

Volume 24, Issue 3

SUMMER, 2015



CANADIAN ORGANIZATION FOR TROPICAL EDUCATION &
RAINFORST CONSERVATION

RAPHIA

COTERC POTLUCK

PLEASE JOIN US FOR AN END
OF SUMMER POTLUCK AT THE
HOME OF

JIM TAYLOR
58 LOVE CRES.
AJAX, ONTARIO

ON
SATURDAY, SEPTEMBER 12,
2015

Here's the link to download the
map

http://cartographic.info/ca_street/map.php?p=ont&id=112105

It would be appreciated if you can
bring along a potluck & or drinks!

NOTES FROM THE EDITOR

Well, summer is once again upon us (although there have been some days when it felt more like early spring). The flowers are out, and our hard-working bees, butterflies, bats and other pollinators (e.g. birds, ants, beetles, flies, moths, etc.) are taking advantage of the plethora.

Unfortunately because of the pesticide neonicotinoids, these vital animals are being decimated in great numbers. Farmers prefer to use this toxic chemical on their crops in order to eradicate weeds, but at what cost? Without pollinators, there will be no food.

Recently the Canadian government initiated heavy restrictions on the use of neonicotinoids on their crops, but it appears that some greenhouse growers are spraying vegetable & flower plants offered for sale at nurseries and we are unknowingly contributing to the problem by purchasing them.

Home Depot has recently decided to tag a warning on the plants they sell, and it is hoped that instead of offering these plants at all, with pressure they will not purchase them from suppliers who use this chemical. It's a start, but much more needs to be done if we are to continue to have a food supply.

The Monarch butterfly is under pressure, as well, partly from the reduced winter grounds in Mexico but also from the great reduction in its major food source, the milkweed plant.

Milkweed is considered a weed by many and cut down in order to build houses, etc., and when trees are removed to harvest the wood, and in recent years the multitude of wildfires has destroyed a good deal of milkweed.

In March and April the Monarch butterfly lays its eggs only on this one type of plant. After about four days, the eggs hatch into baby caterpillars, also called the larvae. It then eats the milkweed for the next two weeks before



attaching itself to a leaf using its silk and beginning the process of metamorphosis, ending up as the beautiful butterfly.

We can help by making room for this plant in our garden, and in return you will have the enjoyment of observing these butterflies close up.

Bats, too are major pollinators and some plants depend partly or wholly on bats to pollinate their flowers or spread their seeds, while other bats are insect-eaters and help to control pests.

Bats are being decimated in great numbers due to a terrible disease called "white nose syndrome" caused by a fungus and which has eliminated at least 80% of the hibernating bat populations of 26 US states and 5 Canadian provinces.



Bat with White Nose Syndrome

Although scientists are vigorously researching this terrible fungus, there is no cure at the moment.

According to Bat Conservation International, "bats are the primary predators of night-flying insects, and we can expect to see significant ecosystem changes in the coming years".

None of this is good news. We depend on all pollinators for our food supply.

COTERC receives no government funding and depends on your generosity to continue our work. Please consider making a donation. You can make a one-time donation or arrange for a monthly withdrawal easily through Canada Helps. Just go to their website

<https://www.canadahelps.org/en/donate/>

Click on "Find a Charity"

Type in COTERC and then follow the instructions.

Whether the amount is \$5 or whatever, your donation is greatly appreciated — and Canada Helps issues a tax receipt directly to you.

Costa Rica – Environmental Success Story

by Doug Durno

In Costa Rica in the 1960s and 70s, deforestation was government policy. The plan was to grow the economy by exporting bananas, coffee, sugar and beef. As a bonus, when trees were cut down to make way for farms, they got timber, which could also be exported. The government encouraged this land clearance with cheap loans and guaranteed prices. It wasn't long before Costa Rica had one of the world's highest deforestation rates. As the following numbers show, Costa Rica has achieved a fascinating turnaround.

| | <u>c 1980</u> | <u>2015</u> |
|----------------|---------------|-------------|
| Forest cover | 17% | 52% |
| National parks | 2 | 27 |
| Other reserves | ? | 140+ |

What changed? In the early 80s, the world economy soured. With Costa Rican exports and their prices falling, the government could no longer afford to subsidize farmers. However, ecotourism was starting to sprout. The government re-thought its economic model. It realized that conventional accounting systems didn't measure "natural capital" – that is, trees, birds, water, land, biodiversity, etc. They have economic value that can be measured as income. For instance, trees prevent soil erosion, saving valuable agricultural land. Also, when animals and plants have homes, biodiversity is strengthened. With biodiversity, ecotourism can flourish, bringing in dollars and creating lots of jobs. Tourism now accounts for 25% of Costa Rica's foreign-exchange income.

How was Costa Rica able to accomplish such a turnaround?

- 1) It has a relatively strong **rule of law**. This means everyone is subject to the law and enforcement is fairly good. Corruption and environmental abuses are less prevalent.
- 2) **Richer countries and NGOs** are more willing to provide funds for environmental protection when they know their donations (50% of the Forestry Finance Fund's budget) will be subject to less corruption.
- 3) Its **property rights** system is fairly good so that reserves and other rural land are safer from people encroaching on them to farm or hunt.
- 4) The **education system** is highly rated. Everyone learns the benefits of environmental responsibility.
- 5) Money does grow on trees. The government put in place a **Payment for Environmental Services (PES)**, which pays landowners to conserve forest and actually expand it. This changed people's attitudes as they realized forests have intrinsic value.
- 6) In 2012, Costa Rica banned **recreational hunting**, the first country in the Americas to do so.

Result: Costa Rica has twice been named top performer on the annual Happy Planet Index. Habitat has been maintained and thus biodiversity. Forests and wetlands remain as carbon reservoirs. Less carbon dioxide is released into the atmosphere. More oxygen is emitted.

Challenges: Compared to what the PES pays, landowners can make more growing bananas, pineapples and oil palms so plantations continue to proliferate. Turtle poaching, illegal logging and mining continue to be problems as funding for enforcement is often lacking. Corruption has dogged the country right up to the presidential level.

COTERC ANNUAL GENERAL MEETING

Minutes from Annual General Meeting, Saturday May 9th, 2015 Board Room, Toronto Zoo

Acting Chair Marilyn Cole called the meeting to order at 5:10 with opening remarks. She thanked the board members for their work over the past year and introduced Dr. William Rapley and Kevin Kerr from the Toronto Zoo. Marilyn noted the number of events where COTERC was represented during the year and highlighted the great work of Station Manager Charlotte Foale, the growth in research at Cano Palma Biological Station and its being recognized as the second best spot in Costa Rica for Sea Turtles.

All board members briefly introduced themselves and spoke about what drew them to COTERC.

Reports from Board Members – Synopsis

Marilyn Cole, Vice-Chair / Acting Chair

In the absence of a Chair, Marilyn has been Acting Chair for COTERC. She has managed all of the administration including monitoring the phone, the e-mail account and bank accounts and ensured that bills were paid. She is a member of the By-law committee and arranged for the team to spend a weekend hashing through the by-laws and simplifying them. She attended the Blumberg Charity Workshop to ensure that COTERC is in compliance with all CRA rules for not-for-profits. She also arranged for a volunteer bookkeeper to create a financial statement in the absence of a Director of Finance in late 2014.

Marilyn represented COTERC at a variety of events including last year's Halton Eco-Fest, Reptile Expo and the recent Canadian Pet Expo. She managed the silent auction for Fiesta Verde, including the tracking of items, setting up the auction and following up with tax receipts for the donors. She also creates the quarterly Raphia newsletter.

Marilyn created a Cano Palma cookbook which is being sold at different venues to raise funds for COTERC. She recently visited the station and provided needed items, especially for the kitchen.

Jim Taylor, Director Membership and Archives

Jim continues to manage the memberships and list of the friends of COTERC. Current membership stands at less than one-hundred members, with a combined list of members and friends of approximately 450. Jim noted that volunteers at the station receive a one-year membership, but very few are renewed. He recommended that membership be added to the agenda for the next board meeting. In addition to membership, Jim oversaw the Dropbox for photos and has recently been

working with internet service providers to ensure that bulk

COTERC e-mails are not being blocked. He sends out the quarterly Raphia publication and the monthly Cano Palma newsletters and any other communications the board requests. He has helped with the setup for various events and has allowed COTERC to temporarily use his new shed to store all of the items which were previously held in the storage locker that was given up to save on expenses.

Jim is also on the by-law committee and spent a weekend with the committee to re-write the by-laws.

Dr. Kym Snarr, Director Conservation and Research

Kym reflected on her 7 years as a board member. Her main focus has been to ensure stability of the research done at the station, including maintaining historical records, documenting and following research procedures and increasing the amount of research being done. With the help of her students, the website now contains a historical record of station managers and papers presented. She noted that when she joined, we had a station manager and a science officer which then merged into one person.

Since the hiring of Charlotte Foale as station manager along with her husband Manual three years ago, the added stability allowed Kym to re-introduce a modified science officer role, which is now the Research Co-ordinator. As a result, the amount of research done at the station has increased and there is more consistent training of interns. The relationship with a university in the Netherlands has expanded to include interns from other countries (now referred to as European Union Research Interns). In addition to the Research Co-ordinator, the station now supports more staff (two turtle interns) and was able to increase wages slightly. Getting items needed at the station continues to be a problem, especially things like laptops which have a short lifespan in the humidity.

Kym's more recent focus has been on the data the station has been collecting. Data is a commodity which can be shared and will be of benefit to the station. She is sorting through all of the receipts and paperwork relating to the Donner Foundation grants to ensure all funds are accounted for and used up. She noted that a recent successful pilot was done with some of the turtle funds, using plastic netting rather than metal screens over turtle nests to prevent the local dogs from getting at the eggs.

Kym is turning over her directorship to Dr. Nathan Lovejoy but will continue to work with him to maintain the continuity she has worked so hard to achieve.

DO YOU NEED TO BE A BIOLOGIST TO VOLUNTEER AT CAÑO PALMA??

-- Even Non-Biologists Enjoy Caño Palma Biological Station

Before arriving at COTERC I was excited about the prospect of living in the Costa Rican jungle for a month but also slightly nervous: would I, a non-biologist with next to no ecology experience, be of any help to the organisation? Would I be seen as the 'plus one' of my ecologist husband and have to try to stay out of the way of the 'scientists'? However, as our time has now come to an end I can confidently say that I have thoroughly enjoyed my weeks here and have been involved and played a part to a greater or lesser degree in every survey that COTERC has run during our stay.

In the UK I have been involved in local wildlife projects and attended educational initiatives (tree planting, conservation talks, nature walks etc) and have always enjoyed being outdoors and learning about the environment. I have also volunteered in our local community with children's events, so when Charlotte mentioned there was also some work with the library in San Francisco I was interested in helping there also.

On the day we arrived we were asked if we wanted to join the team that evening on a herp survey and, being eager to jump in feet-first, off I went. I really enjoyed our first outing in the rainforest at night, traipsing through the jungle and finding snakes (though a few days later I would find out that snakes are a common sighting!) as well as plenty of tropical bugs. The next day I was helping to identify, measure and weigh the snakes!

In the first week I had been involved in surveys for bat tents, shore birds, caimans, macaws and mammals, and also put in beach mile marker posts ahead of the start of the turtle season. The following week I added beach profile, tree frog surveys, weather recording and the turtle morning census to the list. The variety of projects kept things interesting and allowed me to experience a lot of different aspects of the Costa Rican wildlife. I found that on almost all of the surveys I was an equal part of the team, able to look for and find whatever animal or evidence we were searching for that day. On bird surveys where a species was needed to be identified I was still able to assist the search (and after a few encounters enjoyed being able to recognise the common birds myself), but mainly left the identification to the other members of the team. On those occasions I was recording the data, and it was fantastic just being there to see the many different colourful tropical birds in the area.

Within the community I helped to set up and organise the library, and was able to help with homework club (though with my limited Spanish it was mainly with the younger children teaching maths and colours).

On our days off Simon and I would take a kayak out, stroll along the beach or head into San Francisco or Tortuguero. For afternoons off I enjoyed reading by the canal (there is a library of animal-related and non-animal-related books), going for a run, improving my Spanish or cooking (freshly baked bread or cookies are always a welcome sight for those coming back from a survey) so there is always something to do.



Being in Costa Rica and adjustment to jungle living was not difficult for me. As we had been travelling through Central America for almost 2 months we were already accustomed to some of the culture and idiosyncrasies of the region and at Caño Palma we also enjoyed the novelty of having to get everywhere by kayak; being able to drink the tap water was a welcome change. The wildlife around the base was great: monkeys, lizards, caimans, birds and frogs to name a few. Thankfully I am not afraid of spiders or snakes, as there are plenty of those hanging around too!

Volunteering at COTERC was a wonderful and unique experience and although I do not have an ecology background I was able to get involved and help out, as well as learn so much myself. Living in the Costa Rican jungle for a month is an experience I will never forget and will recommend it to anyone who is interested in having an adventure (and doesn't mind a bit of rain).

Sarah Thomas lives in London, U.K. and is a Marketing Manager for Debenhams PLC.

A COMPARISON OF FIELD WORK BETWEEN COSTA RICA & THE U.K.

by Simon Thomas

I've worked in the UK as an ecological consultant for over seven years but it has always been an ambition of mine to spend some time in the jungle. I've dreamed of kayaking down tropical waterways spotting birds or tracking exotic beasts on jungle paths. In late 2014, together with my wife Sarah, we decided to make it happen and Caño Palma fit the bill. We chose COTERC from a number of options because of the opportunity to get involved in a variety of ecology projects as well as working with the local community. We planned a month-long visit to Caño Palma as part of a four-month backpacking tour through Central and South America, starting in Mexico and ending in Peru.



My job in the UK (London) includes surveys for a wide range of protected species, including birds, bats, amphibians and reptiles. I knew that the species I'd encounter in Costa Rica would be completely different but hoped that some of my survey experience would come in handy. On starting the surveys at COTERC, I found that many of the protocols and survey methods were familiar. Weather data and survey effort were recorded in the same way as I have used at home. The early mornings and constant threat of heavy rain are familiar aspects of ecology in the UK. Transect surveys were undertaken in a similar way to what I have done in the past. The shorebird survey was particularly recognisable as I have carried out the same survey on estuaries in the UK. *In fact, some of the species – sandering, whimbrel, plovers, sandpipers and egrets – were the same or similar to species we find in the UK.*

One of the surveys I enjoyed the most was the mammal survey as we encountered the tracks and signs of so many species I'd not encountered before including a jaguar and ocelot prints. I was interested to find that the field signs of armadillo, other than the tracks themselves, were very similar to the signs of the European badger (*Meles meles*). The

two species seem to occupy very similar niches – living in burrows, snuffling along well used routes each night and rummaging through the leaf litter and dead wood in search of invertebrates.

In the UK I work a lot with bats. Coming to Costa Rica I was amazed by the number and diversity of bat species. Tent-making behaviour particularly is totally different from anything bats would do in the UK, where bats roost well-hidden in tree cavities, buildings or caves.

One aspect of ecology field work in the UK and at COTERC is the seasonality of certain surveys. UK ecologists face a 'busy season' starting in about March when bats, reptiles and amphibians start to emerge from hibernation. This was matched at COTERC by the start of the leatherback turtle nesting. In both cases the start of "The Season" is marked by excitement and trepidation, reminiscing about previous years and wondering what the coming season will bring. In the case of the leatherback season 2015, it took a couple of weeks of night patrol before the first nesting turtle was encountered, but it was an experience we won't forget. The turtle had chosen to nest right next to Vista al Mar Hotel, at 8pm and so faced an audience of around fifty tourists. The night patrol team did an admirable job, simultaneously controlling the crowds, answering people's questions and collecting all the required data – even measuring perfect triangulations of the nest!

In the UK I undertake voluntary river surveys for the European otter (*Lutra lutra*), largely searching for droppings on prominent logs. Kayaking along Cano Palma I noticed similar droppings belonging to the neotropical river otter (*Lontra longicordis*). You could see that the otters had been eating fish, crustaceans and even lizards! I discussed with the research coordinator the possibility that someone may go forward with a project to research the otters further.

Working at Caño Palma for a month was just the experience we'd been hoping for. The novelties of living and working in a tropical environment (surprise snakes in the cereal bowls, watching monkeys while having a shower etc.) provided fun and excitement every day. The projects we've participated in have also given me invaluable experience of projects, methods and constraints that are in some cases very different from those I work with back at home. Above all it has been great to be fully immersed in such an amazing and diverse environment, rather than experiencing it in summary format from a brief guided tour.

Simon Thomas studied BSc Biology at York University (UK) and MSc Ecology, Evolution and Conservation at Imperial College London. Simon lives in London and is a Principal Ecologist for Tim Moya Associates in Essex, UK.

ANNUAL GENERAL MEETING MINUTES (CONTINUED)

Bev Carter, Director at Large

Bev provided a written report which was read by Marilyn Cole. Bev has employed her woodworking skills on behalf of COTERC, making and donating birdhouses for Fiesta Verde centrepieces and wooden butterfly decorations, a good portion of which have been sold for fund-raising. She put together several slide shows and Costa Rican music CDs for use at events.

Bev has created a monthly newsletter from all of the station reports which has been very well received.

After 2 years plus a 1 year extension, Bev is stepping down from the board. However, she has offered to continue creating the monthly newsletter.

Susan Kunanec, Director at Large

Susan has represented COTERC at a number of events over the year, including the Partners in Protection program at the ROM. She has done some fundraising with the sale of Cano Palma cookbooks and hand-made Costa Rican jewellery. She attended a web-seminar to understand the impact of CRA changes on not-for-profits.

Susan helped to organize and run Fiesta Verde 2014 with Nancy Cox, the then Director of Special Events.

After 2 years plus a 1 year extension, Susan is stepping down from the board, but not from COTERC and will continue to volunteer when needed.

Submission of proposed new logo for discussion

Marilyn Cole passed around the proposed new logo (a colour version and a black and white version). The current logo is in green with a pair of hands holding up a large tree with many fine details. The proposed new logo is a merging of a red sugar maple leaf with a green Raphia palm leaf to symbolize both Canada and Costa Rica, with a spider monkey in the centre. The new logo is easier to digitize. Most of those in attendance approved of the proposed logo, provided that the brown colour of the leaf veins was removed (it was noted that in some cases the brown appeared to be coming out of some areas of the spider monkey that could be misconstrued).

Submission of proposed new by-laws for approval

A by-law committee was created to review, amend and simplify the COTERC by-laws to ensure that they met all CRA rules. The committee consisted of board members Marilyn Cole, Jim Taylor and Tom Mason and former board members/current COTERC members Barry and Collette McKee. The committee spent a week-end in Muskoka to focus on the job.

The revised by-laws contain what is required by law. As much as possible, the by-laws were re-written to provide enough flexibility that they would not need amendments that would result in having to re-submit them to the CRA. Items previously included but not required by the CRA were removed and will be re-packaged into a procedures document.

The by-laws were reviewed by all attendees. Minor edits were suggested and agreed upon. There was some discussion about the portion of the COTERC mandate which refers to education in the tropics. Some points under Article 6 – Hold Harmless were also discussed and clarified.

Kym Snarr motioned that the by-laws be accepted with the minor edits. John Gormaly seconded the motion and the motion was carried.

Review of Financial Statement

Due to the lack of a Director of Finance until recently, an official audited financial statement was not available. However, a financial statement prepared by a bookkeeper was presented. It was agreed that some of the figures need clarification and further review.

Nomination of Board Members

Term of office is 2 years, with half of the positions up for nomination every year.

At last year's meeting Tom Mason accepted the nomination for Director of Site Services until someone could be found to replace him. Kym Snarr has agreed to take this on while she transitions out of the Director of Conservation and Research position.

- a) **Chair** : Marilyn Cole was nominated by Dr. Bill Rapley, Seconded by Jim Taylor Passed
- b) **Vice-Chair**: Shelley Hutchinson nominated herself
Seconded by Dr. Kym Snarr Passed
- c) **Finance** (vacant): Kathy Lau, CPA, nominated by Dr. Kym Snarr, Seconded by Dr. Nathan Lovejoy Passed
- (d) **Director of Conservation and Research**: Dr. Nathan Lovejoy nominated by Kym Snarr, Seconded by Anders Holder Passed
- e) **Director at Large**: Tom Mason nominated by Jim Taylor Seconded by Nathan Lovejoy Passed
- f) **Director of Special Events** (vacant): no nominations

The Sloth's Busy Inner Life

by Nicholas Wade (reprinted from the
New York Times)

It's true that the sloth, which lives in the jungles of Central and South America, would barely prevail a race with a snail. But it's not a sluggard because it's lazy. Rather, it has carved out a remarkably ingenious mode of life in the treetops, but one that imposes certain constraints on its speed and energy level.

The sloth is not so much an animal as a walking ecosystem. This tightly fitting assemblage consists of a) the sloth, b) a species of moth that lives nowhere but in the sloth's fleece and c) a dedicated species of algae that grows in special channels in the sloth's grooved hairs. Groom a three-toed sloth and more than a hundred moths may fly out. When the sloth grooms itself, its fingers move so slowly that the moths have no difficulty keeping ahead of them.

The probable interplay of these three components has now been worked out by a team of biologists led by Jonathan N. Pauli and M. Zachariah Peery at the University of Wisconsin. Their first step was to ponder a 35-year-old mystery about the behavior of the sloth.

Every week or so, the sloth descends from its favorite tree to defecate. It digs a hole, covers the dung with leaves and, if it's lucky, climbs back up its tree. The sloth is highly vulnerable on the ground and an easy prey for jaguars in the forest and for coyotes and feral dogs in the chocolate-producing cacao tree plantations that it has learned to colonize. Half of all sloth deaths occur on the ground. The other serious hazard in its life is an aerial predator, the harpy eagle.

Why then does the sloth take such a risk every week? Researchers who first drew attention to this puzzle in 1978 suggested that the sloth was seeking to fertilize its favorite tree. Meanwhile, the algae that gave the sloth's coat a greenish hue were assumed to provide camouflage.

Writing recently in Proceedings of the Royal Society B, the Wisconsin researchers assembled all these pieces in a different way. They started by trying to understand what would compel the three-toed sloth to brave the dangers of a weekly visit to ground zero. Its distant evolutionary cousin, the two-toed sloth, stays safely in the canopy, out of the jaguar's view. The visit to the ground, the researchers concluded, could not be for the tree's benefit, because the sloth's dung would not make much difference to its nutrition. Rather, they assumed, it was to favor a critical component of the sloth's ecosystem, the pyralid moth. The descent to the sloth's midden affords the pregnant moths in its fleece a chance to lay eggs. Adult moths leave the dung pile and fly up to the canopy, in search of sloths and mates. Moths increase the amount of nitrogen in the sloth's fur, which encourages algae to thrive. A species of moth lives in the sloth's fur. Pregnant moths lay eggs in the sloth's dung pile, where moth larvae will live until they mature.

The moths' caterpillars are coprophagous or, to put it more bluntly, consumers of excrement. They grow to maturity in the sloth's dung pellets and, on hatching, flutter up to the trees to find a sloth host. Burrowing into its fur, they mostly shed their wings and live there happily for the rest of their days, mating and dying in a safe, protected environment.

Researchers studying why three-toed sloths would risk their lives to defecate on the forest floor found that the activity helps support a complex and beneficial ecosystem in the sloth's fur. Green algae grows on the sloth's hair, which has tiny cracks that store water. The sloths are thought to eat the nutrient-rich algae to supplement their limited diet of leaves.

Three-toed sloths spend most of their lives in the forest canopy. The sloth's diet of leaves is hard to digest and low in nutrients, and sloths have the slowest digestion of any mammal.

The sloths descend to the forest floor once a week to defecate. The journey is risky, and uses about 8 percent of the sloth's daily calories. (Two-toed sloths typically defecate from the canopy instead.)

Continued on Page 9

After they die, their bodies are decomposed by the host of fungi and bacteria in the sloth's fur. The metabolic products of this decay, especially nitrogen, are the feedstock for the specialist algae that grow in the sloth's hair shafts. The researchers guessed that the sloths might be eating the algae from their own fur, and that this could be the purpose of the whole system.

Two-toed sloths, which defecate from the trees, also harbour moths though to lesser extent. Still, they seem to be taking advantage of the sloth-moth-algae mutualism without sharing any of the risk. What could be lower on the moral totem pole than a freeloading sloth?

Leaves are poor sources of nutrition, and animals that depend on them, like gorillas, often require large guts to hold them all. The sloth, having to climb along thin branches, can't afford a big gut. It moves slowly because every calorie counts, and it pays to slow down its metabolism. But the invention of giving over its fleece to algae farming would go a long way to solving its problem of limited nutrition.

Dr. Pauli and his colleagues guessed that the sloth might be overcoming the poverty of its leaf diet by eating the algae on its fleece, and that the moths were essential fertilizer for the algae. In their paper they report much evidence in support of their hypothesis. The greater the infestation of moths, the more nitrogen a three-toed sloth carries in its fleece and the greater the amount of algae. An analysis of stomach contents showed the sloths were indeed eating the algae.

Two-toed sloths, which defecate from the trees, also harbour moths though to a lesser extent. Still, they seem to be taking advantage of the sloth-moth-algae mutualism without sharing any of the risk. What could be lower on the moral totem pole than a freeloading sloth?

Dr. Pauli said he and Dr. Peery started their sloth project in 2009 on a cacao tree plantation in Costa Rica, with the goal of seeing if the sloths could colonize the plantations when their native forest was destroyed. Studying a sloth's movements might seem as exciting as watching paint dry but the researchers sidestepped this tedium, Dr. Pauli said, by tracking the sloths with electronic collars. Genetic engineers sometimes dream of inserting chlorophyll molecules into human skin cells so that people could photosynthesize their own food. The sloth had the idea first, probably millions of years ago.

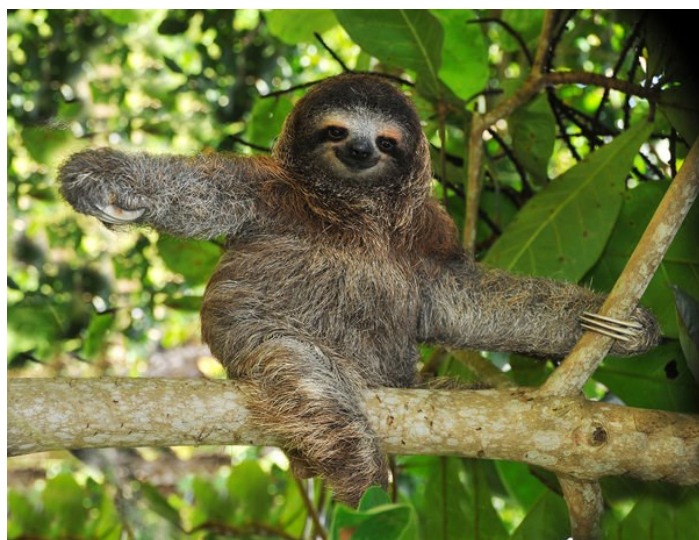
FAREWELL TO BEV & SUSAN

After serving on the Board of Directors of COTERC for several years, Bev Carter and Susan Kunanec have decided to retire to pursue other interests. During their time, they both were invaluable volunteers who contributed much time and effort to further the charity's goals.

Bev has visited the Station, attended board meetings & volunteered for Fiesta Verde & other events, and she has graciously agreed to continue putting together a summary of the various Station reports, so that our members can be kept apprised of activities there.

Susan has visited Cano Palma Biological Station on numerous occasions and is well versed in the challenges our staff face. She has kindly donated many supplies on her trips, and has pledged ongoing financial support to COTERC.

Bev & Susan, we greatly appreciate your efforts!



Three toed Sloth in an upright position for a change

RECIPES FROM CAÑO PALMA BIOLOGICAL STATION—ORDER FORM

If you have ever visited Caño Palma, you will want this souvenir, whether you can cook or not!! The divider pages feature colour photos of people, wildlife and station buildings, while the delicious recipes speak for themselves! Marilyn Cole gathered recipes from the cooks, staff and volunteers and compiled the best into this unique cookbook. The Hints and Definitions section feature suggestions that all volunteers need to know! The cost is only \$ 20 plus shipping & handling. You can order online at http://www.coterc.com/store/c1/Featured_Products.html or contact info@coterc.org PayPal or cheque

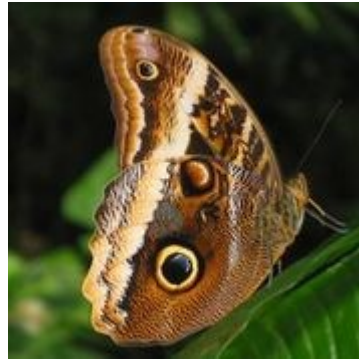
Recipes from Caño Palma Biological Station



**Canadian Organization for
Tropical Education &
Rainforest Conservation
(COTERC)**



Geoffrey's Spider Monkey



Owl Butterfly



Tamandua

Canadian Organization for Tropical Education and Rainforest Conservation

Membership Application Form

This is a request for: NEW Member: _____ Membership Renewal: _____ *Date:* _____
Membership Type: Individual\$30: _____ Student/Senior:\$25 _____ Family: \$40 _____ Corporate \$100 _____

Surname: _____ Given Name: _____ Initial: _____

Email _____

As a member of COTERC a copy of our quarterly newsletter “*Raphia*” will be sent to your primary E-Mail address unless you check one of the following options.

- ☐ Do not E-Mail the newsletter to me. Please send a hard copy to my Mailing Address
- ☐ I do not wish to receive the “*Raphia*” newsletter

MAILING ADDRESS:

Street: _____ Apt: _____

Town/City: _____ Province/State: _____ Postal Code _____

Country: _____ Postal / ZIP Code: _____

| | | | | | |
|--|----------------|-------------|------|--|--|
| Cheque, payable to COTERC | Credit Card | No. | Cash | | |
| | | Expiry Date | | | |
| <p>Please mail form to Box 335, Pickering, Ontario L1V 2R6, Canada or order online at http://www.coterc.com/store/c5/Memberships.html Or via Paypal at info@coterc.org</p> | | | | | |

ADVISORY COMMITTEE

Dr. Robert Murphy

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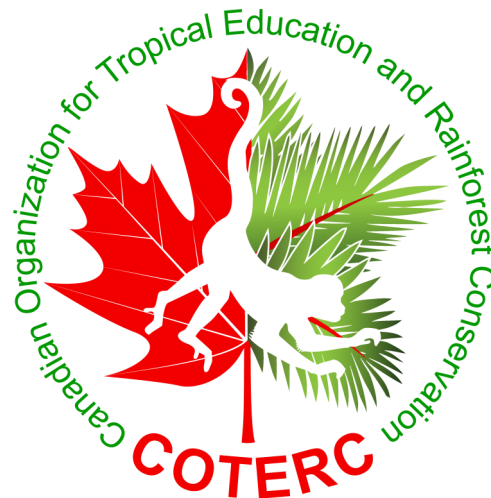
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We welcome any comments or suggestions from our members so that we can be sure that you feel involved. If you have an idea for an article, or better yet, would like to write one yourself —if you have a photo or two that you think we could use — if you have a suggestion for improving Raphia, please do send it along to us at vice-chair@coterc.org

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