RAPHIA

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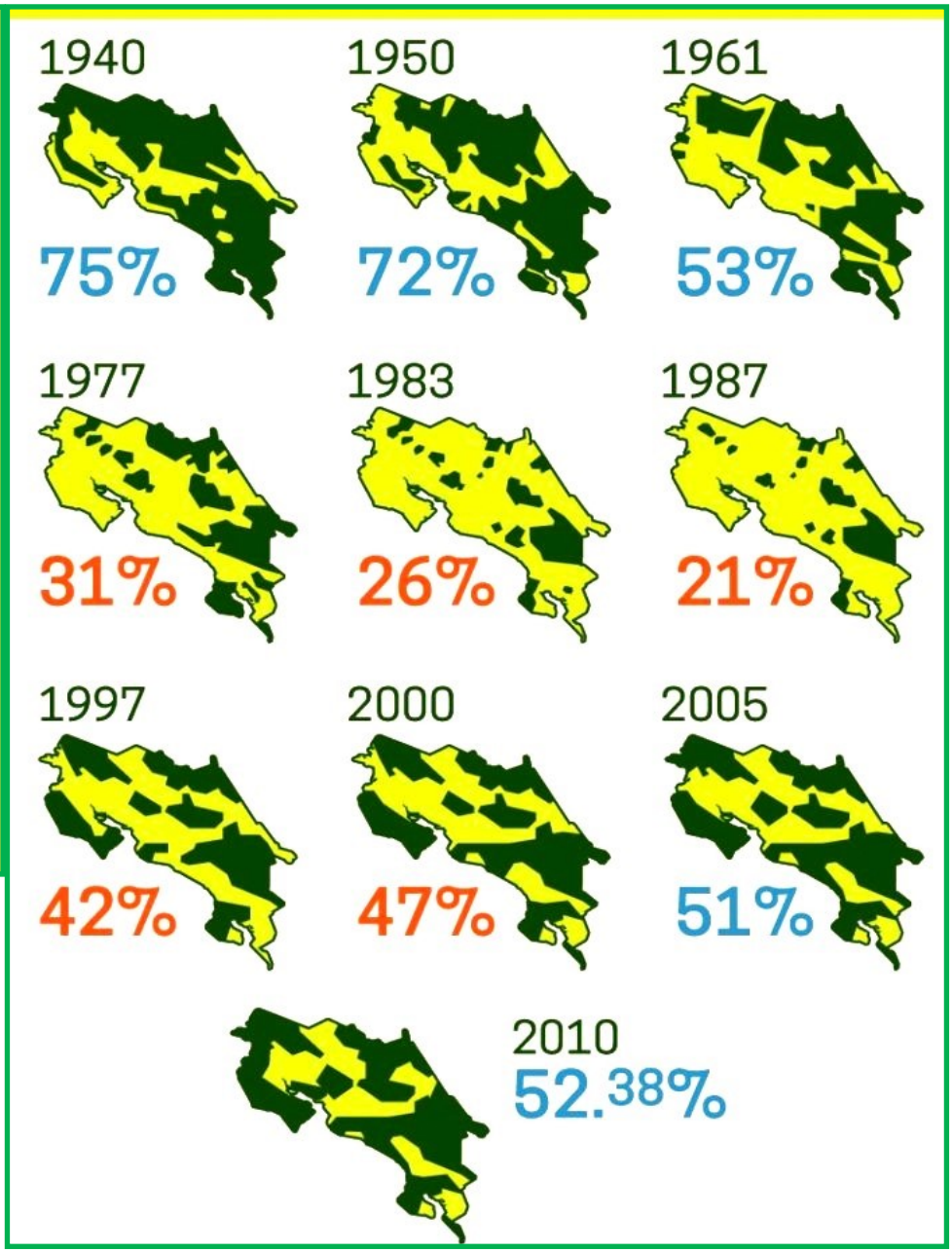
Newsletter of Caño Palma Biological Station

Reforestation Issue

From Deforestation To Reforestation

The Transformations of Costa Rica's Tree Cover



Canadian Organization for Tropical Education & Rainforest Conservation

In This Issue of Raphia

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Operation Chainsaw Reversed

Deforestation gets a lot of attention. Reforestation not so much. So, in this issue, we're taking a look at it with a focus on Costa Rica.

Costa Rica has and continues to be a leader in environmental issues. In 2019, it was named a Champion of the Earth by the UN. Why? First, almost all its energy is from renewable sources. Second, it has begun a project to eliminate single-use plastics.

And third, as the chart on the cover indicates, Costa Rica has completed an extraordinary transition from tree levelers to tree cultivators.

This switchover happened because, in the 1980s, the government had a revelation. Prior to that, the country's motto could have been "In chainsaws we trust". For it was official policy to encourage logging that opened up land for agriculture. Take a look at the cover chart again and you can readily see how much forest was felled from 1950 to 1987.

Why did this reversal come about? It all has to do with a concept called 'natural capital'. The government took this idea and today you can see the forested area has more than doubled. Read all about it on Page 7.

Previous issues of *Raphia* can be found at - **http://www.coterc.com/raphia-newsletters.html**

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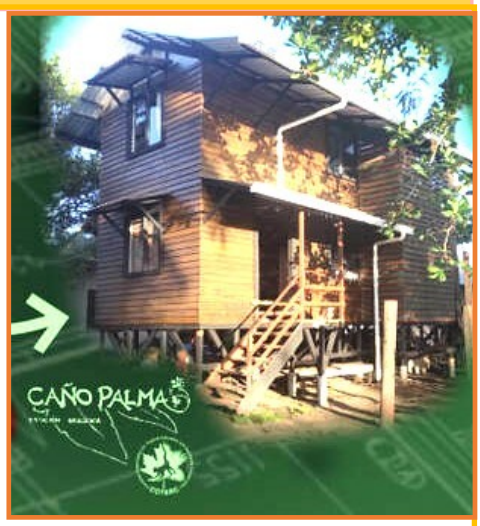
Thanks to You We're Building



Stop the presses. Great news. Our fundraising goals have been reached for the new staff building (drawing plan at right). Charlotte is ready to move ahead with construction. So the old building is being dismantled and materials have been ordered.

Couldn't be a better time to hand out the bouquets and recognize the contributions of all those who answered the call when we sought funds for the rebuild. To all donors, we send out a huge thank-you.

We also want to recognize the Griggs Family Foundation without whose generosity the whole project may have foundered. Hooray for the Griggs.

Another large contributor, Dr Steve Furino, is saluted in this issue with a paper he researched at Caño Palma on the rufescent tiger-heron, a bird not often observed. This paper added to the limited amount of information known about this beautiful species. (Page 13)

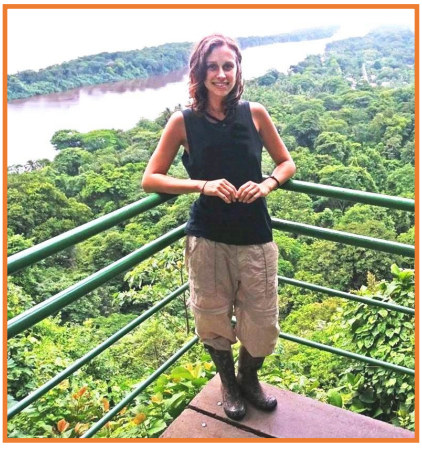
Finally, we must toast another long-time supporter of and frequent visitor to the station who has once again stepped up to help when needed. Take a bow Susan Kunanec.

In future Raphias, look for further updates on the progress being made on this new addition to the station's infrastructure.

New Members of Your Board

At Coterc's recent Annual General Meeting, we welcomed two well-qualified young women to our Board - **Jess Sutton** as Director of Web Services and **Amy Cocksedge**, Director of Development. At the same time, we had to say farewell to **Patrick Traynor** and **Andrew Morris**, two long-serving Board members who brought so much knowledge and character to our meetings. Thanks guys.

Jess grew up in Salinas, California and earned a BSc in Ecology and Evolutionary Biology at UC Santa Cruz. After graduating, she traveled throughout SE Asia and Central America, including a total of six transformative months at Caño Palma, spanning two field seasons. She is currently pursuing a master's degree in Environmental Science from California State Univ, Monterey Bay as well as working as a Field Scientist for a local environmental consulting company.



Amy has a BA in Global Studies, a Masters of Environmental Studies, and a Masters of Biology. For both masters programs, she focused on wildlife conservation and political ecology. Amy, seen here on the Cerro, worked at Caño Palma in 2016. She is currently employed with the government of Ontario in the Ministry of Natural Resources and Forestry.

Notes from the Station by Charlotte Foale

The crazy times are upon us again with turtle season moving forward at pace.

We are fortunate to have an amazing group of young interns here, from France, the US, the Netherlands, the UK, Spain and yes, even Canada! Many of them will be gone by August, so as the nesting season for greens starts to peak, we're going to need more Crocs on the beach...

We've been lucky to have the coastguard join our teams on the beach with the school holidays bringing national tourists to the area, and poaching pressure high. With the sale of turtle eggs from the Ostional arribadas legal, there is often an absence of understanding as to why the eggs from Tortuguero's beaches are different. Just prior to the storm, we were contacted to help a local family who had over 15 dogs abandoned on their property. As many of you will know, we encounter many stray and abandoned pups, and while some have become part of our own family, some of you have taken them home and provided them with their forever families. This time round we were able to coordinate with two hard-working and dedicated groups – Territorio Zaguates and Valentino Zaguate, which is a group in our region who helps animals in need and relies on local foster families to provide treatment and help to find permanent homes. As they didn't have room to take in this large group, they coordinated with Territorio Zaguates to help to take them to their refuge. They currently have over 2000 dogs in their care, and they look to take in only the neediest cases because there is such high demand. They provide medical care and a large property for the dogs to exercise as well as continually trying to find homes for the endless stream of animals that find their way to them. As we live in a protected area, the stray dogs that accumulate here can sometimes do incredible damage, including the destruction of turtle nests as the dogs desperately dig for food. We are massively grateful to the dedicated, large-hearted people who helped us rehome this pack.

(cont'd on next page)

Notes from the Station (cont'd)

Tropical storm Bonnie added to the craziness, threatening to develop into a hurricane and make landfall somewhere between us and the Nicaraguan border. Exercising the utmost caution, volunteers and interns were evacuated to the house of long-time station friends Hania and León. As Hania used to own her own restaurant, many felt that just one night at her house was too short... They are both amazing hosts, and we are extraordinarily fortunate to have their support when we most need them.

We will be seeing a lot of them over the next few weeks as León will be starting construction on our new/replacement building in the next couple of weeks. With your tremendous support, we were able to raise the funds needed to make this work a reality. While we are grateful to everyone who contributed, some big donors require a virtual hug and thank you.

Steve Furino is a keen ornithologist and statistician who has stepped up in the past, and we are always grateful to him for his support. Susan Kunanec is another long-time friend and visitor to the station who showed immense generosity. We also thank the Griggs Family Foundation who gave us the donation needed to kick-start our efforts. We didn't think that we'd be rebuilding in the next two years as we slowly move forward from the pandemic damage, but they approached us with a gift that laid the foundations for this fundraiser.

Thank you all so much – Caño Palma wouldn't be here without the support you all give, and we are incredibly grateful to have you in the family!

Reforestation & the Trillion-Tree Strategy by Doug Durno

As we all know, global warming is primarily caused by greenhouse gases in the atmosphere that trap heat. But how do we remove a gas like carbon dioxide from our air in order to have an impact on global warming?

When Carlos Manuel Rodríguez was Minister of Environment and Energy (MINAE) in the Costa Rican government, his young daughter told him not to worry about climate change because one day a scientist will invent a machine that can absorb all the excess carbon in the atmosphere. He told her that nature had already invented such a machine. "That machine," he said, "is called a tree."

There are 3 trillion of these tree machines on the planet by the estimate of Dr Tom Crowther, a professor at ETH Zurich whose lab researches patterns of plant growth. Crowther then went one step further and calculated that planet Earth has room for an additional trillion trees. He wasn't proposing that a trillion more trees be planted. He was only suggesting that forest restoration is a powerful solution in our battle with climate change.

But Crowther's research bolstered an idea originally put forward by organizers of the International Year of Forests in 2011 – let's plant a trillion trees. Various environmental groups have since picked up the torch of a Trillion Tree Campaign. In 2020, the World Economic Forum said the world should aim for 2030 as a goal to plant the 1 trillionth tree and many countries jumped on board.

Is there sufficient land to support the growth of an additional trillion trees? Crowther and his team had stated that, outside of lands that are urban and agricultural, they estimated that "theoretically" there are 0.9 trillion hectares of land that could support the natural growth of trees. They identified the best locations as degraded land like abandoned farms and deforested areas. At the same time, Crowther cautioned that grasslands and savanna, though mostly untreed, should be left alone as they already store carbon, mostly underground. (They also promote biodiversity.)

As countries and environmental groups planted trees by the millions, lots of mistakes were made. Trees were planted without considering if the land was good enough. The wrong species were planted in the wrong areas. Sometimes they were planted during the dry season. The needs of locals weren't taken into consideration.

Still, there have been plenty of successes. And, beyond reducing CO_2 in our atmosphere, there are many other reasons that forests are critical to the health of the planet. Forests:

- regulate global temperatures and freshwater flows
- help recharge groundwater
- improve soil quality
- anchor fertile soil
- act as flood barriers
- provide habitat for thousands of species

For our health, forests:

- produce the oxygen we breathe
- filter air pollutants
- reduce heat islands in cities
- propel new drug discoveries
- provide sustainable livelihoods - forest products, conservation, restoration

Money Does Grow on Trees - Costa Rica's Success Story by Doug Durno

In the 1960s and 70s, deforestation was government policy in Costa Rica. 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 land clearance with cheap loans and guaranteed prices. It wasn't long before Costa Rica had one of the world's highest rates of deforestation. By 1983, forest cover was down to 17%.

Amazingly, it managed to reverse that policy and become maybe the best reforester in the world.

Today, forest cover is about 52%. Of this, 24% is classified as primary forest, the most biodiverse and carbon-dense form of forest.

National parks and reserves safeguard 25% of Costa Rica's land, the highest of any country. From two national parks in 1979, Costa Rica now has 30 as well as over 140 other types of reserves – protecting the country's rich diversity of plants and animals.

By now you're asking: How did they accomplish this? In the early 80s, the world economy suffered a downturn. Costa Rica's exports and their prices fell. The government could no longer afford to support farmers. Coincidentally, ecotourism was taking off. The government re-thought its economic model. It realized conventional accounting systems didn't measure "natural capital" – that is, trees, birds, water, land, biodiversity, etc. They too have economic value that can be measured as income. Want some examples: Trees prevent soil erosion, saving valuable agricultural land; When plants and animals have homes, biodiversity is strengthened; With biodiversity, ecotourism can flourish, bringing in dollars and providing jobs. Tourism (pre-Covid) accounted for 25% of Costa Rica's foreign-exchange income; and trees store carbon, helping the fight against climate change.

What's so special about Costa Rica that they were able to turn the country around? (1) It has a relatively strong **rule of law**. This means everyone is subject to the law, and enforcement is fairly good. In countries where the rule of law isn't strong, corruption and environmental abuses are usually prevalent. Those economies suffer when "natural capital" isn't protected. (2) **Richer countries and NGOs** are more willing to provide funds for environmental protection when they know their donations (50% of the budget of Costa Rica's Forestry Finance Fund) will be subject to less corruption. (3) Costa Rica's **property rights** system is fairly good so that rural land is safer from encroachment to farm or hunt. (4) The **education system** is rated "high quality". Most learn the benefits of environmental responsibility.

And maybe most importantly (5) **Money does grow on trees.** In 1996, the government put in place a **Payment for Environmental Services** (PES), which pays landowners to not only conserve forest, but to expand it. This

changed attitudes as people realized that forests have intrinsic value. The payments are mostly aimed at the most vulnerable including small forest producers and Indigenous communities.

Result: Four times Costa Rica has been named #1 on the annual Happy Planet Index. Environmental protection is a main component of the rating system. Habitat is maintained and thus biodiversity. Forests and wetlands remain as carbon reservoirs. Less carbon dioxide is released into the atmosphere.

Challenges – Compared to what PES pays, landowners can make more growing bananas, pineapples and oil palms. As well, turtle poaching, illegal logging and mining continue to be problems as funding for enforcement is often lacking.

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Orange Is The New Compost by Marlene Cimons

This is an edited version of an article that appeared in the August 29th, 2017 edition of ScienceAlert.

Orange isn't just the new black. It's also the new green. Twenty years ago, an orange-juice producer dumped thousands of tons of orange peels and pulp onto a barren section of a Costa Rican national park, which has since transformed into a lush, vine-laden woodland. The shift is a dramatic illustration of how agricultural waste can regenerate a forest and sequester vast sums of carbon - for free.

Even more remarkable, it was an accident.

"I was totally floored," said Timothy Treuer, a Princeton researcher and lead author of a new study published in the journal *Restoration Ecology*. On one side was a pasture "with a few scattered scraggly trees," he said. On the other, "was an overgrown jungle, so lush it required a machete to get through. It blew my mind."

Here's what happened.

During the 1990s, 1,000 truckloads of peels and pulp amounting to 12,000 metric tons were deposited in

Guanacaste National Park as part of a deal struck with Del Oro, an orange juice manufacturer that had just begun production nearby.

Ecologists who worked in the park as researchers offered the company the opportunity to dump their orange waste on degraded land if Del Oro would donate part of their own forested land to the national park. The company, which had considered building an expensive facility to safely deal with the waste, agreed.

But, a year after the contract was signed - and the peels and pulp were left on the land - a rival fruit company, TicoFruit, sued to stop the process, arguing that Del Oro had "defiled a national park". The Costa Rican Supreme Court agreed, halting the dumping. Over the ensuing years, the land was pretty much forgotten.

In 2013, Treuer decided to stop by. "It took me two trips to the site to actually figure out where it was," he recalled. "It didn't help that the six-foot-long sign with bright yellow lettering marking the site was so overgrown with vines that we didn't find it until years later, after dozens and dozens of site visits."

Revitalized land is to the right of the road

The research team evaluated two sets of soil samples, and found the land fertilized by the orange peels had richer soil, more tree biomass, a greater variety of tree species, and a larger forest-canopy closure.

"One of the most surprising results was the number, size and diversity of trees in the area treated with orange peels," Treuer said. "One of the fig trees we measured was already so large it would have taken three people to wrap their arms around it."

How did the orange peels work their magic?

"That's the million-dollar question," Treuer said. "I strongly suspect that it was some synergy between suppression of the invasive grass that was preventing the growth of additional trees and rejuvenation of heavily degraded soils."

"We live in a paradoxical world where nutrient-starved degraded lands and nutrient-rich waste streams occur simultaneously," Treuer said. "Resolving that paradox means profits for private industry, more resources for conservation areas, and potentially gigatonnes of climate-change-causing gases getting sucked out of the atmosphere."

Notes from the Chair by Dr Kym Snarr

Dear Members of COTERC and Caño Palma Biological Station,

As I sit in the boarding area at Toronto Pearson Airport heading to a family celebration, I am grateful for the ability to get onto an airplane with some ease. Delays are plaguing airports both in Canada and across the globe. As the COVID virus continues to mutate, masks and vaccines follow. This has some current impact on those coming to the station to conduct their own research or assist in our 11 long-term monitoring projects. It has been incredible for myself as a long-term member of the COTERC Board and an alumni of the station to see that, despite the COVID pandemic, the mission of COTERC and CPBS is continuing to be met by enthusiastic interns, researchers, Board members, and longtime alumni. With heavy reliance on our station manager, Charlotte Foale, and our steadfast monitoring project leader, Manuel Arias, during the quiet times of the pandemic, it is exciting to have the station filled again with returning alumni, university groups and new researchers carrying out their own research.

A big thank you goes out to those who have aided us since the beginning and especially to those who have helped out on the recent campaign to rebuild the derelict staff building close to the dock. With regular flooding and the normal issue of near 100% humidity, all equipment and buildings take a beating. Because of the generosity of the Griggs Family Foundation, long-term alumni such as Steven Furino, Susan Kunanec and a whole host of others, we've been able to order new materials for a completely new building! This structure will be elevated with a ground area for water boat storage and/or carrying out dry science plus a wide variety of other uses. The upper floor will house long-term staff with areas to be used for presentations and educational seminars.

Another exciting project under development is the review of our backup energy needs with an eye to installing solar panels. A subcommittee is working on energy needs and how best to install needed equipment. Being sustainable has always been a goal of the station – using rainwater and re-using waste water is part of that reduction in waste and energy/water footprints. There are more ways we can improve in this area and we are excited to be moving these forward….look for future updates! For myself, I recall the first years at the station with the noisy generator that gave some energy. Then the station had reasonable electricity via the underwater cable. We've moved from spotty internet in the early years to now having fibre optics – fast and pretty reliable. This gives us a greater capacity to carry out research as well as more consistent communication. As those who come to the station are global in nature, we are excited to have this stability in our online capabilities.

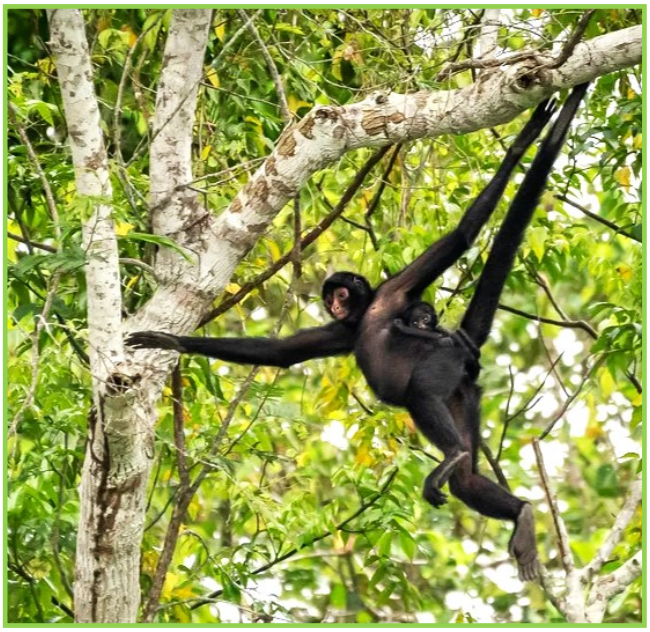
The Board and staff at the station will be revisiting our 'wishlist' and will be sending out these ongoing needs to alumni. A recent donation came in from Stanley Tools Canada through a request letter, which was directed from Mark Gregoire, a relative of the first station manager, Greg Mayne. We would like to extend a big thanks to Stanley for their generous donation of a new cordless drill with a battery pack and a wide variety of carpentry equipment. Manuel Arias, our long-term project leader, also works at station maintenance – not an easy job given our extreme environmental conditions. His recent enhancements to the station have helped bring electrical work to a more consistent quality along with all other renewing and repairs! We are always grateful to Manuel for his wide range of skills to stabilize and upgrade the station. He will welcome the donated equipment from Stanley with open arms as it will allow him to carry out that work with greater ease.

As new Board members settle into their roles, watch for updates to our website. The recent publications resulting from our long-term data will be placed onto the website and some Board members have dug up previously published articles from former researchers whose data comes from the station or surrounding area. Old and new Board members continue to draw on their skills to help fulfil all of the needs to carry out our mission. We are organizing towards strategic planning. If you are interested in assisting us on the Board or becoming a Board member, please reach out to us at chair@coterc.org. We are always in need of those who have energy to assist in all aspects of our organization.

Spider monkeys -- Part 1 by Doug Durno

Geoffroy's spider monkey (Ateles geoffroyi) is found throughout Central America and in southern Mexico. Of its five subspecies, the ornate spider monkey (A. g. ornatus) resides in our area.

High up in our rainforest canopy, Geoffroy's spider monkeys can be found feeding on the fruits they relish. But it's when these primates start moving through the trees that things get interesting – they're trapeze artists. They leap and bridge between trees. And often



swing from branch to branch at impressive speeds - that's **brachiation** (photo above).

Not many animals can perform this method of locomotion. Try to imagine a dog brachiating. It ain't possible. The over-the-head, hand-over-hand motion that spider monkeys perform requires adaptations like flexible wrists and specialized shoulder joints. More visible adaptations are lengthy arms and slim bodies. And their long fingers form a powerful hook that quite effectively grasps branches, enabling them to zip through the forest.

This gripping ability may be aided by their lack of a thumb, which could get in the way when swinging from branch to branch.

https://www.smithsonianmag.com/videos/why-spider-monkeys-only-have-four-fingers/

But there's a tradeoff in having a vestigial thumb – manipulating objects is more difficult. So, unlike some

other New World monkeys, spider monkeys aren't tool users.

On the other hand, they have another extremely useful adaptation to help them propel their way through trees – prehensile tails that can firmly grasp a branch. And this fifth 'limb' is also quite handy for feeding. Hanging by their tail frees up both hands and, with its 65 to 90 cm length, gives them an extended reach. But wouldn't a hairy tail be slippery? Yes. So the tail's underside is partly bare and grooved for better gripping. The first video below demonstrates how strong a spider monkey tail is. The second shows the tail's utility.

https://www.youtube.com/watch?v=EnZLV2pWsD8&list=PLOukf2LipfGnvsk8AInba02BiMRHF_Ebf&index=5

Swing Through the Trees With Amazing Spider Monkeys | National Geographic - YouTube

All seven species of spider monkey are endangered to some degree - the IUCN status of Geoffroy's is Endangered. Since they're regularly on the move to find trees with fruit available, spider monkeys are dependent on having an unbroken canopy to (cont'd on next page)

Spider Monkeys (cont'd)

reach them. When we humans move in and start cutting down trees, a spider-monkey troop can lose some, maybe all of its territory or find it fragmented. As well, since spider monkeys can weigh as much as 9 kg, making them one of the largest of the New World monkeys, they can be an important food source for locals. In addition, though their size might make you think they're too large to be domesticated, pet brokers sell them when they're young and cute. Any of these pressures will reduce a tribe's size. Since females produce only one offspring about every three years, a tribe can't be repopulated quickly. With a 50% decline in the past 45 years, spider monkeys are among the most endangered primates. In areas most accessible to humans, they've often been extirpated.

Another reason to redouble our conservation efforts is the fact that spider monkeys are an umbrella species - by protecting their habitats, we're also protecting many other species in their ecosystem.

SPIDER MONKEYS IN COSTA RICA - YouTube - A 52-minute video on the natural history of Geoffroy's spider monkey in Costa Rica

Showing hands without thumbs

No Passives in Nature -- A Walk in Our Rainforest by Lawrence Speight

Laurence, who volunteered at the station recently, was born in Belfast, Northern Ireland. He's a member of the Green Party and the Irish group INNATE, which is concerned with nonviolent conflict resolution, justice issues and eco-sustainability.

We're out on a bat survey in a forest bordering Tortuguero National Park.

After a time, my body sweat becomes indistinguishable from the humidity of the great forest. My rubber boots sink deep into the brown, squishing, sucking mud, wanting, it would at times seem, to swallow me into the forest's digestive system. The roots of the Sangrillo trees spread over the forest floor like giant fingers and toes, gripping the earth, absorbing its nutrients. They stand in imposing silence, vigilant, bulky and tall, ecosystems within ecosystems.

To most people trees are simply trees. They grow in our gardens, fields and along city streets, unnamable and largely unnoticed. They are, however, personalities with a story to tell, are known to other trees with whom they communicate, cooperate and compete. They are a home, resting place, shelter, feeding station and social venue for other life forms. They hold the soil with its trillions of microorganisms in place. Many have medicinal properties. The Sangrillo for instance contains an astringent resin that can heal wounds. The Aztecs and Maya used its bark to make codices, a type of manuscript; and the Maya considered the tree, which is widespread throughout swampy coastal forests in Central and South America, as a link between Earth and Heaven.

Amongst the crowded, dense intensity of green growth, decaying trees, leaves, fruits and nuts, one occasionally sees brilliant, radiant colours in the form of flowers. This afternoon, in the gloom of a prolonged downpour, in the crown of a palm, I saw a yellow flower as bright as a summer sun and a flaming red-ribbed flower shaped like a miniature walking stick.

All the while, there was the rhythmic drumbeat of the rain on the leaves, a mind-penetrating liquid sound that one comes to swim in. I stood still: listened, smelt, inhaled and visually absorbed the multi-dimensional

drama of forest life.

When the rain ceased for short intervals, the sound of birds and insects resumed. We came across a hawk, unfussed by our presence, emitting a continual *chwirk* to its unseen companion. Our eyes followed a family of 10 spider monkeys as they climbed in single file ever higher on the uppermost branches of one of the tallest trees in sight. They would have had a magnificent view of the forest, albeit one that would have a different meaning for them than it would for their human cousins.

Cobwebs, if not spotted, can become entangled in one's hair and spread like sticky thread across one's face. Even when wearing long trousers, a long-sleeved shirt and a hat, ants, mosquitos and other insects inevitably find some part of the body to bite. There are butterflies, dragonflies, and frogs as small as your thumbnail. One such frog, common in this forest, is the Strawberry Poison-Dart Frog whose main source of food is ants. At one point, I came across an insect on the forest floor the very colour of the brown leaf it had concealed itself on. Its limbs (cont'd on next page)

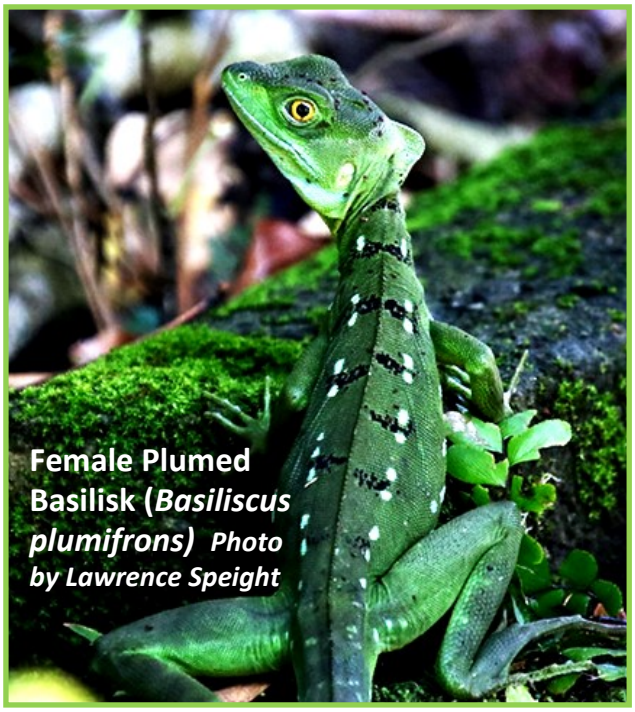
No Passives in Nature -- A Walk in Our Rainforest (cont'd)

looked like delicate twigs. I learned that it is locally called a gladiator and kills its prey by using its long limbs to trap them in a snapping spring-release-like fashion.

If you ever venture into mature native woodland, which sadly is rare in most countries, stand still, breathe deeply, look around, notice the multiple forms of vegetation and the immensity of the entanglement whose symbiotic relationships are mostly invisible to unaided human senses. Be mindful that you are in the midst of an evolutionary process too complex and dramatic to fully grasp. Reflect, in your transient moment, your nano-eternity, that you are in the woodland, be it for good or ill, as a participant.

There are no bystanders in nature, no audience, no passives. In nature, we are all participants. Even when dead, we are in nature, an integral part of the billions of years old wondrous science of life. Given this, we should take care of it. One way we can do this is by planting trees, the right one in the right place. Or pay an organization like the Woodland Trust to plant one or two or more on your behalf. Planting trees is one way of being a good ancestor.

After three hours in the forest, we were back at the biological station in need of a shower and a complete change of clothes.



Female Plumed Basilisk (*Basiliscus plumifrons*) *Photo by Lawrence Speight*

Seven Nests of Rufescent Tiger-Heron

by Dr Steven Furino & Mario Garcia Quesada

Seemingly, the Caño Palma area has the perfect habitat for the rufescent tiger-heron – swamp forests, gallery forest and mangrove swamps along slow-moving rivers. Yet the checklist of birds for our area lists it as rare.

Of course, it may be that they're there in good numbers but just difficult to observe in such challenging-to-access habitats. More to the point though is the nocturnality of rufescent tiger-herons (*Tigrisoma lineatum)*.

For the same reasons, information on its breeding behaviors is somewhat limited. So, Steve Furino and Mario Garcia Quesada, a former station manager at Caño Palma, set out to expand the knowledge base by (cont'd on next page)

Seven Nests of Rufescent Tiger-Heron (cont'd)

exploring the area around the station for signs of breeding birds with only this slight account from "The Handbook of Birds of the World" to go by:

> "**Breeding**. Little known. Nests quite high up in trees, … nest in large platform of sticks. In captivity: 3 eggs; incubation 31–34 days, by female only; chicks have white down."

Steve and Mario documented 7 nests found near Caño Palma Biological Station. Here are excerpts from their paper:

All of the nests were observed within approximately one kilometre of CPBS. Caño Palma canal was searched repeatedly in Spring 2005 for another 4 km upstream and 1 km downstream but no additional nests of rufescent tiger-heron were found. Additional searches along the larger canals and some smaller canals, and questioning of local knowledgeable guides, did not turn up any additional nests.

Nest placement and structure was very consistent. Large stick nests were constructed three metres or more directly over water on branches or fronds. In all cases, the nests were solitary.

With crest raised

Because of the location of the nests, it was impossible to observe the number of eggs present. In five cases, only one young was observed. In one case, two young were observed. In the remaining case, it seemed that no birds had yet hatched. There was no evidence of predation.

Nesting in the four most recently observed nests began in March. In the three prior records, nesting took place much later in the year.

The one chick observed was covered in white down. However, all young birds showed substantial amounts of white that diminished over time.

The majority of observations were made during daylight hours in 2004 and 2005. In daylight hours, almost no activity was observed. No nest building was observed, no feeding of young was observed, no adult pairs at nest were observed. Birds were silent during the day. Young were left unattended for very extended periods of time.

Young covered with white down in stick nest

Nest 3 was visited on more than 20 separate occasions after sunset or before sunrise. In almost all cases, there was some notable activity. This included a second adult visiting the nest and communicating with the adult already there, though it was not clear which of the two left shortly afterwards. Most frequently this included the young bird vocalizing and an adult bird feeding the nestling. This pattern of daytime quiet and night-time activity is consistent with the published reports.

The herons seem undisturbed by boat traffic though they clearly recognize the sound of motors. In one instance, a young heron approached within one metre of observers on the opposite shore.

For more detail on each individual nest, refer to Steve and Mario's paper at: http://www.coterc.org/uploads/1/6/1/8/16182092/rufescenttiger-heron.pdf

The Impact of Research-Based Tourism on the Tortuguero Area -- Part 2

by Laurentian University students

This is an edited version of a paper produced by students of Laurentian University in Sudbury, Ontario. Participants were Carole Anderson, Gregory Robillard, Alexandra Stankiewicz, Katrina Tisdale and Mitch Harrow. Project Head was Dr. Snarr, Chair of the COTERC Board. Part 3 will appear in the Fall 2022 issue. The original paper can be found at **research_based_tourism_2016_snarr_laurentian_university_class_report__1_.pdf (coterc.org)**

Mitch Harrow, one of the Laurentian students involved in the research and writing of this paper

Social and cultural impacts (cont'd from Page 11 of original paper)

Visitors generally realized that their participation in Caño Palma's programs had a big impact. This is important as it shows a true understanding of the station's purpose. They saw the importance of data collection. In this way, they're differentiating themselves from tourists. Research-based tourists and volunteer tourists are those who can recognize the importance of their role, and express a desire to inform the general public with their findings.

But what impact did their involvement have on they themselves? Responses were mixed though they leaned towards the positive:

- Many had a changed outlook on the concept of field research and what it entails.
- Others gained confidence in their ability to collect and organize data.
- Many didn't anticipate the amount of pain, both mental and physical, that they'd undergo.

Though a few guests thought it too early to say if their Caño Palma experience had changed them, many said they'd gained valuable life experience, and how to truly appreciate nature. Comments:

"It really tested my boundaries - like doing snakes."

"I've learned to appreciate things a lot more - nature and things back home. I think I'll be less materialistic because I now know how little we can live with."

"I really like the experience of being fully immersed. Think it's fantastic. Just being isolated. Everyone is so involved in their project. They love talking about it."

Beyond the research, some found the station ideal for self-improvement:

"Experience as much as I can and in that way contribute as much as I can. So personal goals are leadership and responsibility. Learn as much as I can."

"One of my goals is to learn about myself. Doing a successful project, managing things by myself. Here you're isolated so it's good for that."

Some volunteers moved on from the culture shock of isolated living in the jungle.

"It's not as overwhelming. I got used to travelling by boat and I feel a lot more comfortable with what's going on."

"After one month, it feels like my home. Everything is new at the beginning and now it's routine."

Being comfortable allows visitors to shift their focus fully to their projects and programs run by the station. In this sense, those who could adjust to the station's culture were those who could better understand their purpose in being here. In fact, that was one reason some volunteers came to Caño Palma - besides gaining work experience, they wanted to discover what it's like to be fully immersed in the field.

Sea-Turtle Happenings by Sebastian Martinez & Sarah Ravoth

May **Nesting Activity** – Of the 12 nests our teams came across this month, 10 were hawksbills and 2 were leatherbacks. Nine halfmoons, all hawksbills, were also recorded.

Evidence of hatching was found at 6 nests.

Poaching - The good news is that no adult turtles have been poached so far this year. To determine if adult turtles have been poached, we check for drag marks in the sand.

On the other hand, 11 nests were poached, at least 4 of them successfully. All were hawksbill nests, most likely because their nests have a lower egg depth. The evidence of a poached nest we look for includes poke holes, footprints, signs of digging, and broken eggshells in the vicinity.

As we've been doing in previous years, we make the effort to disguise all nests. As we did in 2021, the night-patrol teams take a rake out on the beach with them. Rakes camouflage the nest more effectively and require much less effort. It also reduces the workload for the morning-census team.

June **Nesting Activity** – With the onset of their nesting season this month, the greens starting arriving in mid-June. 7 nests as well as 6 half-moons were observed. That's a big improvement over last June when no greens were observed on Playa Norte.

Hawksbills were also active as there were 6 nests and 9 half-moons. Hawksbill nesting usually peaks in June and July (greens in August and September).

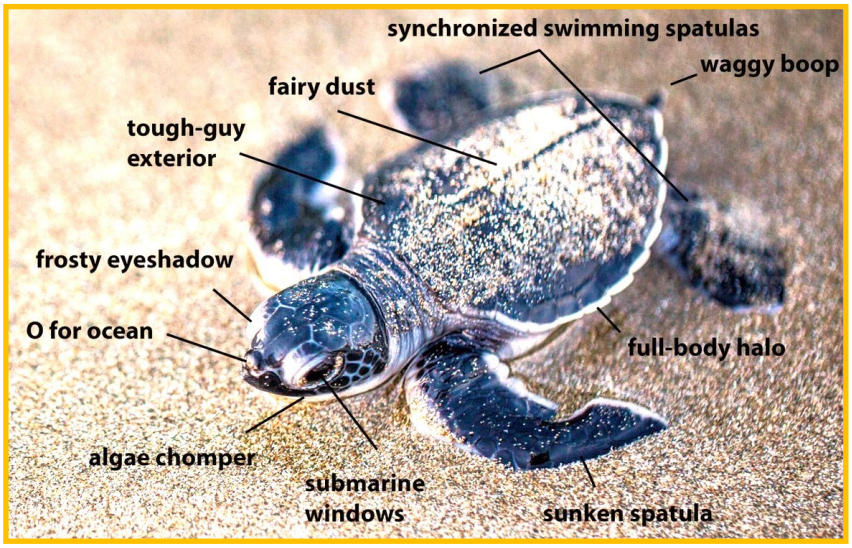
Poaching – 2 nests were poached this month.

Excavations – The goal of excavations is to calculate the hatching and emergence success of nests, and to identify natural and anthropogenic factors affecting nest success. Hatching success measures how many hatchlings leave their egg, whereas emergence success measures how many hatchlings exit the egg chamber.

Our turtle team excavated 10 nests - 7 leatherbacks, 2 hawksbills and 1 green.

Predation - 60% of excavated nests had partial or full dog predation. Because dogs tend to shred eggshells, predation of nests can obscure other factors affecting incubation and make it difficult to estimate nest success. Two nests laid by leatherbacks were fully predated. Four nests, 3 leatherbacks and 1 green, suffered partial predation. Two leatherback nests escaped dog predation. Surprisingly, both hawksbill nests suffered no dog predation despite this species having on average the shallowest egg depth, which makes it easier for dogs to sniff out the egg chamber.

Green sea-turtle hatchling



Looking Forward - Our focus is training incoming interns and research assistants to be patrol leaders as well as other essential research skills such as data management, teamwork and leadership. In June, Anna Zagora and Laurianne Richards began patrol leader training, and both have learned technical concepts quickly and showed a high degree of competence in the field. In July, Scarlett Souter will be returning as an RA and is taking a leadership role in managing the turtle project.

Enigma Wins Costa Rican Presidency by Doug Durno

On April 3rd, Costa Ricans elected a new President: Dr. Rodrigo Chaves, a 60-year-old economist who had briefly served - and resigned - as Minister of Finance in the previous government. He received 53% of ballots cast by an electorate that didn't seem excited about any candidate – an historically high 43% of eligible voters didn't vote.

Chaves is something of an enigma. He ran as an 'outsider'. That's certainly true in the sense that he left Costa Rica at about 20 to go to university in the U.S., and then spent his entire work career outside his native country. He only returned in 2019 after maybe 35 years away. So, by claiming he wasn't part of the

country's elite, he could build his campaign around the promise to shake up the ruling class by cleaning up political graft.

That might be tough to do considering that his party, the recently formed Social Democratic Progress Party (PPSD), won only 10 of the 57 seats in Costa Rica's Congress. That means Chaves will have to form alliances with the other parties. In fact, upon election he immediately met with his presidential opponent, Jose Maria Figueres, to discuss a cooperation agreement with his National Liberal Party (PLN) who have 27 seats.

As one commentator put it, "The question remains, can any change come from the 'outsider' Chaves, who looks remarkably similar to those who preceded him."

Besides his party's lack of seats, Chaves faces a tough economic situation. Costa Rica has seen two decades of steadily increasing unemployment and rising inequality. As well, he has to face the unpopular tax measures and cuts to the civil service that his predecessor, Carlos Alvarado, introduced to address a soaring budget deficit. That's certainly not helped by the damage Covid has caused to the country's lucrative eco-tourism sector.

Chaves will also have to deal with the conditions that the IMF imposed on Costa Rica so the country could receive a $1.77 billion loan. Since he spent 18 years at the World Bank, which is closely aligned with the IMF, it's unlikely Chaves will stray too far away from those conditions. Since those conditions provoked large street protests when originally announced, that's likely to be another problem for him.

Besides combatting corruption, Chaves and the PPSD promised to fight unemployment by increasing the number of STEM graduates, supporting bilingual education, welcoming foreign businesses, and encouraging more women to join the workforce. (**Irony alert**: The Costa Rican press was quick to jump all over Chaves for his statement that he won't tolerate harassment of women. That's precisely why he was sanctioned at the World Bank in 2019, and why he resigned his post there.)

To lower the cost of living, Chaves proposed a five-step plan:

- Remove taxes from basic food and household items
- Lower the price of rice
- Reduce the price of electricity
- Eliminate monopolies
- Support the importation of more efficient agrochemicals for farmers

So, how are Chaves and his new government doing?

- **Rice cartel** - Its powerful lobby has managed to maintain a 36% tariff on rice that protects them from cheaper imports. Since gallo pinto is a staple of Costa Rican diets, a tariff reduction to 5% is obviously great news

(cont'd on next page)

Enigma Wins Costa Rican Presidency (cont'd)

for the poorer segments of the country.

▪ **Agrochemical monopolies** - The government has taken them on, trying to open up competition while also encouraging the use of more environmentally friendly chemicals.

▪ **Minae** – The government has cut a lot of positions in this ministry in order to reduce excessive bureaucracy. Local Minae employees are quite happy as their funding with be increased as will that allocated to the national parks.

▪ **Sugar** - The government has passed a law that will hopefully prevent large producers from hurting smaller producers.

▪ **The Press** – Chaves has taken on Grupo Nación, a powerful media company that publishes Costa Rica's biggest newspaper La Nación. Grupo wanted to quadruple the size of an already large (capacity 16,000) entertainment/sporting venue they own. The government asked for a safety plan. Perhaps Grupo was used to previous governments just rubber-stamping their requests. So La Nación accused the government of stifling freedom of the press. Chaves replied: "This is not about freedom of expression. It is about a business group thinking that, because of their surnames and ancestry, they have the freedom to do what they want, as they have done for generations. That's over."

▪ **Electricity** – Rate reductions have been announced.

▪ **Foreign investment** - To generate more jobs, Chaves said, "The order to my ministers is that foreign investors should not have bureaucracy, but a red carpet of welcome".

It appears that Chaves and his government have gotten off to a good start. But more time will be needed to assess how much he has "shaken things up", particularly as regards corruption.

Plastics & Fences

Plastic, plastic everywhere. Anyone who has walked Playa Norte knows the truth of that. But where's the plastic coming from? How about local rivers that act as garbage streams, carrying plastics from inland communities to the sea?

In our case, much of it could be coming from the Rio Parasmina, just 40 or 50 kilometers south of Caño Palma. The government obviously considers this river a large problem. Calling it one of the most polluted rivers in the country, it has designated the Parasmina for installation of a waste-collection fence, one of four such fences to be installed in Costa Rican rivers.

This is part of the Plastics-Free Landscapes Project, instituted by the United Nations Development Program (UNDP). The fences will be only one part of a country-wide initiative to collect non-recyclable plastics that are not correctly disposed of. The plastics will then be shipped to a central plant that will transform them into raw materials to be used in construction.

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Contact COTERC at:

info@coterc.org **OR**

Box 335
Pickering, Ontario L1V 2R6,

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