

# RAPHIA

Newsletter of Caño Palma Biological Station

## What Are These Researchers Up To?

Find out on Page 4



Yowl. Snarl.  
Yowl. Snarl.  
(Translation - Page 13)



Tayra  
Rips Into  
Editor

Canadian Organization for  
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# KNOW SOMEONE WHO'S JUST HANGING OUT THIS SUMMER?

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### COTERC's Annual General Meeting

Thursday May 16<sup>th</sup> - 7 pm

At Scarborough College

(Room EV-140, Environmental Sciences Building)

All are welcome to attend

Marilyn Cole, the founder of Caño Palma, loved the jungle and its animals. So, it was deemed appropriate that her ashes be spread in the rainforest around the station. Accordingly, on a recent visit to Caño Palma by Board members, a ceremony remembering Marilyn was held, followed by the scattering of her ashes. May she rest in peace.



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## Its Own Corner of the World by Sylvan Wichert

Currently studying Environmental Biology at the University of Toronto, Sylvan came to Caño Palma with nine fellow students and professors Dr Nathan Lovejoy and Dr Roberta Fulthorpe. Next year, Sylvan hopes to start working towards a Masters in Civil Engineering. Her longer-term goal would be to combine her two areas of study in order to tackle urban design and/or agricultural challenges in the face of climate change. In her spare time, this Toronto native is a novelist and a keeper of two small, self-sustaining fish ponds.



The jungle was quiet for the tropics, and a lone, lazy howler monkey commanded the airspace. As our boat rolled around a corner, we got our first glimpse of Caño Palma, the isolated sanctuary where we'd be spending the next week. The double-decked dock welcomed us like open arms. We shed sweaters and exchanged grins. This was not Canada in February.

We were technically a class, but two days of travel totaling eleven hours and three modes of transportation has a special way of bonding people. We were, in the strictest sense, at the station to catch fish. Every two years, students from our university have come here to net and record fish biodiversity in the area's rivers, identifying species, taking tissue samples, and preserving what they caught for collections at the Royal Ontario Museum and the University of Costa Rica.

But no part of a system works in isolation, and our tour soon placed us in the broader context of the station, the forest, Costa Rica, and conservation. By the time we crashed on our beds hours earlier than most of us were used to, we had learned what would and wouldn't bite us in the jungle, how to avoid and respond to emergencies, where we might spot a visiting snake, and who to call if we spotted one—so they could come catch and measure it, of course.

We also learned that local dishes cooked up by the master of the station – you know who you are – were simply *delicious*.

When we got up the next morning, the sun was already up, the station definition of 'sleeping in'. After breakfast, we found rubber boots that fit, loaded into a boat with enough nets to trap an alligator, and drove to our first fishing site. We pulled up in a gorgeous little channel off the main river.

"Alright, everybody out!", grinned our prof, as he hopped over the side into waist-deep water.

Over the next five days, we would spend three of them this way. Our fishing sites ranged from scenic channels to buggy backwaters ready to swallow us up into thigh-deep mud. We deployed



seine nets and dipnets, and repurposed guitar amps that we'd strapped to sticks. Electric fish, it turns out, sound like a buzzing stereo when amped, and the sound gets louder the closer you get. Electric fish, it also turns out, are slipperier than greased eels. Cichlids can leap two meters across the water to escape you. Anchovies begin to disintegrate the minute they die. We set about our fish-hunt with a vengeance.

Our intro to science began when we got back to the station. Each fish we caught had to be identified to a species level, and two representatives of each species had to be

(Cont'd on next page)

## Its Own Corner of the World (cont'd)

photographed and sampled. Our work table devolved into a mess of identification keys, books, tissue vials, scalpels, tweezers, dead fish, trays, ID tags, and laughter. We were up until after dark on most days.

The other two days of the five we spent participating in station activities. We went on green macaw surveys, mammal surveys—better known as Manuel-finds-tracks-and-you-identify-them—a caiman survey, and a tree study. We went night fishing and followed Manuel, the other station master, on forest hikes. We learned tracks and trees and the different types of tents that tent-making bats build. We saw rare herons and dozens of bird species. We slept better than any of us do at home, and if anyone missed hot showers or television, I never heard them complain.

That was a distinctive feature of the station: good spirits. People were helpful and humorous and passionate about what they did. The attitude was contagious. Food was vocally appreciated, dishes got washed, and boats were loaded and unloaded without prompting. Waking up at 3:45 AM and hiking up a hill in the dark, through the webs of four-inch spiders, was nothing in light of the birds we saw at the top. A boat-motor breakdown that left us stranded for hours spawned banter and more birdwatching, and impromptu canoeing lessons with our single paddle. Fish species got nicknames.

Fish-processing sessions developed their own running jokes. We mimicked the howler monkeys, chatted with station interns, and marveled at leaf-cutter ants. When at last it was time to leave, everyone was sad to see the station fade into the distance.

It took only a plane ride back to a Canadian February to make the whole week feel like a warm, whirlwind dream. But we were not just passers-by in Caño Palma's story. **We were, like everything at the station, in the tropics, and in the scientific world, a small piece of something bigger.**





**Rest In Peace**

**Marilyn Cole**

As the present Chair of COTERC, I was honored to attend a very special event that took place this spring. This was the return of Marilyn Cole, our founder, to her beloved station. With blessings from the Cole family, and in tribute to Marilyn and her desire to preserve "a little piece of heaven", Marilyn's ashes were scattered at Caño Palma Biological Station (video is available at <https://youtube/AG7Qu4jnigg>). In the presence of four Board members, our station manager, and long-term monitoring leader, a short ceremony took place in remembrance of Marilyn and her life's work in developing and supporting Caño Palma. Her ashes were placed in a natural wooden box made from wood obtained from a fallen tree at the station. We moved in a solemn procession along the Raphia trail to the chosen spot. The box of ashes was laid upon a tree. Each person was given a chance to speak and to spread a handful of ashes. The poem below by John Clare was read out. A small troop of spider monkeys moved in for a closer look at us as if in thanks to Marilyn for her work in helping to conserve and understand the habitat of the area. A final spreading of her ashes took place. With lightened hearts and knowing that she was in a place to which she had dedicated much of her life, in a place she loved, we quietly returned to the hum of the station and continued her work. -- KS

*All Nature has a Feeling*

All nature has a feeling: woods, fields, brooks  
 Are life eternal; and in silence they  
 Speak happiness beyond the reach of books;  
 There's nothing mortal in them; their decay  
 Is the green life of change; to pass away  
 And come again in blooms revived.  
 Its birth was heaven, eternal is its stay,  
 And with the sun and moon shall still abide  
 Beneath their day and night and heaven wide.

## Notes from the Station by Charlotte Foale

Conservation at Caño Palma can take on many forms, from walking the beach protecting marine turtles and their eggs, to paddling the canals looking for information on understudied species like the neotropical river otter. This past month has been busy, but exciting for us. After experiencing record-low nesting numbers for leatherbacks for the past two years, and watching beach erosion destroying the open spaces that leatherbacks need for nesting this year, we only planned for a few nights of turtle survey per week, and our volunteer numbers on base reflect this. Despite the lack of beach, the leatherbacks have made this THE year, with the first four weeks of the season seeing more nests than the entire 2018 or 2017 seasons! The good news is that their nests are not popular with poachers. The bad news is that teams are catching eggs, as the turtles lay their eggs beneath the high-tide line, and often with waves washing over them. While we could definitely do with a few extra hands on base, we are extraordinarily grateful for the tremendous efforts of those who are here.

On the canals, we had the privilege of a visit from one of the authors of the 2nd addition of the southern Africa bird bible "Roberts Bird Guide". Greg Davies was here scouting the territories of the sungrebe, with a view to returning next breeding season to conduct his own research. It was a real treat for the birders on base to have someone around with his amazing level of knowledge.

Police, coastguards and staff from the Ministry for the Environment (MINAE) often lend us a hand by patrolling the beaches to discourage poachers, and supporting environmental-education efforts. So we were happy to return the favour in recent weeks. With just a few volunteers here, we were able to host 28 enforcement personnel overnight as they launched a local operation. And we saw the other 42 join us for lunch as their work concluded. We have to send a massive thanks to all who supported fundraising for the new dock, as the old dock wouldn't have been able to accommodate the boats, let alone the sheer weight of so many people!

With 2019 zipping by, we are now in the midst of preparations for the Shawnee State University visit. We can't wait to see some old friends as well as give some new students an experience they'll not quickly forget. Thank you all for your continued support, and best wishes from Costa Rica!

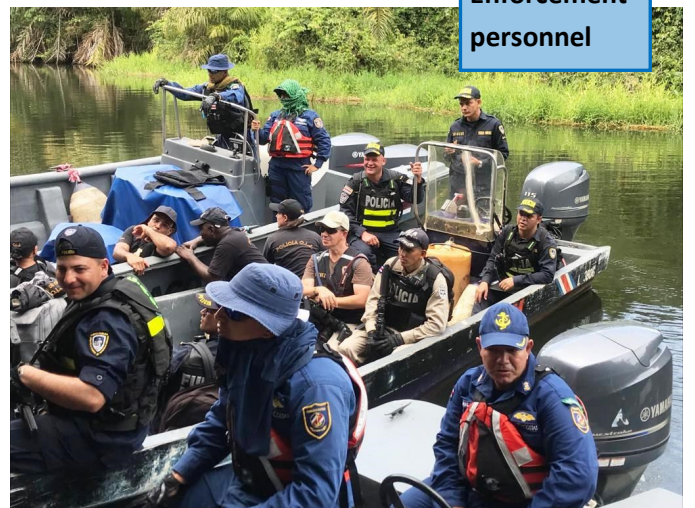


Sungrebe in favored habitat of overhanging branches. Buffy cheeks ID it as breeding female.



**Officer of SINAC** (*Sistema Nacional de Areas de Conservacion* or the National System of Conservation Areas) **SINAC** is part of the Ministry of Environment and Energy (**MINAE**). It is the administrator for Costa Rica's national parks, conservation areas, and other protected natural areas.

RAPHIA



**Enforcement personnel**

SPRING 2019

## Notes from the Chair by Kym Snarr



### Welcome to Spring 2019!

It's been a busy year for COTERC. Amongst other achievements, we've built new infrastructure at the station. We've put a new emphasis on highlighting what we do there via a stronger presence on social media. And we've continued strengthening our presence in academic publications as researchers take advantage of our long-term monitoring programs to examine longer-term trends.

In addition, at our winter retreat, some 'lively' discussion resulted in the development of a new mission statement as well as an updating of our values and goals. This puts us on the path to building a new strategic plan. Why is this necessary? Well, over the 25+ years of Caño Palma's existence, COTERC and its work at the station have morphed with the building or phasing out of different relationships and supports. That called for changes to our mission and our objectives, which hadn't been updated since the station's creation. I should also mention that COTERC is getting closer to achieving one of its long-term goals: having the station become self-supporting. With strong management on-site and a steady hand in terms of scientific programs, we continue to move closer to achieving this.

In my second year as Chair for COTERC, we continue to build momentum in supporting scientific work at the station, in building knowledge on long-term trends for flora and fauna in the region, and in emphasizing education on scientific methods and basic field work to all the folks who come to the station. For their unstinting drive to support these objectives, I want to thank all our Board members who do this on a volunteer, unpaid basis.

To strengthen our team, I'd like to welcome aboard Gregory McLean who has a strong background in finance. He came to us out of his interest in being on a board that works in the tropics. As a Director at Large, he is learning about our work and how we operate.

We've developed a new position, Director of Communication, filled by Patrick Traynor. He has worked tirelessly to bring alive the work done by the station and the Board – keeping the websites, emails and the media message moving forward. His creative energy is infectious!

Also, we've had some movement of Board members into different positions, allowing for personal interests to better address station needs. Dr. Roberta Fulthorpe has moved into the position of Director of Conservation and Research, bringing her expertise of 20+ years as a scientific academic to our scientific programs and the continued need for scientific direction. Dr. Nathan Lovejoy is now working as Director of Site Services. Having been to CPBS a number of times with field courses, he understands the work that has to be done to meet the station's infrastructure needs as well as the implementation of procedures.

Other Board members continue to strengthen what we do! Steve Gillis and his persistence in building a process for funding applications has allowed us to regularly work on external funding of projects. Andrew Morris has helped the Board through the process of strategic planning and seeing their own value at times. Doug Durno has worked on developing the Raphia newsletter into a more exciting format, with regular communication with COTERC members, supporters, and alumni. We have had Dr. Kevin Kerr assisting with organization direction, branding, and assisting as a Liaison with the Toronto Zoo and other agencies. And of course,

**(cont'd on next page)**



## Notes from the Chair (cont'd)

Shelley Hutchinson has brought her enthusiasm and steady organizational eyes to many aspects of the Board.

Former Board members and volunteers with COTERC continue to provide important opportunities and support, people like the Mason family, Tom and Fran and Pennie. Always ready to help is James Taylor, assisting with web updates and helping us to understand our storage needs. June Enright has been called upon to recall particular events and directions from the past. Anders Holder and Gisela Bento are assisting in social-media development.

I want to thank all of those who have helped over the many years with COTERC and the station. And don't forget, you're always welcome to come forward to assist as a Board member or volunteer. We have varied needs – feel free to contact us and we can discuss what we can do together!

Finally, in reference to the spreading of the ashes of our founder Marilyn Cole at Caño Palma, we hope she would be proud of the continued work of the Board. We have grown the number of programs, which has led to new positions being formulated and filled at the station to direct these programs, allowing for continued world-class scientific discovery. By showing such resilience, COTERC continues to draw in funding from non-governmental organizations, and to build on old and new relationships in order to maintain its conservation, research, and educational opportunities. I look forward to watching this resilience continue to manifest itself as we continue developing in the coming years! May we keep alight the flame of Marilyn's dream.



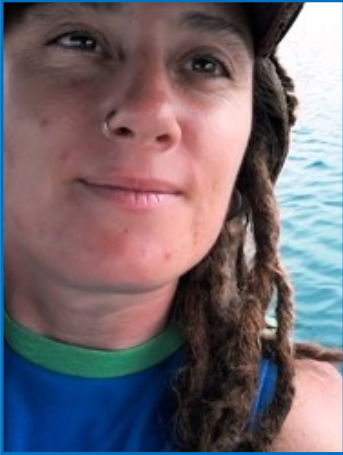
## Our Earth Day Drive

To see a stirring video, CTRL + click on this link -- <https://youtu.be/YogfYuIXGeU>



## Laying on the Edge by Helen Pheasey

With this issue, RAPHIA is starting a feature that will highlight publications based on research that has taken place at Caño Palma Biological Station.



To kick things off, we feature Helen Pheasey's paper on turtle demographics along Playa Norte. This is a good place to start because so many of you have contributed to Helen's research by making those long night patrols along the beach in search of nesting turtles. In the paper's acknowledgements, Helen thanks you all.

Helen has been at the station many times, but started out as a turtle project coordinator. This paper was first published in the March 2018 issue of Marine Biology. (Luis Fernandez, a former assistant Research Director at Caño Palma, is one of Helen's co-authors). Here's a link to access "Laying on the edge: demography of green sea turtles nesting on Playa Norte, Tortuguero":

[http://www.coterc.org/uploads/1/6/1/8/16182092/up\\_-\\_laying\\_on\\_the\\_edge\\_-\\_demography\\_of\\_green\\_sea\\_turtles\\_\\_chelonia\\_mydas\\_.pdf](http://www.coterc.org/uploads/1/6/1/8/16182092/up_-_laying_on_the_edge_-_demography_of_green_sea_turtles__chelonia_mydas_.pdf)

And here's Helen's summary of her paper:

Tortuguero National Park is the largest green sea-turtle nesting beach in the western hemisphere. Playa Norte, the beach to the north of Tortuguero that's monitored by Caño Palma Biological Station, has a much smaller number of turtles nesting on it.

We mark all of the turtles we encounter with a unique number by tagging their flippers. However, it's not possible for night patrols to encounter every turtle that nests on Playa Norte, so there are gaps in our understanding of the number of turtles that use this beach. This is further complicated as turtles nest more than once in a season and nest every two or three years. However, using the data we have, it's possible to undertake statistical analysis to estimate how many turtles are using Playa Norte. We can also establish if the population is increasing or decreasing. We used 10 years of tag data, which showed that we had 1573 encounters representing 1101 individual females. **We had sufficient data to enable us to undertake statistical analysis which showed there are an estimated 6004 turtles in the subpopulation that use Playa Norte.** We were also able to estimate that the population is increasing on average by 1.79% a year.

Our study shows that Playa Norte is an important nesting beach for green sea turtles and that the methods we use in the field to collect data provide reliable information about the size and structure of the population. -- HP

## Thanks to All Who Contributed

Recently, we printed Charlotte's wish list for items needed at the station. The response was heartening as we received quite a few of the items on the list. The problem then was getting it all down to Caño Palma. So, on their recent trip to Costa Rica, COTERC Board members and Scarborough College students stuffed as much into their bags as the airline's weight allowance allowed. Pictures below show only some of what was donated.

You can easily pick out larger items like the microscopes from Shawnee State University, the laptop from Kirstin Silvera, and binoculars from Vortex along with accessories from the Toronto Zoo.

But running a station requires a lot of little things that may not be easy to come by in an isolated location. In the kitchen, tea towels, storage containers, mugs, plates and utensils are always needed. Other items received that make day-to-day life a bit easier are pillowcases, sheets, pens, elastic bands, clothespins, safety pins and a good quality flashlight.

Besides those mentioned above, many others came through for Caño Palma, people like Steve Furino, Susan Kunanec, Margaret Thompson and Joanne Smith. Thanks to all who donated.



## Station Happenings

Taken from Research Coordinator Anna Harris's reports

### December

**Unusual find** - With December rainfall below average, almost all surveys were completed this month. Perhaps the most interesting occurrence this month was the discovery of a boa in the station's kitchen on two occasions.

**White-lipped peccary** – As discussed in the Winter issue of *Raphia*, this peccary is a main item in the diet of jaguars in our area. Not coincidentally, of the 291 white-lipped peccaries detected on this month's surveys, 290 were found in Tortuguero National Park where most jaguars in our area are found. Jaguars should continue to thrive there. (In January, 359 peccaries were detected in Tortuguero National Park out of a total of 360 for all sites.)



**Anna Tomczyk (USA)** – The station said goodbye for the second time to Anna who has twice been at Caño Palma as a turtle intern.

**Dan Khieninson** – This New Yorker originally came for six weeks, but has now departed after staying for six months.

### January

**Caimans** – It was a good month for youngsters. Of 204 caimans observed on five surveys, juvenile sightings outnumbered adults by 72 to 70. As well, 62 subadults were seen.

**Acer project** – In anticipation of the arrival of students from Vanier College (Montreal), our team was out in the field labeling trees and setting up the ropes that divide the sub-plots for Vanier's upcoming ACER surveys. We have three plots, one in the CPBS forest, another on the Cerro, and the most recent plot on the Dr. Archie Carr Wildlife Refuge. The CPBS plot has a few years of consistent data while the other two plots are still in their pilot phase.

**Helen Noel** – Helen is one of those Vanier students. In addition to working on the Acer plots, Helen will also be researching native beach plants that may be able to help in beach-erosion prevention.

**Ella Wooden** – This Londoner is taking time out from a year of traveling through Central and South America to join us at the station for a six-week mixed-taxa internship.

**Clement Lalait (France)** – Clement worked at the station for a year on his Master's project, which focused on the Dr. Archie Carr Wildlife Refuge. From the baseline data we have collected so far, Clement was able to create a recommendation plan for MINAE to use as they begin to restore the Refuge in anticipation of introducing ecotourism to the site. Clement wrote about this project in the Winter 2019 issue of *Raphia*.

**Chava Joosten (HAS University, the Netherlands)** – During her 4-month internship, Chava focused on the annulated tree boa (*Corallus annulatus*). In addition to her research project, Chava was a great help on several other long-term monitoring projects including marine turtles, mammals, and ACER plots.

**Great green macaws** – An average of 21 greens per survey were observed this month, a much higher number than the average of 7 last February.

### February

**Jaguars** – With 25 this month, detections of jaguars in TNP continue at a high rate.

**U of T Scarborough** – A group of 10 students along with Professors Lovejoy and Fulthorpe spent a week at the station doing fish sampling (story on Page 4).

**Amelie Courbon (France)** – Amelie was welcomed to Caño Palma as a volunteer for two months.



**Bert van Assink (the Netherlands)** – This Dutchman will also be at the station for about two months to fulfil the internship requirements of his university.

**I am Tayra  
Hear me roar  
At your edit-or**



I, Tayra, am a member of the weasel family. And among us weasels, we have a name for animals who are conniving, devious or sneaky. We call them humans. But it's not enough that you diss us by using "weasel" as a pejorative. Some of you take advantage of our friendly nature by domesticating us to catch mice around your living habitats. So we eat a few of your chickens. Why do you get so angry? Sounds like a fair trade-off to me.

But let's get to the real reason I'm addressing you today – the insult that your editor has slung at us Tayras. In the Winter issue of Raphia, he mislabeled us as Pacas, otherwise known as the royal rat. Certainly, I look regal – but a rat. I think not.

Speaking of royalty, I used to admire, just based on the number of pictures I see of her, the queen of your kind. Then I saw she ate a Paca. Maybe she was thinking she could set an example for ridding the world of a bothersome pest. Typical of you humans. Kill whatever you feel like. Btw queenie, your title is in danger of being trumped – that guy with the golden fur on his crown sure gets his picture on TV a lot.

But enough about you. Let's talk about me. I'm an expert tree climber, bounding along limbs and leaping from tree to tree. Can you fly like that? Didn't think so. Plus I'm so cute. Here's a video for your admiration: <https://www.youtube.com/watch?v=Wm9wTq2lqMA> Told you so. However you probably took one look at those teeth and said "I'm not messing with her". You betcha won't. I've been known to take down monkeys though I usually dine on smaller stuff like rodents and lizards as well as fruit and honey.

And furthermore – I know you humans think you're pretty smart. But, while your babies are still goo-gooing after a year, I've already been out there hunting on my own for 7 or 8 months. And who invented the ripening of fruit? We Tayras taught you how to take green bananas and let them sit around for a few days till they're edible. We've been doing that since you were picking bugs off each other for sustenance. I could go on, but why bother. Humility doesn't seem to be your strong suit.

And one more thing – it seems you humans like to classify everything you set your eyes on. That's probably a good thing because it'll force the Raphia editor to open his eyes and see the difference between a Tayra and a Paca. Where was I? Oh yeah, humans classifying things. So what's up with this *Eira barbara* name you've given us Tayras? Do you have any idea what *barbara* means? Just looked it up in my Tayrasaurus (lol) and here's some meanings: cruel, savage, uncivilized, uncouth. Really? That's how you view us Tayras? Take a look in the mirror. Whoa, stay where you are. I meant that figuratively. Honestly, you humans.

I am strong  
I am invincible  
I am Tayra



# CAÑO PALMA

## EARTH DAY DRIVE



**This Earth Day, help us soar!**

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[coterc.org](http://coterc.org)**

**Check out [coterc.org](http://coterc.org) for some amazing drone footage of the station.**

## You Choose -- Elephants or Biodiversity by Doug Durno

On a trip to southern Africa, Joanne and I had to hire a guide to enter the Sani Pass, which connects South Africa and Lesotho. At some point, I mentioned to him how heartening it had been to see so many elephants - between 70,000 and 100,000 we were told --in Chobe National Park in Botswana. Our guide's response shocked us: "If the law let me, I'd be up there tomorrow with a gun shooting the elephants."

What could possibly spark such a statement? After all, Stuart McLean, our guide, is a 28-year veteran of the South African parks system. He's a devoted environmentalist. All day we'd listened to him explain the need for South Africa to up its game on conservation.

Back home, online, I discovered that a debate over culling elephants has been ongoing between conservationists and those who manage lands, like Chobe, that are being badly damaged by elephants. Are the land managers right? Are there circumstances when the killing of endangered animals is justified? Perhaps the question should be presented this way: "Do your moral principles tell you to save all elephants unconditionally or are there situations when you would opt for the biodiversity we all otherwise preach?"

First, according to the World Wildlife Fund, the elephant population in Africa today is about 415,000, down from between 3 and 5 million in the early 20<sup>th</sup> century. Most remaining elephants are crowded into a few parks such as Chobe. African elephants are listed as a vulnerable species.

Now, imagine you're driving into Chobe. Your eyes are immediately drawn to the elephants. They may even



be crossing the track you're on. But, once the wow factor has worn off, you'll notice something else: the paucity of vegetation. Such an arid habitat can't handle a rapidly increasing population of elephants trampling the vegetation or killing trees by knocking them over or stripping their bark. As well, they eat around 150 kilos of plant matter a day – each. When the vegetation is overgrazed like this, the elephants are forced to eat from the same plants over and over. With such stress, the plants will eventually die. That means there's even less for the elephants to eat.

As National Geographic describes Chobe:

"Helicoptering above the park on a searing-hot October afternoon, the landscape looked [as if] nuked after a war: Only a few spots of green interrupted a flat, seemingly endless terrain of desiccated trees and brush". With only a scattering of trees, the canopy cover that birds, reptiles and arboreal primates require is quite inadequate. As well, plants that can't tolerate too much sun are deprived of the shade they need to prosper.

So, trampling, overgrazing and lack of shade have greatly reduced the microhabitats that many animals depend on for food and shelter. Elephants have produced a much altered environment. Result: the biodiversity that we all promote is disappearing.

At this point, you're likely thinking of possible solutions that would humanely reduce elephant numbers in ([cont'd on next page](#))



## You Choose -- Elephants or Biodiversity (cont'd)



Chobe and other parks in similar situations. We suggested some to Stuart. Couldn't they be moved somewhere else? Stuart said that to relocate a significant-enough number would be too expensive and too stressful to the herd. Besides, taking in elephants from other areas is one reason Chobe has so many. What about contraception? This has generally been rejected because it's expensive, difficult to deliver and upsetting to elephant society, which is "based on many generations of related females raising children in extended

family groups". (For promising developments, see this article on immunocontraception: <https://www.scientificamerican.com/article/the-elephant-in-the-room/>). Another solution would let the elephants find their way to other suitable habitats as they've historically done. But Africa's exploding human population (220 million in 1950 vs 1.2 billion today) is eradicating their traditional migratory corridors. Regardless, elephants are at great risk outside park boundaries because of poachers. Additionally, they earn the enmity of farmers as they trample and/or eat crops. Humans, humans and humans – we cause the problems. But we conservationists are the good guys, working to preserve habitats and protect diversity. That could be said for Stuart McLean too. He was sticking to his conservationist principles in advocating for culling. It's just that he favored biodiversity over overgrazing elephants in overcrowded parks.

So, should we be culling elephants when they are destroying land that we'd be anxious to conserve otherwise? We were all part of the furor when a single lion was killed in Zimbabwe by a Pennsylvania dentist. Furthermore, at the first sign of any culling of elephants, conservationists in the First World would be calling for tourist boycotts. And that's what countries like Botswana, so dependent on tourism, are afraid of. For example, Kruger NP in South Africa had a culling operation from 1967 to 1994. It kept elephant numbers at about 8000 within Kruger's 20,000 km<sup>2</sup>, an area 40% the size of Costa Rica. At that density, other animals and plants could thrive. But the cull was halted due to international pressure. Since then, the population has grown to more than 17,000. Kruger would like to translocate some of its elephants, but it can't give them away. So, South African Parks is again contemplating culling. Threats of a boycott from the First World are expected. Is culling going to happen? Probably not. Stuart himself realizes that it's too emotional an issue.

### See also

[http://wwf.panda.org/wwf\\_news/?75340/A-numbers-game-Managing-elephants-in-southern-Africa](http://wwf.panda.org/wwf_news/?75340/A-numbers-game-Managing-elephants-in-southern-Africa) – A long but excellent article from the World Wildlife Fund. Their official position reflects the ambivalence of conservationists.





## Las Vueltas Lodge by Doug Durno

In 2008, the Seelye family bought a car. Prior to that, they got their cheese to market by using horses to reach Highway 1, and then taking a bus. Other than a vehicle, the Seelyes have an inspiringly low carbon footprint while operating a combined organic farm and ecolodge, known as Las Vueltas Lodge or Seelye Farm.

But let's go back to the beginning. In 1978, unhappy with the turmoil of life in the US as well as its growing consumerism, Maxine Seelye, her husband plus their two young kids traded harsh Michigan winters for coastal living in Costa Rica. While a tropical winter sounded good in theory, the parents eventually sought escape from its humidity and invertebrate wildlife (bugs) by traipsing up the nearby Cerro de la Muerte (the Mountain of Death) where they found

opened into a dairy farm. They vowed that it would be operated sustainably. The kids all learned to make cheese, which they sold in the nearest town in order to pay off the loan used to buy the land. Once the farm was established, the kids dedicated themselves to building a lodge so they could share their way of life with guests. As timber, they used only trees that had fallen – or as they put it, "No living tree was harmed in the making of the Lodge". Power is produced ingeniously. Heat is generated by using even more fallen trees and a creative duct system. Besides cheese, they make their own butter, ice cream (yummy) and even sour cream. Meals are delicious.

So, if you're looking for an interesting place to spend 2 or 3 days in Costa Rica, make it a point to visit this delightful family and hear, in person, mama Maxine



some unoccupied land. The growing family (eventually six kids) lived in tents with neither electricity nor running water. With no money, they grew their own food. And they wanted to do as little damage to their land as possible. But they were squatters. After a long battle, the government was successful in evicting them. However they won a partial victory as the authorities made the land a preserve.

Next, they bought a nearby farm, which they devel-

tell their story. Tour the property and hear how they maintain sustainability. Walk the mountainside trails and discover, in the coolish climate, some more of Costa Rica's amazing biodiversity – you may even come across the elusive quetzal. During lava season, look across the valley and watch Turrialba Volcano put on a show. Failing that, walk the upper trail and you will at least see a volcano hummingbird.

*For more information, visit:*  
[www.lasvueltaslodge.com](http://www.lasvueltaslodge.com)

## Plastics and the Curse of Durability by Friedrich Widdel, Max Planck Society

Plastic is an indispensable part of everyday life. Bottles, bags, packaging and technical molded parts made of plastic are lightweight and resistant to water and decay. While such qualities are highly valued during usage, it's a different story when it comes to discarding plastic refuse in the environment. Here, the blessing of durability becomes the curse of imperishability.

At first glance, the problem appears to be one of an aesthetic nature. Because, as ugly and dirty as plastic may be, plastic itself is non-toxic. The graver aspects of our plastic world only become apparent upon closer inspection -- aquatic species can perish in nooses made of plastic waste or fish can ingest the tiniest plastic fragments, which could then be fed back into the human food chain. Evidence suggests, for example, that plastic softening agents could have a harmful long-term effect on fertility. And the impact of plastic refuse on an organism when it decays into tiny particles has yet to be established.

Whereas microorganisms, such as bacteria and fungi, are sometimes used to break down toxic substances in the environment (e.g. petroleum), plastic refuse has yet to be successfully disposed of. All decay-inducing organisms reach their limits with plastic; otherwise the material would not be so durable.

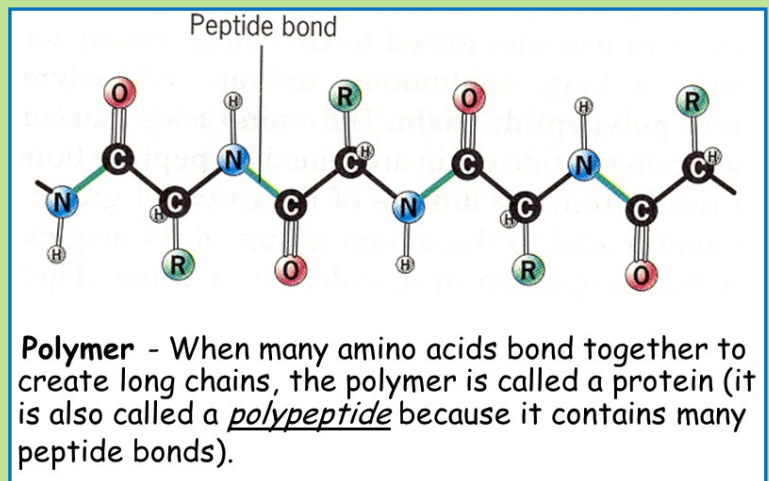
This is easily explained from a chemical perspective. All plastic materials are polymers, chemically-speaking. Polymers consist of very long chains of molecular units, which in turn consist of carbon as the defining element. This is almost always combined with hydrogen. Other elements include nitrogen and oxygen and in exceptional cases fluorine and chlorine. The long molecular chains ensure the polymers are strong and durable, and do not decompose in water. Polymers can also be extremely flexible and pliable, a valuable property not provided by mineral materials, such as clay and limestone, and only to a limited extent by metals.

Polymers are not a human invention. Wherever robustness and shape retention as well as toughness and flexibility are found in living organisms, it's down to **natural** polymers. For example, cellulose, a fibrous material made of sugar components, provides plants with their stability. So too, collagens and keratin are highly stable proteins-- in other words, chains of amino acids --that give skin, hair and bird feathers their stability.

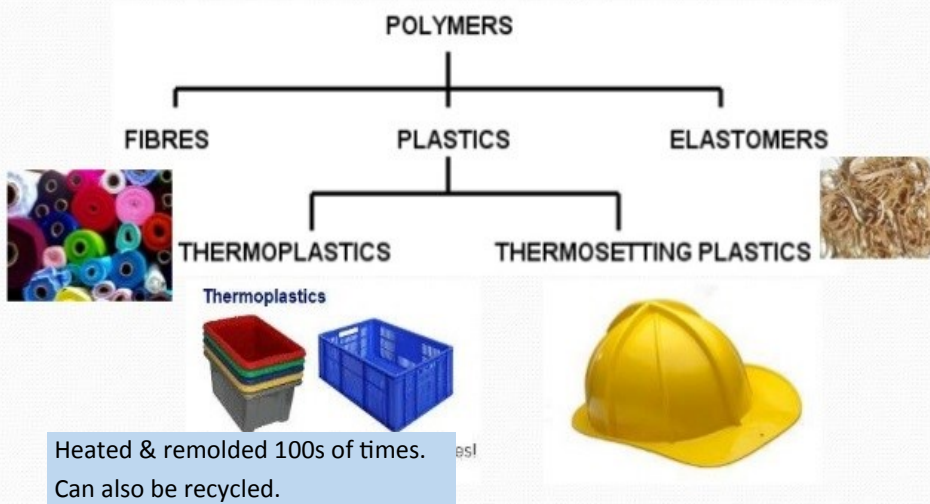
However, neither cellulose nor keratin last forever. After the death of a living organism, these polymers are slowly decomposed by bacteria and fungi, i.e. their components are broken down, digested and ultimately oxidized into carbon dioxide and water. For every substance formed by living organisms, there's at least one type of microorganism in nature that can break it down.

However, plastics are not broken down in nature. Their chemical structure is foreign to nature.

The ideal plastic material-- one that remains durable during usage but decomposes after disposal -- remains a utopian dream.



### Classification of polymers



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