completed and dedicated in June 2000.

Carlton Reserve

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For more information or to reserve space, call New College of Florida at 359-4365 and ask about Meg Lowman's nature walks.

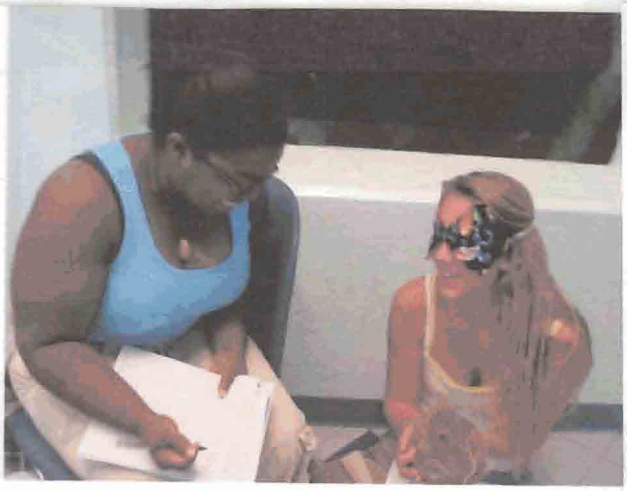
New College of Florida

Canopy Demonstrations / Lectures

Location (School, park)	**Number of classes**	**Total Number of Participants**	**Date**	**Age Group**
Sarasota Military Academy	2 classes	45 students	October 3rd	9th and 10th grade
Red Bug Slough	1 class	120 persons	September 17th	Children and Adults
New Gate School	2 classes	25 students	November 14th	4th-6th grade
Braden River Elememtary	4 classes	125 students	November 15th	3rd, 4th, 5th grade
Bay Haven School	7 classes	150 students	November 16th	K-5th grade
Bay Haven School Science Fair	3 classes	195 students and parents	December 2nd	K-5th and parents

The Story of SOS

SOS is a student-initiated, science outreach seminar program to enrich Sarasota County middle school students in environmental science. Under the advisory capacity of Professor Meg Lowman, who has conducted extensive science outreach through tpublic science lectures, the Jason Project in Education, and National Geographic, students offer community service and enhance science literacy in their community. SOS participants pursued a rigorous schedule of training, public speaking, and researching different environmental topics culminating in presenting hands-on lectures to K-12 students, with emphasis on middle schoolers. SOS students created lectures relating to different topics for twelve area schools with emphasis on Booker Middle School, local chapters of the Boys and Girls Club and Girls Incorporated, families via public nature walks on weekends, and Janie Poe after-school programs in Newtown. For each lecture students were required to: participate in three science outreach programs; create a written outline and self-evaluation; administer, and grade a minimum of one set of pre and post quizzes to the k-12 students attending their lectures. Assessment was based on creativity and participation; organization and lesson planning; teamwork; and a minimum of one teacher evaluation from a school teacher who hosted one or more of their visits. Students also completed a final exam by creating a group activity for a forthcoming teacher workshop of 10-20 science teachers.



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www.sarasota-foundation.org

THE COMMUNITY FOUNDATION
of Sarasota County

July 25, 2005

Ms.. Margaret Lowman, President
The TREE Foundation, Inc.
P.O. Box 48839
Sarasota, FL 34230

Dear Meg:

It is my pleasure to inform you that the Community Foundation's Board of Directors approved a grant to your organization for $11,000.00. This grant is for Sub-grants One, "Science Outreach to Students In Sarasota County" and Two, "Canopy Biology Outreach in Schools." Funds should be used only for these two Sub-grants.

This grant is through the **Eldon and Marge Herrig Family Foundation Fund and the Gilbert N. & Marjorie A. Parker Advised Fund of the Community Foundation of Sarasota County.** A thank you letter should be written to Mr. and Mrs. Eldon Herrig in care of the Community Foundation.

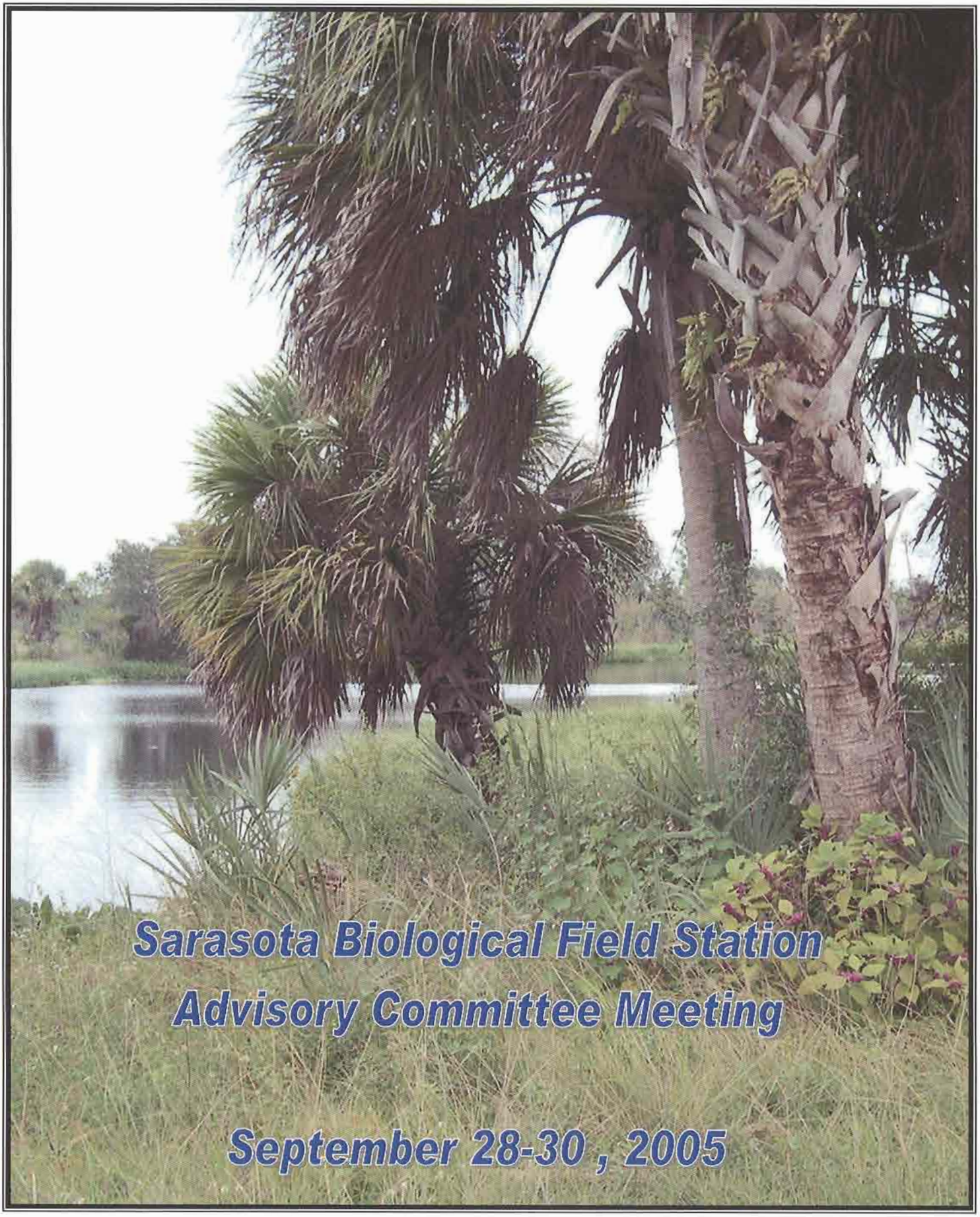
Please return a signed copy of this contract in the enclosed self-addressed envelope. **The outcomes portion of the contract must be filled out.** A check will be sent as soon as we receive the grant contract filled out completely. Keep a copy for your file. If you have any questions about this grant, please call me at 556-7152.

Sincerely,

Wendy

Wendy Hopkins
Vice President of Grant and Program Services
WH/mp

Enclosures


Sarasota Biological Field Station
Advisory Committee Meeting
September 28-30 , 2005

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AGENDA
Sarasota Biological Field Station Advisory Committee Field Meeting

September 28-30 2005

WEDNESDAY SEPTEMBER 28

Participants arriving from afar will convene at the Hyatt Hotel on the Boulevard of the Arts in downtown Sarasota. Rooms have been booked and will be covered by the TREE Foundation planning grant. Meg's cell phone is (941) 266-0817 if anyone needs a ride or is delayed.

2:00 PM Dayna Baumeister will speak on Biomimicry at the Pritzker Marine Lab, New college campus (optional for early arrivals)

7:00 PM Committee members to meet in the Hyatt pub and dine in downtown Sarasota (optional for early arrivals)

THURSDAY SEPTEMBER 29

7:15 AM Early breakfast for out-of-towners at the Hyatt

8:00 AM SHARP – departure for field sites leaving from the Hyatt front lobby. Anyone driving to meet us can park at the Hyatt all day – bring comfortable walking shoes, cameras, rain gear if appropriate. Lunch, notes, four-wheel drive vehicles, and fun will be provided by Sarasota County. Drivers and guides will share their knowledge of the natural history of four short-listed sites in natural areas throughout the County. Visits to four field sites and (if time) an optional tour of the Myakka canopy walkway. Folders with extensive maps and notes will be handed out en route.

5:00 PM Back to the Hyatt for quick showers

6:00 PM Reception with local leadership – commissioners, college faculty and administrators, environmental leaders, and local scientists to officially "launch" the field station project.

7:45 PM Gala tropical banquet at the Hyatt for all members of the science advisory committee (spouses may reserve for an extra cost of $45, wine included but please email Meg by Friday September 23 at lowman@ncf.edu)

FRIDAY SEPTEMBER 30

8:00 AM Breakfast at the Hyatt for out-of-towners

9:00 Discussion session at College Hall, New College on the bayfront. A shuttle van will depart from the Hyatt at 8:45 to take delegates to New College campus. Others can drive and park in visitor slots.

9:00 – 9:15 Introductions

9:15 – 9:45 History of the Sarasota County field station, review of ecosystems, and future conservation goals Meg Lowman, New College of Florida

9:45 – 10:15 Aerial review of the sites visited Belinda Perry, Sarasota County Environmental Services

10:15 – 10:30 Introduction of fifth site, Isles of Athena Don Ross, Earth Balance

10:30 COFFEE

11:00 Summary of NEON activities as relevant to southwest Florida Meg Lowman

11:30 Discussion and ranking of the field sites Elzie McCord, New College of Florida

12:30 LUNCH BREAK

1:00 Return to the conference table until sites have been ranked with some level of consensus. McCord and Lowman

Mid-afternoon Scientists depart to their respective flights, homes or tourist destinations

TREE Foundation, New College of Florida, Economic Development Corporation, and Sarasota County invite you to officially celebrate the launch of the

Sarasota County Biological Field Station

Reception to meet the Science Advisory Committee
Thursday, September 29, 2005
6:00 to 7:30 PM
The Keys room

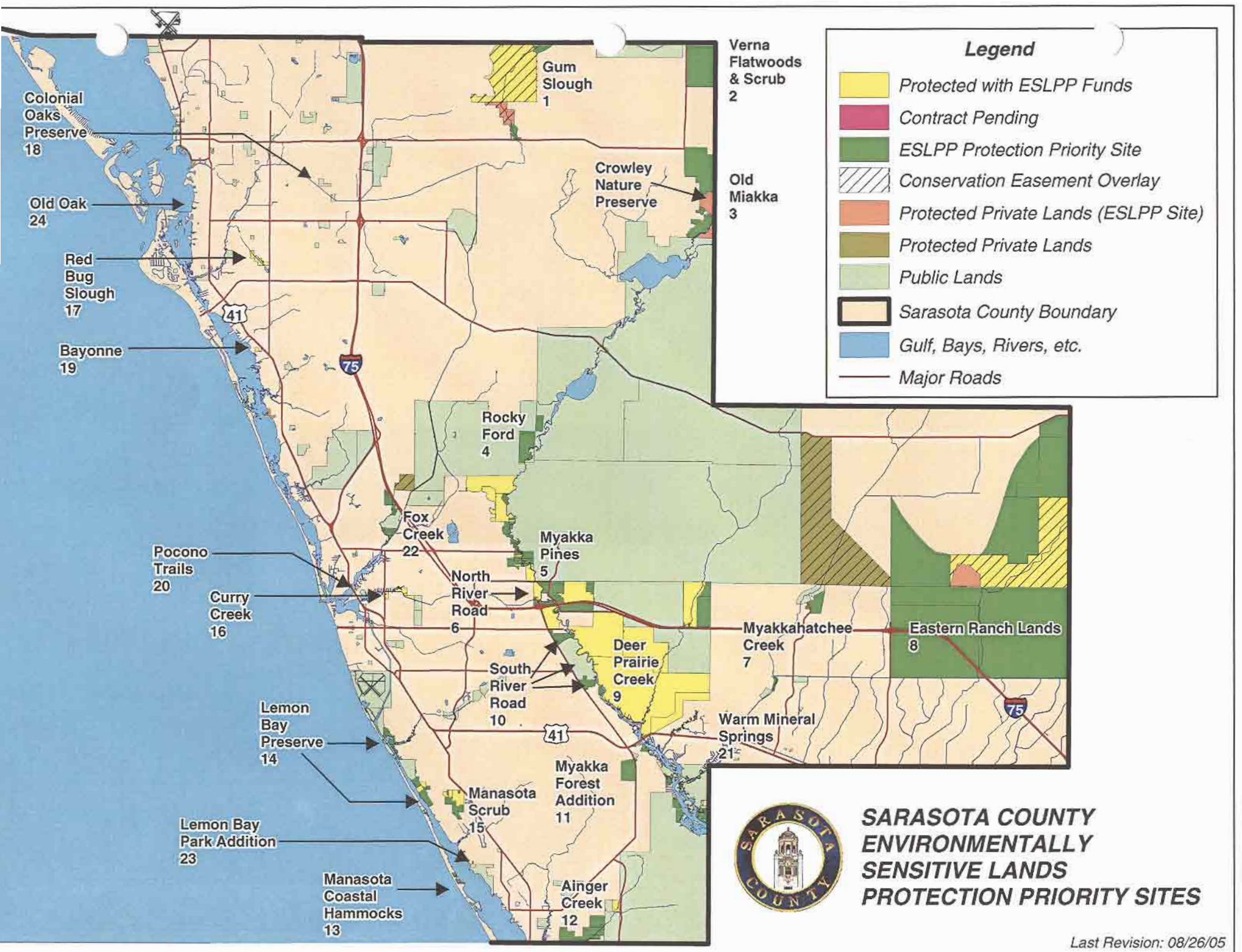
Hyatt Sarasota on Sarasota Bay
1000 Boulevard of the Arts
Sarasota, FL 34236

Dress: 'Field Casual'

Co-Chairs: *Meg Lowman, Professor of Biology & Director of Environmental Initiatives*

Elzie McCord, Assist. Professor of Biology

RSVP (Regrets Only)
Debby Zeilman, Sarasota County
dzeilman@scgov.net



SARASOTA COUNTY ENVIRONMENTALLY SENSITIVE LANDS PROTECTION PRIORITY SITES

Last Revision: 08/26/05

Base Camp Sarasota

New Visions for a Biological Field Station in Southwest Florida

Meg Lowman, New College of Florida and Sarasota County Environmental Services

Sarasota County

Thoreau

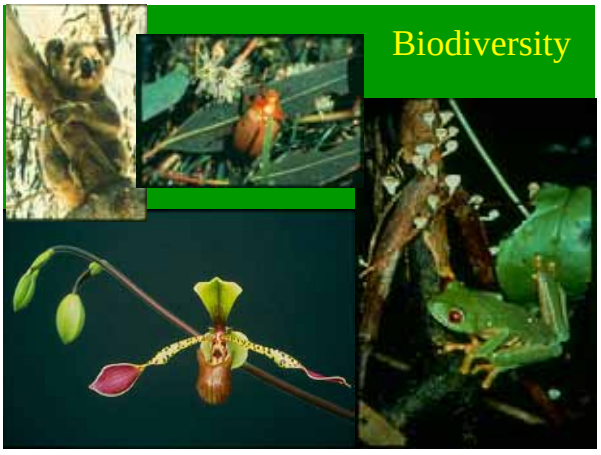
- ….Each town should have… a primitive forest, of five hundred or a thousand acres, where a stick should never be cut for fuel, a common possession forever, for instruction and recreation… Let us keep the New World new."

  - entry for October 5, 1859, The Journal of Henry David Thoreau

Environmentally Sensitive Lands

- County identified "lands with high ecological value"
- County "to develop a strategy to protect these lands" – 15,000 acres to date
- Earmarked 42,660 acres encompassing over 24 properties designated
- As of June 2004, $60 million spent ($12,434,000 recovered from grants or cost-sharing)

Biodiversity



Ecosystem Services

A Few Numbers

- Global human population = 6 billion
- Expands by 90 million/yr, equivalent to one India every 12 years
- Global warming at 2-3 tenths of a degree per decade
- Forest loss is 11 million/ha/yr (44 to 28%)
- Florida – all natural systems declining

Possible Uses of Acquired Lands

- Recreation
- Reservoir for biodiversity, water or others
- Ecotourism
- Education
- Scientific research
- Conservation management
- Managed harvest (Timber? Fish? Boar?)

Long-term Studies

Scientific Merit of Conservation Field Station

- Understanding ecology of SW Florida
- Synthesis of systems and management
- Information dissemination
- Legacies of observations, experiments and collections
- Training of students, scientists, managers
- Outreach to public, policy-makers, students

Long-term Goals

- RESEARCH - Knowledge of SW Florida ecosystems for better land management
- ECONOMY - More visitors and outside funds to Sarasota County
- EDUCATION - public understands nature for long-term stewardship of the ESL

Field Stations – amenities vary but productivity is high




Field Station - Antarctica



All the Comforts of Home?

Scientists in Isolation



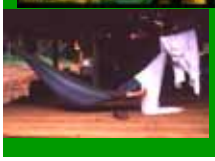
One Tree Island, Great Barrier Reef



Christmas a la One Tree

Heron Island

Cameroon Hilton



Laboratory conditions?

Amenities in African Rain Forest

Peruvian Amazon amenities

Economic Role of Conservation Field Station

- Public-private partnership
- Ecotourism options
- Summer science camp (Boys & Girls Club? Girls Inc? School Board?)
- Small Conference Center
- International draw for scientists
- Visitor center for educational exhibits

Criteria for Field Station

- **Access to diversity of local ecosystems**
- **Ease of travel to/from site**
- **Past history of research and data**
- **Conservation priorities at national level**
- **Stewardship by academic institution**

Requirements for Funding

- Sound science history of region
- Unique ecological issues
- Access to scientists and educators
- Legacy of infrastructure, ecosystems or data
- National priority
- Endangered ecosystems

LTER Network

Sound Science measured in Peer-reviewed publications

- Highlands County (Archbold) 1150
- LTER Everglades 800+
- Pinellas County (Brooker) 300+
- Leon County (Tall Timbers) 700 +
- Harvard Forest MA 1500+
- Highlands NC 6000+
- Sarasota County 49 +

Ecosystems of Importance

- Live Oak/Cabbage Palm Hammock
- Dry Prairie
- Pinelands
- Upland Hardwood Forests
- Scrub
- Grassland/pastureland
- Silt-bottomed lakes
- Riverine watershed
- Estuarine
- Mangroves

Timetable and Plan of Action

- **Fall 2004 – Examine potential sites**
- **Spring 2005 – Apply for federal planning grant – NSF and identify local partners**
- **Summer 2005 – Task force underway**
- **Fall 2005 – Create master plan**
- **2006 – Apply for NSF Field Station funding**
- **2007 – More Fund-raising**
- **2008 – Construction**

We have a lot to learn – climate change, invasive species, land use, biodiversity, watersheds, disease

The End

Can You Identify these Florida Organisms?

- Oldsquaw
- Potato Vine
- Ruddy Daggerwing
- Monitor
- Cupaniopsis
- Gum bumelia
- Tardigrade
- Brant
- Tillandsia
- Slider

Global Losses of Forest

- Original forests covered 44% earth
- Today they occupy 28% earth
- Loss is 11 million hectares per year
- But what about “cryptic deforestation”?
- 1/3 world (2 billion) use wood for fuel
- Florida ecosystems all declining

Possible Sources of Funding

- NSF FSML panel – planning grant $25 K
- Local pledge - $250 K through NCF
- Private partners for ecotourism
- NSF FSML infrastructure grant with New College partnership (up to $500 K)
- Possible outside funding – USF? Archbold? UF? Environmental Foundations?

Global Warming

- Stimulates the decay of organics in the soil\
- Soils release more carbon dioxide and methane
- Oceans warm
- Warmer oceans absorb less carbon dioxide
- More ice melt eventually cools the Atlantic currents
- Cooler Atlantic currents causes ice age in Europe and North American coasts

Civilizations that were destroyed after the loss of their forest

- Ancient Syria
- Ancient Greece
- Persia
- Mediterranean basin
- Levant
- Carthage
- Haiti
- Madagascar
- China
- India
- Pakistan
- Java
- SE Asia

ENVIRONMENT

NATURE'S SECRETS / By Meg Lowman

Base camp Sarasota: Monitoring ecosystems for future health

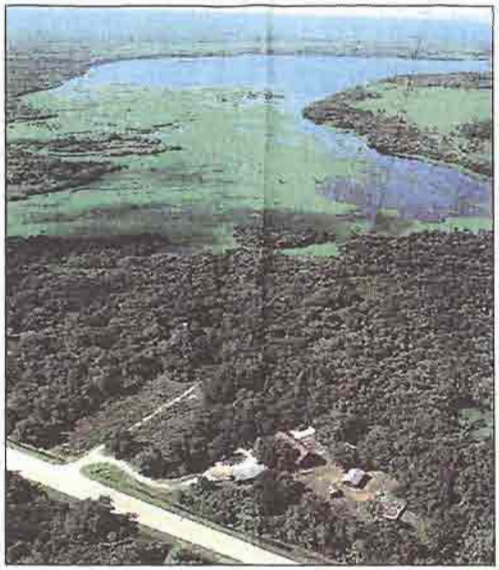
"Each town should have . . . a primitive forest, of five hundred or a thousand acres, where a stick should never be cut for fuel, a common possession forever, for instruction and recreation . . . Let us keep the New World new."

Henry David Thoreau, journal entry for Oct. 5, 1859

MEG LOWMAN
NATURE'S SECRETS

Most of us go to a doctor when we are ill. The doctor usually relies on our past history — measurements such as blood pressure, weight, or prostate specific antigen — to assess what has changed and to prescribe an optimal program for healing. We usually seek a medically trained professional, with an advanced degree and some past experience, to ensure the best health care. The same scenario is true for maintenance of healthy ecosystems. Professional scientists called ecologists measure the health of ecosystems and offer solutions when species decline, toxins pollute, invasive weeds take over, or forests die back. Like doctors, ecological scientists rely on baseline data, such as frog populations, weather, soil chemistry, or abundance of bird nests. These baseline data are critical to gauge the health of an ecosystem, especially now because we are witnessing an unprecedented decline of ecosystem health on a global scale.

Like the medical profession, ecologists share and document their findings in standardized formats. The standard measures(or currency) of success in science are publications in professional, scientific journals. Such articles provide a permanent library of facts for future environmental solutions. In regions where the number of scientists and associated publications is large (e.g. Harvard Forest; Rocky Mountain biological station) the trickle-down benefits to the local economy and environment are enormous. For example, in New Hampshire, the Hubbard Brook Research Station has supplied watershed information to state leaders on how inputs upstream link to the health of areas downstream.



PHOTOS PROVIDED BY MEG LOWMAN

The wild expanse of the Myakka watershed stretches toward the horizon in the aerial view above. At bottom right, a field biologist gets a wader's close-up view of the Myakka watershed and its varied flora and fauna. At top right, New College science students measure tree heights in hammocks with the aid of a hypsometer, an instrument for determining the height of trees by triangulation.

natural environment is a precious legacy, linked to the economy through tourism, quality of life, and essential services such as drinking water, agriculture, fisheries, or rainfall patterns. Our region is blessed with a wealth of music, art, beautiful real estate, restaurants, museums, and health professionals. We are also blessed with a healthy population of marine biologists, thanks to Mote Marine Laboratory. But it may come as a surprise to learn that Sarasota suffers a shortfall of professional scientists who study terrestrial ecosystems. As our community looks ahead, we will need "doctors" of the landscape to maintain ecosystem health. So how do we attract them?

The Economic Development Corp., Sarasota County and New College of Florida have an exciting partnership to attract intellectual capital to Sarasota to address future ecological needs. A proposed biological field station in Sarasota County will attract ecologists to study our ecosystems, providing a "base camp" for research and education, that will facilitate environmental decisions based on both economics and biology.

Scientists are a funny lot — I know because I am one. Essentially, if beds, kitchen and unique ecosystems are provided, ecologists will flock! It is that simple. A good example is the Archbold Field Station in central Florida. Through a visionary legacy by the MacArthur family, Archbold offers beds, library, kitchen and sandy ridges and scrub ecosystems within walking distance. A cadre of scientists conduct research there, not surprisingly a large portion from northern universities who visit during September, approximately 20 scientists representing educational institutions of Southwest Florida as well as distinguished ecologists from around the country will meet in Sarasota. The TREE Foundation (a local group that built the Myakka canopy walkway and continues to advocate for exploration and research on forests) obtained a grant to convene this science committee to explore the feasibility of a field station in the Myakka watershed. Affectionately called the ecology base camp, this station will feature exemplary green-design architecture and attract distinguished scientists to Southwest Florida. Ecologists will not only bring their professional expertise, but also their grant funds, graduate students and laboratory equipment. Florida will be the beneficiary of a legacy of research to ensure sound management of our natural environment. In addition to the scientific benefits, our local residents, visitors and students (including K-12, Manatee Community College and the University of South Florida) will enjoy environmental education programs hosted at the field station.

The visiting science advisory committee will traipse through mud and fire ants several field sites as potential locations of the Southwest Florida biological field station. Over the past 10 years, Sarasota County has developed a strategy to protect natural lands for future generations. To date, over 42,000 acres encompassing over 24 properties have been designated for purchase as part of the county's environmental legacy. By attracting scientists to study these natural, subtropical Florida lands, we are creating a "life insurance policy" for local ecosystems and also for our children. The proposed biological field station will serve as a base camp hospital to monitor ecological health in Southwest Florida.

Dr. Margaret Lowman (aka Canopymeg) is a science writer and Director of Environmental Initiatives at New College of

Calling all teachers

In response to my last column about environmental education in our schools, the students at New College are offering their volunteer services. Teachers of middle-school science are invited to contact Fabiana Silva (fabiana.silva@ncf.edu) to schedule a lecture on ecology or environmental topics in your classroom this fall or next spring. Fabiana is the student coordinator of SOS (Student Outreach for Science), college students who are training as community environmental educators.

INTERNATIONAL Canopy Ecology Activities

1. Hosted two interns from developing countries to empower them as future conservationists and to provide educational opportunities not available in their home country:

   Pamela Montero, from Iquitos, Peru, aspires to become a primate biologist, focusing on Amazonian ecology. Pamela spoke at regional schools, undertook English training, attended biology classes at New College, and volunteered in the biology department at University of Vermont. With the networking she achieved during her visit to USA, she is applying for a full scholarship for graduate work at Princeton University.

   Guillermo Sanchez, from Panama, is self-trained and passionate about ants. During his internship in Sarasota, Guillermo presented lectures at New College and at regional schools. He also visited Archbold Field Station, University of Florida, and Florida State University, where he met with ant biologists. Thanks to the networking of the TREE Foundation, Guillermo is in line to receive a full scholarship for graduate work at FSU with ant expert, Professor Walter Tshinkel.

See attached:

- Thank you from Pine View School for Pamela's lecture
- Newspaper article about Pamela's school talks in Vermont
- Thank you from Guillermo to TREE Foundation
- Thank you for Guillermo's contributions to students at New College

2. Attended 4th International Forest Canopy Conference in Leipzig, Germany with additional funding for 3 student attendees; and Ecological Society of America meeting in Montreal, Canada with one student.

See attached:

- Abstract of papers presented at Forest Canopy Conference
- Photos of canopy ecology students with poster presentations
- Newspaper column on new canopy technology using cranes

Pine View School

1 Python Path • Osprey, Florida 34229
(941) 486-2001 Fax: (941) 486-2042
http://www.sarasota.k12.fl.us/pvs/

Steven Largo, Principal

Gail Abrams, Assistant Principal
Brenda George, Ed.D., Assistant Principal
Josie R. Saavedra, Ph.D., Assistant Principal

March 1, 2005

Unsent Message
From: June Schertzer
Subject: Re(2): spanish language and culture at Pine View
To:
Cc:

To: Tree Foundation
Re: Pamela Montero

June Schertzer writes:
Hi Meg..just a note to let you know how much the students and teachers enjoyed the time spent with Pamela. When she returns from Vermont, if there is a day she could come back, I would love to have her. Some of my classes never got to meet her and a couple of teachers, wanted her to visit with some additional classes. Hope she gets some rest.....she is in high demand! Thanks for the experience,
jls

montones de gracias,
June

Wild Places

by Pamela Montero Alvarez

Editor's note: *Pamela graduated recently from the University of Iquitos with a degree in biology and is currently visiting Charlotte as part of a CCS PTO-sponsored program. She has been presenting PowerPoint slide shows about various aspects of Peruvian life and the Amazonian rain forest. She is hosted by the McGarghan family and will be in Charlotte until May.*

What do Vermont and the Peruvian tropical forest have in common? Your first impression is probably nothing at all. That's what I thought, but now that I have paid more attention I have noticed some things that are really interesting. I can start by saying that both are wild and adventurous places.

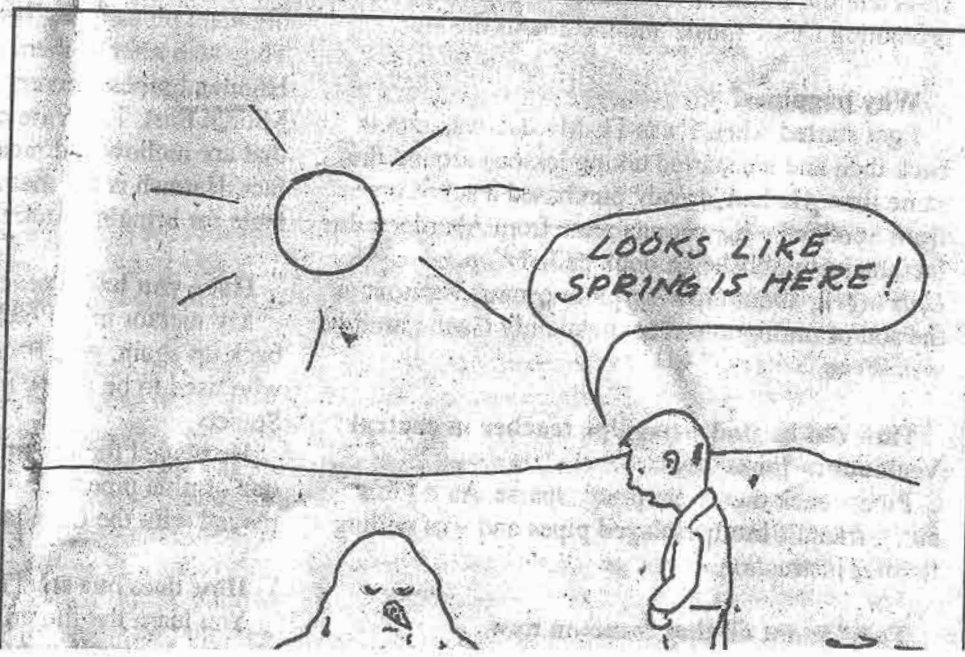
When Sarah McGarghan, my hostess, told me "We are going sledding on Sunday, ok?" I was like…mmmm…sledding? Ok, I can try that, believe me! Sledding in the snow, going at considerable speeds and hitting all kinds of things in your way—I consider it exciting! Also, walking outside with a simple jacket to pick up something in the car at nine degrees, well, that actually could be considered insane for me! Of course, I come from a tropical place with a lot of sun, heat, rain, trees, butterflies, more heat, birds, monkeys, centipedes, more heat again, ants, bees, some flies and cucarachas, grasshoppers (all sizes and colors), frogs, monkeys, mosquitoes (some of them really friendly) and some other animals not so attractive. So Vermont is completely new and amazing for me.

All the snow (it was the first time I saw snow!) was just great. Going to the Charlotte School and sharing what I know about the Peruvian rainforest and our lifestyles was another great experience for me. Answering all the questions and being with the kids was fun and pleasurable.

I told you about the things in common between Vermont and the Peruvian Tropical forest. The other thing is the people, their warm and huge hearts, their amazing care and concern for each other is something that makes me feel at home.

I will be here until the end of May and I am looking forward to meeting more people and experiencing the Mud Season.

Pamela Montero Alvarez gives a powerpoint slideshow in the Charlotte Central School library. ROBBIE STANLEY



We're hoping for spring... are you?

Subj: **TREE Foundation letter (new)**
Date: 4/17/2005 11:01:15 A.M. Eastern Daylight Time
From: paraponeraguillermo@hotmail.com
To: canopymeg@aol.com
CC: paraponeraguillermo@hotmail.com

Date: 4-17-2005

From: Jose Guillermo Sanchez Paredes

To: TREE Foundation

I apreciate the marvelous opportunity you gave to me to travel to Florida. In two weeks, I presented lectures in the New College of Florida and Pine View School about natural history of neotropical ants and the natural world of Panama (including flora and fauna of tropical rain forest).

I visited the University of Florida in Gainesville and Florida State University in Tallahassii and I met interesting people in biology of ants. I know now about graduate programs to apply in the next year in his schools, which has been a life changing experience for me.

The experience learned with this travel has been excellent. I know new university departments, new ant researchers and new friends. Thank you so much to give me this big opportunity to growth!

Jose Guillermo Sanchez Paredes
University of Panama
Smithsonian Tropical Research Inst.

New College
THE HONORS COLLEGE of Florida

Division of Natural Sciences
5700 North Tamiami Trail
Sarasota, Florida 34243-2197
(941) 359-4370
Fax: (941) 359-4396

Guillermo Sanchez
Panama University
Alan Smith Fellow
Smithsonian Tropical Research Institute

17 April 2005-04-17

Dear Guillermo,

On behalf of the New College environmental studies program, I thank you for your wonderful participation in our programs over the past two weeks of your visiting internship. You presented lectures to our students, faculty and community about tropical ants, and also about the natural history of Panama. These were very well received!

In addition, you visited our local schools and gave the youth of our community a better sense of tropical ecology. And perhaps most of all, you made friends with academics and students throughout Florida, thereby paving the way for your return as a graduate student or scholar in some form. We look forward to welcoming you back to Florida, and thank you for your role as a TREE Foundation intern at New College. Keep up your excellent studies, and you will doubtless make major contributions to tropical research in the future.

With thanks, Meg Lowman

Dr. Meg Lowman
Professor of Biology and Environmental Studies

The many ways we measure herbivory

K. ERNEST[1], M. LOWMAN[2], D. SHAW[3] & H.B. RINKER[4]

[1] *Department of Biological Sciences, Central Washington University, Ellensburg, WA, 98925-7537 USA*
[2] *Biology and Environmental Studies, New College of Florida, 5700 N Tamiami Trail, Sarasota FL 34243, USA*
[3] *Wind River Canopy Crane Research Facility, University of Washington, 1262 Hemlock Road, Carson, Washington, 98610, USA*
[4] *Pinellas County Environmental Lands Division, 3620 Fletch Haven Dr., Tarpon Springs, FL 34688, USA*

Consumption of plant tissues by herbivores potentially affects canopy structure and processes, including plant architecture, plant chemistry, forest energy budgets, and nutrient cycling. How we measure herbivory, therefore, will influence the significance we attribute to herbivory both spatially and temporally within and between forest ecosystems. Although herbivores commonly eat roots, flowers, apical buds, and phloem (and occasionally the inner bark of trees) in addition to leaves, folivory (leaf consumption) is the primary measure of herbivory used by most investigators and is the focus for this paper. Over the past several decades, canopy researchers have measured herbivory in numerous ways, including static (point-in-time) vs. dynamic (long-term rates) and direct (amount or percent of tissue consumed) vs. indirect (e.g., quantity of frass produced by insects; arthropod biomass/plant biomass) methods. Even direct measurements can be done in a variety of ways, from visual estimates, to enumeration of herbivore damage using gridded acetate transparencies, to computer analysis of digital images. Another variable is how plants or units of plants are selected for sampling. For example, vertebrate herbivores in canopies often eat entire leaves; without tagged leaves or direct observation, this form of folivory is difficult to quantify. We have reviewed these techniques from the literature and assessed their appropriateness for specific goals. We recognize that different methods are useful for different hypotheses, but argue that stronger guidelines for standardized measurements will greatly enhance the degree of accuracy for assessing herbivory at different spatial and temporal scales, and thus our ability to make stronger conclusions about the role of herbivory in forest canopies. In particular, the ability to compare herbivory among forest canopies can be enhanced by adoption of more standardized sampling protocols. We present a case study of a standardized protocol we adopted in recent field studies in temperate and tropical forests.

High above the kangaroos: herbivory Down Under

M. LOWMAN & S. LOWITT

New College of Florida, 5700 N Tamiami Trail, Sarasota FL 34243 USA

In this presentation, we statistically assess herbivory from large data sets recorded over a twenty year period of research in different forest types of Australia. Our overarching hypotheses are: 1. that complex forests will have lower levels of herbivory as compared to low diversity forests, and 2. that high levels of herbivory can correlate with stand dieback or entire forest mortality. We surveyed over a hundred thousand leaves using ropes, walkways, towers, and cherry pickers in Australian cool temperate, warm temperate, subtropical, tropical, and dry schlerophyllous forest types. Two field methods were employed: long-term whereby leaves were surveyed monthly for increments of damage; and short-term ("discrete") measurements of annual leaf area losses whereby leaf hole areas were calculated at one time period as a quicker method of assessment. The long-term method obviously was the most accurate technique (albeit time-consuming), and canopy herbivory ranged from 4 % to 300 % in different tree species and throughout different forest types. We statistically analyzed different cohorts of canopy leaves to address our hypotheses, and arrived at a multiplier for extrapolating short term herbivory measurements into more accurate long term levels. On a global scale, some Australian forest types appear to suffer significantly higher levels of herbivory than other continents.

ENVIRONMENT

NATURE'S SECRETS / By Meg Lowman

Construction cranes serve as tools to detect forests' hidden attribute

...e in both the forest and the ...s distributed in horizontal ...s. Most life is near the top, ...use that is where the sun ...strikes and everything be... ...depends on this surface.
Marston Bates, "The Forest and the Sea" 1960

MEG LOWMAN
NATURE'S SECRETS

ike Dorothy returning to Kansas in the balloon of the Wizard of Oz, we ...ed silently over the tree... Our mode of transport ...a metal gondola car sus... ...ed on the arm of a con... ...tion crane. Although not ...ehicle of choice for most ...rne travelers, the crane ...esents an innovative meth... ...study forest ecology, ...new breed of cranes, ...ed from urban construc... ...to become denizens of ...t science, now encircles ...lobe, creating a network ...search sites. The canopy ...e outside Leipzig, Germa... ...one of 10 cranes world... ...providing new insights to ...ecrets of the treetops. Our ...arating ride above Germa... ...temperate deciduous ...t provided close-up ac... ...to several hundred trees. ...ral million leaves, and ...resident populations of ...ts, birds, amphibians, ...s, reptiles, fungi and mam... ...Within the radius of the ...e arm, we had access to ...al acres of forest from top ...ttom.

...as traveling with three ...ce students from New ...ge of Florida as delegates ...e Fourth International ...py Conference held in ...zig during July. (Of note, ...rst and second canopy conferences were hosted in Sarasota!) In the course of a week, we heard 90 scientific lectures representing more than 250 scientists from 20 countries. The students were dismayed to note that only 12 talks were presented by women, confirming the ongoing challenges to achieve gender equality in science. We were privileged to hear the most recent findings, from discoveries of new leaf beetles in the jungles of New Guinea to the emerging impacts of climate change as some forests become hotter and drier. New tools were demonstrated, ranging from canopy cranes to infrared imagery that detects heat loads in ecosystems, to items as sublime as an improved "whizzie" for discretion when relieving oneself in the treetops. Animated discussions in many languages exhausted our brains, as we learned the latest advances in ecology. But the field trip into the German treetops proved a highlight of our week.

Set amid 100-year-old English oak (Quercus robur) and common ash (Fraxinus excelsior), the Leipzig canopy crane allows ecologists to explore the mysteries of a European temperate forest. This heavy, metal contraption makes the collection of scientific information more accurate, efficient and admittedly more fun than the ground-based studies of the past. What insects are defoliating the top of the oak crowns? How do leaves adjust their photosynthesis throughout the day? Which defenses protect the uppermost leaves from drying out in the harsh sunlight and winds? Where do moths hide in the daytime?

Myriad questions can be addressed by teams of scientists using one crane. And comparative information can be gathered by making similar measurements in the suite of cranes located throughout different forests around the world. After 10 years of operation, German scientists have a better understanding of how their forests work. At the Leipzig crane, researchers have studied frogs in the treetops, populations of butterflies and moths, predatory spiders and their prey, pollinators and the sex life of ash trees.

Canopy cranes are a new method for ecological studies in the treetops. The accuracy of science depends in part upon the quality of tools. X-rays, microscopes, GPS, calculators — even the simple ruler — are tools that enable researchers to achieve accurate measurements and results. Construction cranes are to canopy biologists what binoculars are to ornithologists.

Worldwide, research cranes exist in Panama, Australia, Germany, Indonesia, Switzerland and Washington state. New cranes are planned for India, Brazil, Madagascar and Ghana. Sadly, no cranes are proposed for studying our local Florida hammocks, even though they represent one of the least studied forest ecosystems on Earth. How ironic that Sarasota County boasts a healthy population of urban cranes dedicated to construction, but none dedicated to research. Perhaps someday, one of our urban cranes will be donated to study the secrets of the Myakka forests. No doubt, new and exciting discoveries await the willing arbornau... who embark on this ventu...

If you suffer from acrop... bia, research in a construct... crane may not be desirable... But if you relish the joy of ... discovery and the beauty o... tall trees, then research on ... forest ecology might be wo... consideration. Leipzig not ... boasts the musical heritage ... Mendelssohn and Bach, bu... also serves as a global cent... for canopy research.

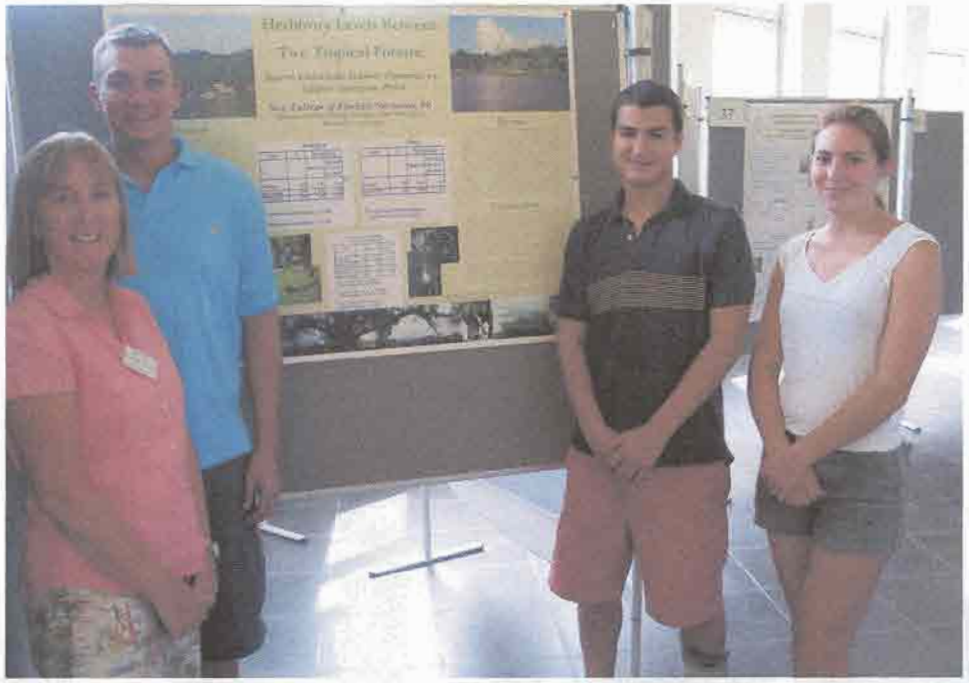
Dr. Margaret Lowman (aka Canopymeg) is a science writer... Director of Environmental Initiatives at New College of Florida. Her column appears semimonthly.

Activity

Cranes dot the horizon in Southwest Florida; observe one in your region. Watch its accurate agility in moving through three-dimensional space. For ecological research, the crane arm needs to overtop the tallest tree in a forest. Estimate the height of your crane arm based on the number of stories of a tall building nearby. In Florida, the live oaks and palms that constitute a forest hammock grow approximately 50 to 60 feet tall. Would the arm of your construction crane be tall enough to overtop them?

PROVIDED BY DR. JÖRG SZARZYNSKI, CENTER FOR DEVELOPMENT RESEARCH, BONN, G...

The Leipzig crane is seen in a typical view and one made by thermal imaging, which is used to estima... plant temperature and check for water-deficit stress. The "hotter" colors indicate higher temperatu...




33
Canopy Walkways of the world

PUBLIC SCIENCE OUTREACH about Forest Canopies and Ecology

1. Hosted two community lectures and one workshop:
   Dr. Mark Moffett, National Geographic Society and Harvard University –
   Forest Canopies Around the World
   Dr. Dayna Baumeister, The Biomimicry Guild, Montana –
   Biomimicry 101 – Engineering the Future

   Workshop for environmental education students: Lynne Cherry (author of environmental children's books including The Great Kapok Tree):
   Reaching the Youth -- Messages about Environmental Science

See attached:

- Photo of Dr. Moffett leading a special student field trip for Conservation Biology naturalist-in-training at New College of Florida
- Survey form to assess community lectures
- Flier for Biomimicry lecture

2. Maintenance of International Center for Canopy Ecology offices – oversaw national lectures on canopy ecology and outreach, fund-raising lectures for canopy programs and walkways around the country, expansion of our website (www.treefoundation.org), dissemination of canopy ecology and forest conservation literature, and publications of new materials

See attached:

- Fund-raising lecture by Dr. Lowman for the newly established Meg Lowman Treetops Camp for disadvantaged girls in upstate New York
- Forest Canopies textbook, with distribution of over 25 copies to students, field stations and scientists in developing countries
- Upcoming publication, It's a Jungle Out There, due out in March 2006 by Yale University Press
- Newspaper columns on ecology and environmental science for southwest Florida, as published in the Sarasota Herald Tribune (full list on our TREE website)

Community Lecture – Forest Canopies **SURVEY**

Date: February 15, 2004 **Speaker: Dr. Mark Moffett**
National Geographic Society

Number surveyed: 47

1. One a scale of 1 (poor) to 5 (excellent), rank this talk:

1	2	3	4	5
			5	**42**

2. Did you learn anything new about forests in this lecture?

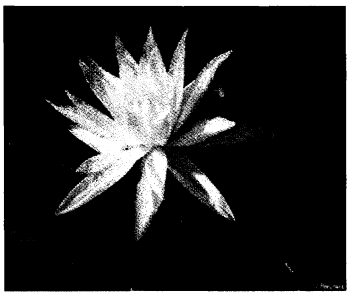
YES NO

ALL YES!

3. Did this talk give you a better appreciation for our natural environment and conservation?

YES NO

ALL YES!!



"Biomimicry 101"

Conference/workshop – engineering the future of Sarasota

Presenter

Dayna Baumeister, VP

Biomimicry Guild, Montana

Agenda

- Introductions
(first name, job (verb + "er, or") (e.g. teacher, connector, translator, doer, finder, communicator, etc.), favorite creature + 3 adjectives why)

  Example: Dayna, translator, aspen, adaptable, graceful, calm

- Slide Presentation/Lecture (30-45 Minutes) as intro to Biomimicry, to bring everyone up to the same basic level of understanding

- Brief discussion on methodology of Biomimicry

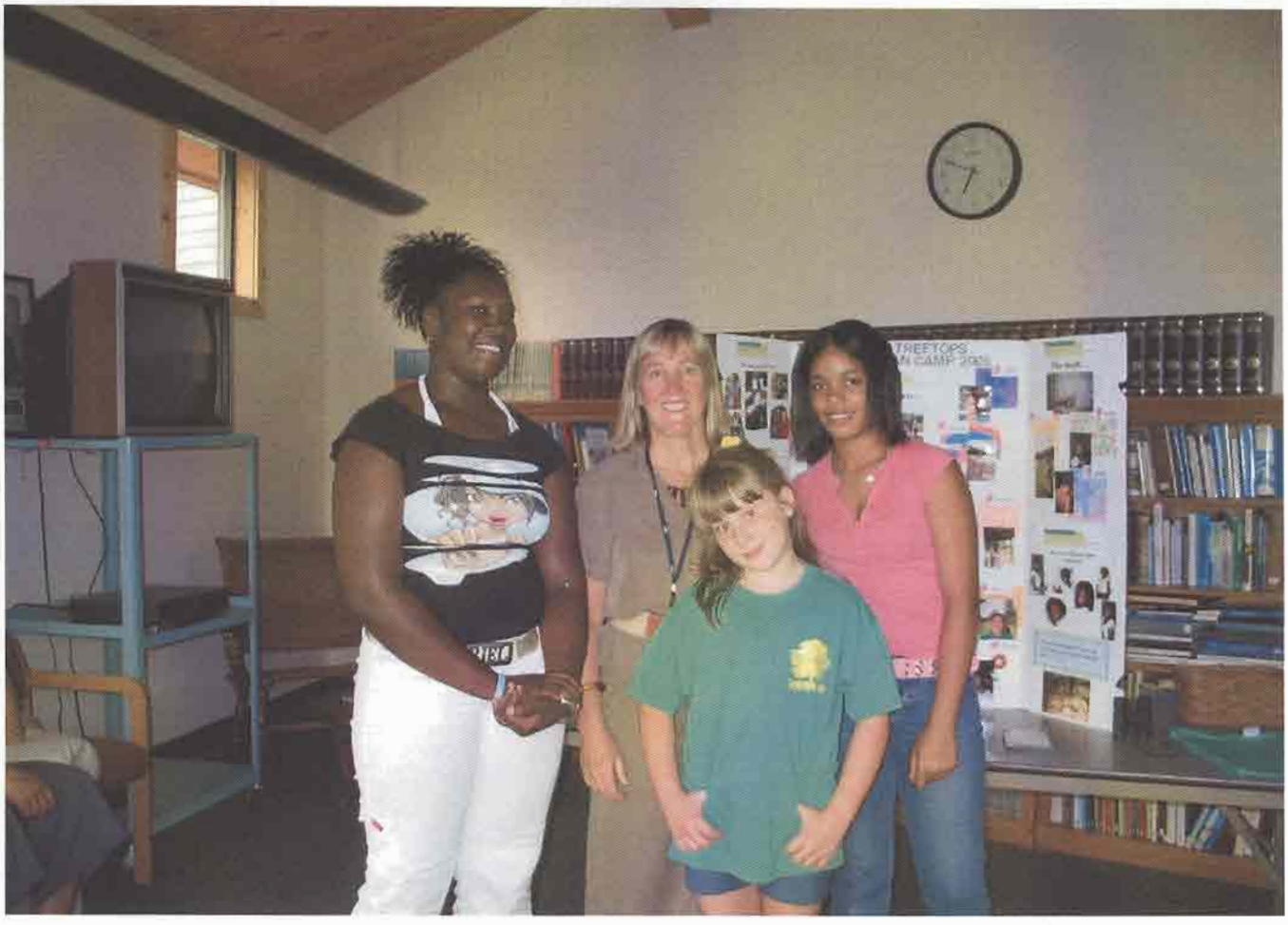
- One minute presentations on creature teachers

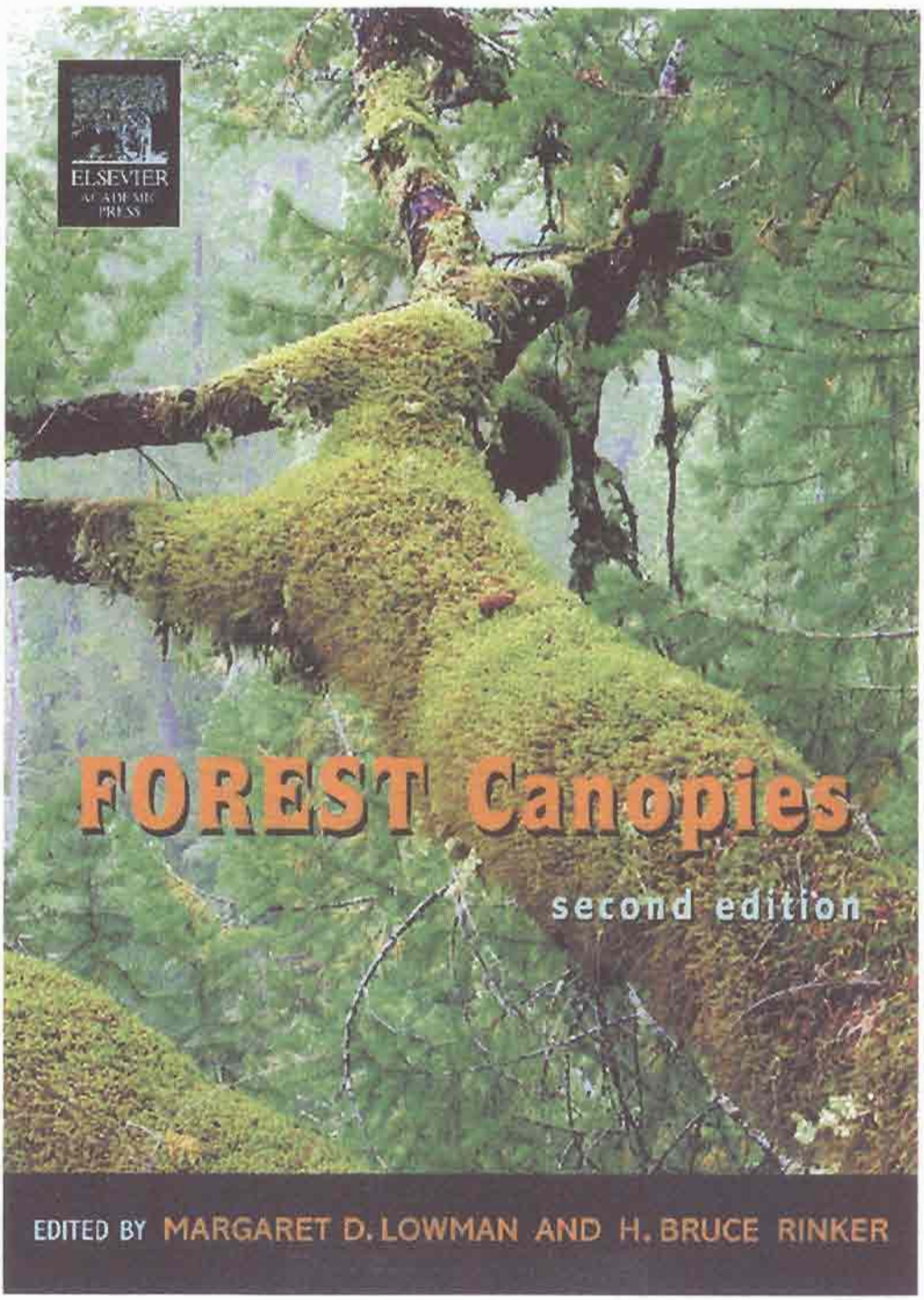
- Discussion of challenges facing Sarasota County (with worksheet Assistance)

- Brainstorm on how nature would solve those challenges

- Generate ideas, possibilities, and set stage for workshop 2

Sponsored By New College of Florida alumna,
Economic Development Corporation of Sarasota County, The Tree Foundation





For more information, please contact Meg (canopymeg@aol.com), Bruce (HBruce_Rinker@antiochne.edu), or Elsevier/Academic Press (http://www.harcourt-international.com/catalogue/title.cfm?ISBN=0124575536); publication scheduled for mid-August 2004.

It's A Jungle Up There

More Tales from the Treetops

Margaret D. Lowman

Edward Burgess & James Burgess

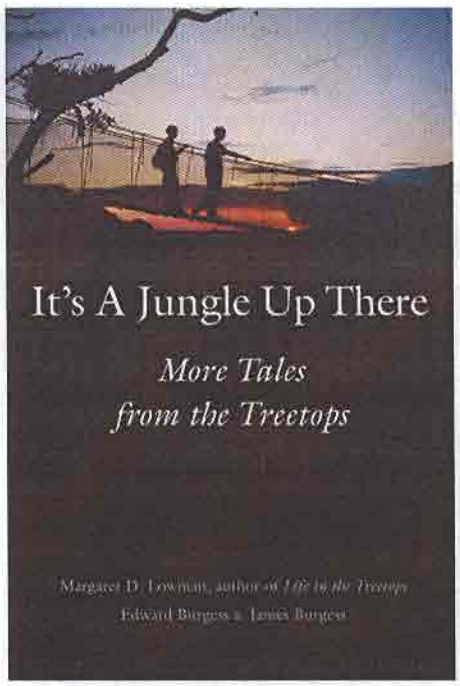
Contents

Foreword by Sir Ghillean T. Prance

It's a Jungle Up There

More Tales from the Treetops

Margaret D. Lowman, Edward Burgess, and James Burgess
With a Foreword by Sir Ghillean R. Prance



"A lively, readable book that will help to educate a variety of readers about scientific research and processes in forest environments, as well as the importance of environmental conservation."—Ellen Wohl, Colorado State University

"The inspiring story of a woman who has been able to pursue her love of science, research, and conservation while raising children."—Laura Meyerson, University of Rhode Island

Drawn to the mysteries of tropical rain forests and fascinated by life in the treetops, Meg Lowman has pursued a life of scientific exploration while raising her two sons, Edward and James Burgess. This book recounts their family adventures in remote parts of the world (Samoa, West Africa, Peru, Panama, India, Biosphere 2, and others), from the perspectives of both kids and parent. Together they explore tropical rain forests, encounter anacondas and piranhas, eat crickets as hors d'oeuvres, discover new species, and nurture a family ethic for conservation.

The chapters of the book focus on field biology questions, the canopy access methods developed to answer the questions, and conservation or education components of each expedition. Lowman enumerates the challenges and joys of juggling parenthood and career, and the children reflect on how their mom's work has affected their lives. A rollicking, inspiring book, *It's a Jungle Up There* is an upbeat portrayal of how a parent's career can imprint children, and how children in turn can influence the success and trajectory of their parent's career.

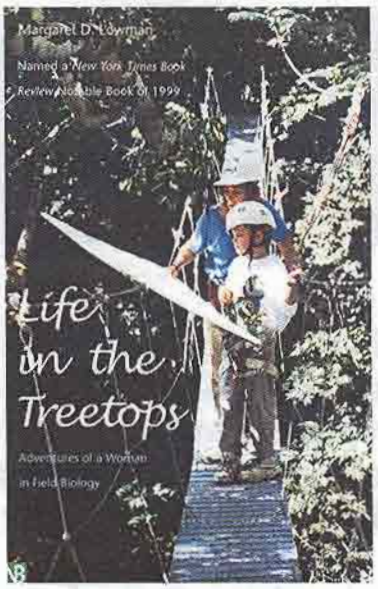
2006 304 pp. 35 b/w illus.
Cloth ISBN 0-300-10863-X **$27.50**

Margaret D. Lowman is director of environmental initiatives and professor of biology and environmental studies at New College of Florida. **Edward Burgess** is a member of the class of 2007 at Princeton University, where he is majoring in chemistry. **James Burgess** is a member of the class of 2009 at Princeton University, where he plans to focus on engineering.

Life in the Treetops

Adventures of a Woman in Field Biology

Margaret Lowman; Foreword by Robert Ballard



"A funny, unassuming chronicle of the trials and achievements of a woman (and mother) engaged in studying tree canopies and inventing techniques to do it." —Liesl Schillinger, *New York Times Book Review*

"[This book] is interwoven with wonderful stories of life teeming in rain forest tree tops. [Lowman's] struggle for self-realization and fulfillment is told with directness and humor, while its twin tale of the emerging science of canopy biology . . . is compelling for anyone with an interest in natural history." —Georgia Tasker, *Miami Herald*

"Lowman presents a wonderful mix of ecological research and life story. Her pioneering research in the forest canopies of Australia, Africa, Belize, and the United States is fascinating and gives the reader a real feel for the importance of canopy research in particular and ecological research in general. . . . Recommended for public and academic libraries and also of interest to teens contemplating science careers."—*Library Journal* (Starred Review)

"*Life in the Treetops* provides a lively personal account of the successes and setbacks of an American woman field biologist on three different continents. . . . The author's account of her scientific fieldwork in the treetops is both fascinating and amusing. . . . This well written and delightfully illustrated book ought to be read by seasoned and aspiring scientists alike, as well as the general public. It should be on the bookshelves of public libraries, high schools, community colleges, and universities. I hope that instructors in biology, history, and women's studies will take note of this slim but important volume and use it in their classes. I know that I will." —Marianne Gosztonyi Ainley, *The Canadian Field-Naturalist*

A pioneering tree canopy scientist for more than twenty years, Margaret D. Lowman here describes her challenges as a working wife, single parent, and field biologist studying forest treetops around the world.

Named one of the Best Books of 1999 by *Library Journal*; Named a *New York Times Book Review* Notable Book of 1999; Winner of the Eugene Odum Award for Excellence sponsored by the Ecological Society of America Education Award; Selected by the New York Public Library as a 2000 Book for The Teen Age List; Winner of the Kilby Laureate Award; Winner of the 2000 Educator's Award sponsored by the Delta Kappa Gamma Society; Selected as an outstanding book by *University Press Books for Public and Secondary School Libraries*

Nota Bene
1999 240 pp. 30 b/w illus
Paper ISBN 0-300-08464-1 $13.95

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ENVIRONMENT

NATURE'S SECRETS / By Meg Lowman

Science education connects our children with their natural world

Those who contemplate the beauty of the earth find reserves of strength that will endure as long as life lasts.
— Rachel Carson

MEG LOWMAN
NATURE'S SECRETS

As our thoughts in late summer turn to school, I find myself contemplating the current challenges of science education. Never in the history of humankind has an understanding of science been more complex yet more important. Knowledge is their best weapon if young people are to make good decisions about personal health and also about the future of their environment. They need to know what affects the chemistry of the ocean; they need to know why mercury builds up in fish and how to reduce it; they need to understand what gases compose our atmosphere and how human activities threaten their natural balance; they need to know what makes petroleum a finite resource and how to seek alternatives; and they need to know enough math to calculate supply and demand in a world of diminishing resources and increasing population.

We are in the midst of a science education revolution. Federal funding for the National Science Foundation has been slashed. Our country currently attracts fewer talented youth in science and engineering from overseas — which gave our technology an edge in the past. And country-wide, the science literacy of our citizens has eroded. This has far-reaching implications, and perhaps represents the most critical global challenge that we can not afford to lose.

characters in Pokemon than could identify an otter, beetle, or oak tree. An ad-hoc survey conducted on freshman environmental-studies students at Sarasota's New College and Williams College, in Williamstown, Mass., found that fewer than 5 percent could name even three female scientists.

A recent book, "Last Child in the Woods: Saving Our Children From Nature-Deficit Disorder" by Richard Louv, analyzes the societal problems that have arisen in the last generation of youth who have essentially lost contact with natural science. Louv quoted a fourth-grader as saying, "I like to play indoors better 'cause that's where all the electrical outlets are."

The author cites recent studies where outdoor education programs provided important therapeutic value to troubled youth, significant reduction in symptoms of attention-deficit disorder, and statistical gains in academic grades, problem solving and test scores. We may not feel safe offering young children free range of the outdoors in this day and age of urban dangers, but, as parents, we need to seek ways to offer nature to our children as a critical part

diagnosis, but a description of the human costs of alienation from nature. Among them: diminished use of the senses, attention difficulties, and higher rates of physical and emotional illnesses. This disorder damages children; it also shapes adults, families, whole communities and the future of nature itself. Yet, exciting new studies show us the benefits — biological, cognitive, and spiritual — when we give the gift of nature."

When baby boomers think back to their childhoods, they can probably recall a tree house, a Scout troop camping trip, family picnics, or a fleeting passion for fishing, biking, hunting or horse-riding. In today's world, these baby boomer parents are rightfully reluctant to give their children unsupervised time outdoors, due to the dangers from global threats or distrust of strangers. Most children know more about the complexities of Nintendo games than about their food chains. Those of us involved in science education recognize the need to reverse this trend.

One exemplary program that has been successfully developed in other parts of the country is the inclusion of local ecosystems in science education. Our neighbors in Pinellas County offer Nature's Classroom, an environmentally based education curriculum that connects kids with the outdoors. Can Sarasota County do the same?

Burgundy Center for Wildlife Studies in West Virginia (www.burgundycenter.org) features nature study as a summer camp curriculum.

PROVIDED BY MEG LOWMAN

PROVIDED BY ELAINE SPACHER

Kids enjoy capturing a slippery slug or poring over the beauty of a butterfly. Acquainting young people with their natural environment has lasting benefits.

Several environmental-based school programs in Los Angeles and San Diego improved math and science scores by 27 percent for participating students. I recently spoke at a fund-raiser in New York for a new summer nature camp for disadvantaged girls. The energy and enthusiasm of these young naturalists inspire me to believe that the world is in good hands.

Parents can not simply assume that schools will provide their children with all facets of science education. It needs to start at home. One way to ensure that your child has some time to experience the

few flowers on the kitchen table create connections to engage children in natural science. Families in Southwest Florida are fortunate that opportunities for outdoor activities abound during all months of the year. As Thoreau said, "We need the tonic of wildness . . ." We may not have much natural wildness left, but our kids deserve encouragement to become connected to this remaining heritage. In doing so, they may be healthier and happier because of it.

Dr. Margaret Lowman (aka Canopymeg) is a science writer

Activity

Plan one event in your week to experience a bit of local natural science. Whether you are a grandparent, parent, sibling or volunteer, choose one of the following: picnic on a beach; visit the canopy walkway in Myakka River State Park; look for scrub jays in Oscar Scherer State Park; take five flowers or leaves into a classroom so that students can draw and describe them; or read a nature book aloud to a classroom, Sunday school, after-school, or family group.

ENVIRONMENT

NATURE'S SECRETS / By Meg Lowman

Project NEON may herald a new American Age of Exploration

Over the long haul of life on this planet, it is the ecologists, and not the bookkeepers of business, who are the ultimate accountants.

— Stewart Udall, 1970

MEG LOWMAN
NATURE'S SECRETS

On Jan. 4, in a nondescript hotel conference room in Marina del Rey, Calif., 160 scientists launched a new frontier for American biological exploration. This concentrated assemblage of scientific brain cells under one roof spawned passionate, yet technical, discussion. New research tools were bandied about that sounded like gadgets from "Star Trek" — biodiversity tricorders, lotic sensor array platforms, sensor micronets, soil megabiotrons and satellite remote-sensing systems. These almost-unpronounceable words represent the scientific tool kit of the future. In the next 30 years, they will be deployed across our country to monitor its environmental health. Mission: Planet Earth.

Project NEON, which stands for the National Ecological Observatory Network, is the first proposed continent-wide observation system designed to understand the ecosystems of the United States. Never has an equivalent of NASA (that prioritizes outer space) been launched to study our very own planet. Five scientists represented Florida on the NEON committee: Hillary Swain (Archbold Field Station), Carlos de la Rosa (The Nature Conservancy), Tom Miller (Florida State University), Dan Childers (Florida International University), and myself. We shared a sense of exhilaration and also enormous responsibility to plan future exploration of our continent. An obvious question asked is, "Don't scientists already know everything about the environment of America?" Simply answered, we probably know more about the substrate of Mars than we know about the soils of our own Myakka River watershed in Southwest Florida. Although NASA and outer-space exploration remain important missions, scientists also recognize a need to focus on regional and continental priorities. Examples of this are obvious — we have yet to eradicate red tide, control the love bug, accurately count fish populations, or restore a natural water balance to the Everglades.

Become an Earth detective

Use your powers of observation. Experience the quest of exploring your own back yard, just like NEON scientists throughout America. Can you observe one bird, plant, insect or animal that you have never seen before in your Florida neighborhood? Good luck.

All of these environmental challenges stem from a lack of adequate scientific understanding of our own ecosystems. Scientists and Congress have come together via NEON to tackle these critical issues of "homeland security."

NEON will transform the way that we investigate our landscapes, providing research and education programs from genomes to ecosystems, from invasive species to infectious diseases, from best land-use practices to better science education. NEON uses new technology to assess the health of our country: satellite images to map insect outbreaks on crops; delicate sensors to calculate productivity of crops; radio-tracking devices to monitor herds of caribou; and tiny thermisters poked into the soil to detect microorganisms decomposing waste material.

In short, NEON is a detective operation dedicated to uncovering the secrets of American ecosystems so that we can forecast change. Can we consistently and accurately predict hurricanes? Comprehensive weather tracking using advanced satellite remote-sensing systems will provide better information for monitoring storms. Can we rediscover the ivory-billed woodpecker in a remote swamp of Louisiana? Bird lovers pray that the newest monitoring devices (e.g. polarimetric radar, or high-powered audio detectors for birdsongs at great distances) may uncover a remnant population of this bird that could be brought back from the brink of extinction. Can we reduce the severity of asthma in the United States? New sensors to monitor particulates in the air may lead to solutions for environmental health issues. NEON promises to provide important answers to critical issues. Just as we hire mechanics to repair and maintain our automobiles, we employ scientists to maintain the environmental machinery of our planet. NEON is an important homeland security program that will protect the future of life on our little-known planet. (Check out www.neoninc.org.)

The age of exploration in our own back yards is dawning. As we sit drinking our morning coffee and reading the newspaper, scientists are testing new tools to provide high-resolution ecological forecasting and prediction. New discoveries already abound. In Australia, a new species of tree called the Wollemi Pine was first documented a few years ago in a deep mountainous gully less than 50 miles from Sydney! An entire valley had remained unexplored despite its close proximity to a major urban metropolis. During the first-ever biological census in New York City's Central Park last year, several new species of organisms were discovered, in one of the most highly populated areas of the entire United States. I hope these new tools for biological detection will allow my children and their children to someday hear the call of the magnificent ivory-billed woodpecker, and better understand its role in the machinery of our ecosystems.

Stay tuned. If Congress continues to fund NEON, scientists may discover how to control invasive weeds, how to alleviate asthma, how to monitor and recover endangered species, or how to curb outbreaks of red tide. NEON will doubtless contribute to a healthy Florida environment for all of us to enjoy in the future.

Dr. Margaret Lowman (aka Canopymeg) is a science writer and Director of Environmental Initiatives at New College of Florida. Her column appears semimonthly. Mina Walther's Tide Lines columns are now republished on an occasional basis.

PROVIDED BY MEG LOWMAN

AFP PHOTO /SOOO /WILLIAM WEST

Above, horticulturist Mark McMahon inspects Wollemi Pines on display in Sydney, Australia. At left, a bottomland exhibit at Louisiana State University in Baton Rouge includes a pair of stuffed male and female ivory-billed woodpeckers. A forestry student at LSU reported seeing a pair of the birds in a swamp in 1999.

NATURE'S SECRETS / By Meg Lowman

Seeing the big picture — a new technology for Earth images

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 (Earth's) ecology.

— Lawrence B. Slobodkin, "A Citizen's Guide to Ecology," 2003

MEG LOWMAN
NATURE'S SECRETS

The University of South Florida St. Petersburg houses one of the best-kept scientific secrets in our region, the Geo-spatial Analytics Laboratory. In this space, lab director Barnali Dixon and her students analyze satellite images of our region and serve as "doctors" who detect changes on the Earth's surface.

Many of us, myself included, cringe at the current terminology in science. Just what does remote sensing mean, and how does it differ from GIS (Geographic Information Systems) or GPS (Global Positioning Systems)?

One type of remote sensing uses information collected from satellite sensors that observe different wavelengths reflected from the Earth's surface. Some wavelengths can detect chlorophyll in green plants; others may measure nutrient flows in wetlands. More than 7,000 satellites orbit the Earth, many of which are utilized for communication or as spy satellites, but others are dedicated to studying the health of our planet. On the ground, GIS technology is a tool for answering questions about the Earth's surface. GIS can be used to select sites for nature reserves or highways, or detect changes in crop health. It does require interpretation by professional ecologists applying sound decision-making capabilities.

On a smaller scale, GPS is an often hand-held tool used to determine map locations on the ground.

All of these technologies rely on satellites. A recent conference on remote sensing was funded by the Economic Development Corp. of Sarasota County and held at Mote Marine Laboratory. The event attracted a crowd of more than 50 scientists, planners, engineers and business people statewide. They came to learn more about remote sensing, including GIS, GPS and other jargon that involves the use of satellites to map our Earth.

Our eyes and ears are sophisticated remote sensors because they extend our capacity to detect physical objects and forces at a distance. Satellites use highly specialized cameras that allow us to "see" wavelengths outside of the visible spectrum and map levels of detail that our eyes cannot detect. However, the most important part of remote sensing is the training to develop the expertise to analyze the images. These technologies, along with a family of ground-based miniature sensors (called motes), are the wave of the future for monitoring the health and vitality of our planet and its natural resources. Applications of remote sensing include mapping forests, detecting insect outbreaks, mapping soil erosion and measuring light intensity of cities.

Aerial images can be incomprehensible to a layperson's eye. But forest scientist Dr. Stephanie Bohlman, who was a speaker at the EDC conference, has learned to identify specific tree species within the vast green expanses of tropical forests in the Amazon basin, and to detect slight changes over time that represent the occurrence of selective logging, roads or forest fires. The resolution that she uses for her images depends on the question asked. Specific satellites (e.g. Landsat, Quickbird series) take photos with different resolutions and different spectral arrays. Bohlman uses remote sensing to measure tree cover that in turn can be utilized to map regions of carbon uptake. Because vegetation acts as a sponge for carbon dioxide, aerial photographs have provided information about climate change.

Remote sensing can also be used for soil-moisture and water-quality research. At USF, Dixon studies hydrology in Florida via remote sensing. With GIS, she detects soil erosion, water quality and contaminant transport, and advises on land-use planning. Map views are two-dimensional but ecosystem processes are three-dimensional. This is a critical difference, and so maps require experts trained to interpret the visual images showing ecosystem processes. To understand the maps, scientists must communicate across disciplines — hydrologists must talk to GIS experts, to biologists, to city planners and to agriculturists to effectively use this new technology to manage our ecosystems. Dixon reminds her students that everyone must speak the same language in order to solve land-use challenges, and that the use of different scales in aerial assessment is critical to answering important global environmental questions.

So what? Why do we need expensive, high-resolution images of different ecosystems across the Earth? Can't we measure enough on the ground? The answer is no, that direct observation or "ground-truthing" does not always provide the "big picture" or overall perspective of large-scale activities such as regional changes in watersheds, coastal pollution or forest fragmentation. As human populations expand throughout the globe, we invariably affect the health of ecosystems. With scientists mapping the changes and understanding the widespread impacts of local events, remote sensing provides citizens with an accurate tool for creating solutions to environmental challenges. Satellite images, and experts trained to translate these images into environmental solutions, are part of today's "scientific tool kit" to ensure the future health of planet Earth.

Dr. Margaret Lowman (aka Canopymeg) is a science writer and Director of Environmental Initiatives at New College of Florida. Her column appears semimonthly.

The water math

In my previous column, I mentioned that Mother Nature generates about 54 inches of rainfall per year on our landscape, and I posed this question: For a county of 550 square miles (about the size of Sarasota County), can you calculate how many gallons fall?

Sarasota County water expert Steve Suau calculates that this would equate to an average annual volume of 516,148,695,528 gallons. That's over 500 billion gallons!

Sarasota County's entire annual water demands could be met if we could capture just one inch of the 54 inches!

DIGITAL GLOBE/THE NEW YORK TIMES

An image captured by Colorado-based DigitalGlobe's QuickBird satellite shows wildfires raging north of Tuscon, Ariz., in June 2003.

1972

1986

1996

ASSOCIATED PRESS/AMERICAN FORESTS

Above, the disappearing green of vegetation is visible from space in these Landsat images of the Puget Sound region taken, from left, in 1972, 1986 and 1996. The dark circular region at lower right is the glaciated peak of Mt. Rainier. The dark areas in the photos represent impermeable areas such as paving or buildings. Landsat images can be used for detailed information on watersheds or urban sprawl. Left: Aerial imagery can be photographed from a small plane, such as this view of the tree canopies in Myakka River State park used for locating oak-palm hammock ecosystems.

THE

END

With thanks to:
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