Fall 2018 Volume 27 Issue 4

ISSN # 1188-2425

RAPHIA

Newsletter of Caño Palma Biological Station

THE MESOAMERICAN BIOLOGICAL CORRIDOR

- What is a biological corridor?
- Why are they important?
- Where does Caño Palma fit in?

Canadian Organization for Tropical Education & Rainforest Conservation

Touchdown!! Page 9 has latest research on green sea turtles at CP.

In This Issue of Raphia

"Lifelines for Living"

Central America is a biodiversity hotspot. But, over the last 60 or 70 years, cities and farms have taken up ever-increasing amounts of space. This means ever-decreasing space for wild ecosystems. Habitats for animals and plants become fragmented, smaller, and often isolated. This isn't a recipe for maintaining our treasured biodiversity.

Our feature stories on Pages 3 through 7 tells of the attempts by Central American nations to remedy this problem with **biological corridors** that keep connections open between those fragmented habitats. This enables genes to flow along these pathways so that isolated populations of animals (and sometimes plants) don't start down the path to extirpation, or even extinction, because of reduced genetic diversity. Corridors also allow the recolonization of historical habitat that has been destroyed. A good example is the Ara Project's breeding and release of great green macaws on the Caribbean side of Costa Rica (as described in the Summer issue of *Raphia*). Similar work is taking place in the San Juan/La Selva biological corridor in northeastern Costa Rica as well as at our station. Such efforts have played a role in the green macaws' recent return to our area.

So the focus of this issue is the preservation and restoration of biological corridors throughout Central America. The big picture is the Mesoamerican Biological Corridor, which encompasses the entire breadth of the isthmus from southern Mexico to Panama. Then there's our little corner of the world. Though small, we are part of this Corridor, and we have to take the necessary actions that will make a positive contribution to maintaining it. Most of us probably don't even realize the role we're playing. Just by preserving present pathways, we're doing our bit.

Similarly, Caño Palma Biological Station has vital roles to play in the preservation of the jaguar. We work to preserve the forest in which jaguars live and roam, thus helping maintain the pathways/biological corridors along which their genes, and prey, flow. We also monitor their numbers, and share our knowledge with the local population.

Look for the jaguar's tale in the next issue of *Raphia*.

Follow Us On

Website - www.coterc.org

Facebook - Canadian Organization for Tropical Education and Rainforest Conservation

Instagram - canopalmabiostation

Twitter - @coterc

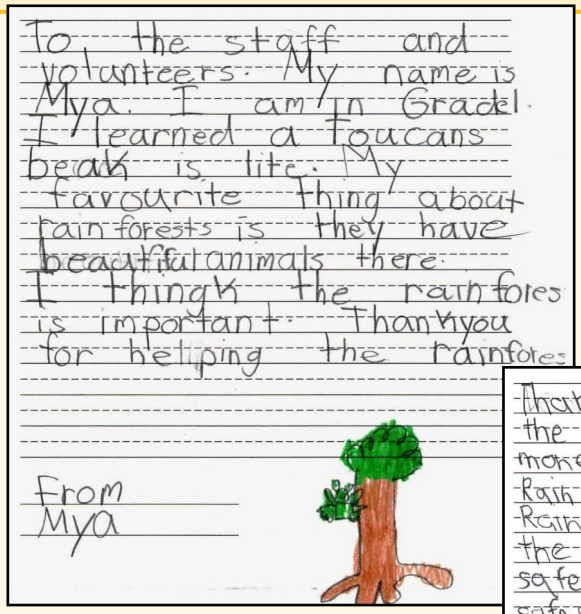
Thank You to the Green Students at Aberdeen Hall

At the end of the 2018 school year, COTERC received an envelope full of inspiration from the First Graders at Aberdeen Hall Preparatory School in Kelowna, British Columbia. Their teacher had tasked these young minds with learning about the importance of tropical rainforests. Their letters supported all those at Caño Palma involved in sustaining habitats, promoting clean air, and monitoring the effects of climate change. A random selection is printed below.

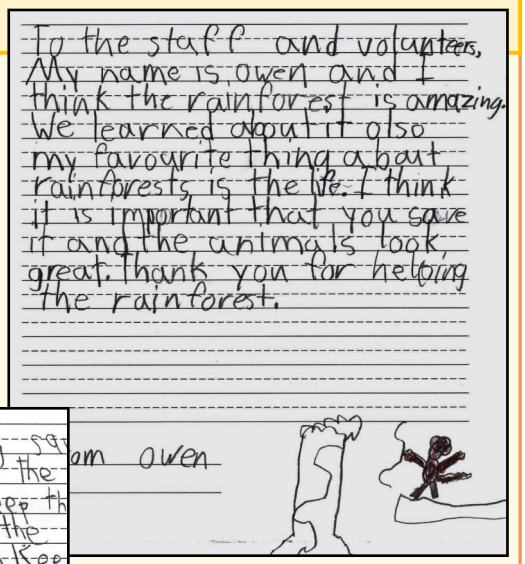
Over 25 years ago, COTERC founder Marilyn Cole and others had this same vision of learning, sustaining and preserving tropical rainforests for future generations.

Alongside their heartfelt words, these young people also fundraised, collecting about $370 for the biological station, a huge feat for such a small class. Their funds will assist in purchasing equipment for the continuous monitoring of turtles, birds, monkeys and plants. COTERC and Caño Palma are most grateful for this support.

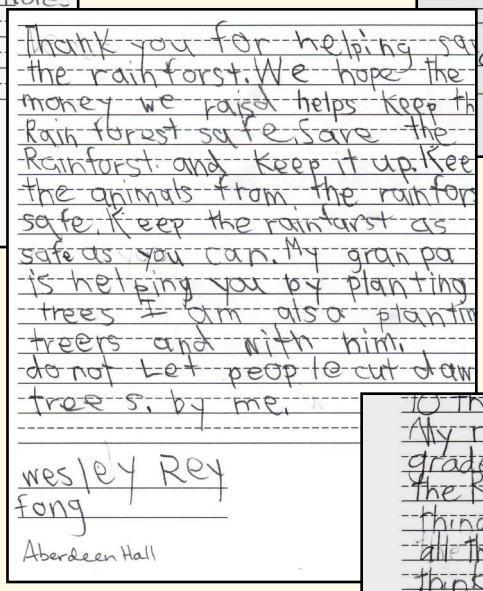
Hats off to their teacher for planting the seeds and using COTERC's mission as the fertile ground to grow those seeds. We look forward to hearing from these students in the future. Maybe one day some will attend the station.


To the staff and volunteers. My name is Mya. I am in Gradel. I learned a toucans beak is like. My favourite thing about rain forests is they have beautiful animals there. I thingk the rain fores is important. Thank you for helping the rainfores

From Mya

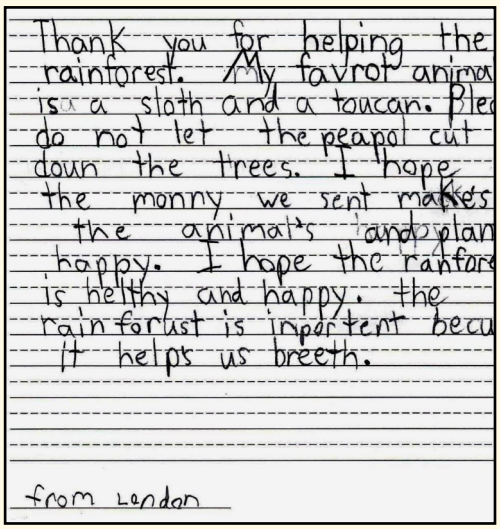

To the staff and volunteers, My name is owen and I think the rainforest is amazing. We learned about it also my favourite thing about rainforests is the life. I think it is important that you save it and the animals look great. Thank you for helping the rainforest.

am owen

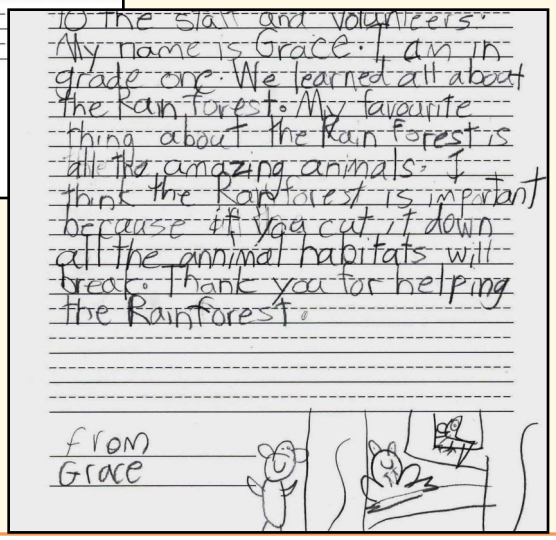

Thank you for helping sa the rainforst. We hope the money we raist helps keep th Rain forest safe. Save the Rainforest and keep it up. Kee the animals from the rainfor safe. Keep the rainforst as safe as you can. My granpa is helping you by planting trees I am also a plantin treers and with him. do not let peop le cut dow tree s. by me.

wesley Rey fong

Aberdeen Hall


Thank you for helping the rainforest. My favrot anima is a sloth and a toucan. Ple do not let the peapol cut down the trees. I hope the monny we sent makes the animals and plan happy. I hope the rainfore is helthy and happy. the rainforlust is inportent becu it helps us breeth.

from London


To the staff and volunteers. My name is Grace. I am in grade one. We learned all about the Rain forest. My favourite thing about the Rain forest is all the amazing animals. I think the Rainforest is important because if you cut it down all the animal habitats will break. Thank you for helping the Rainforest.

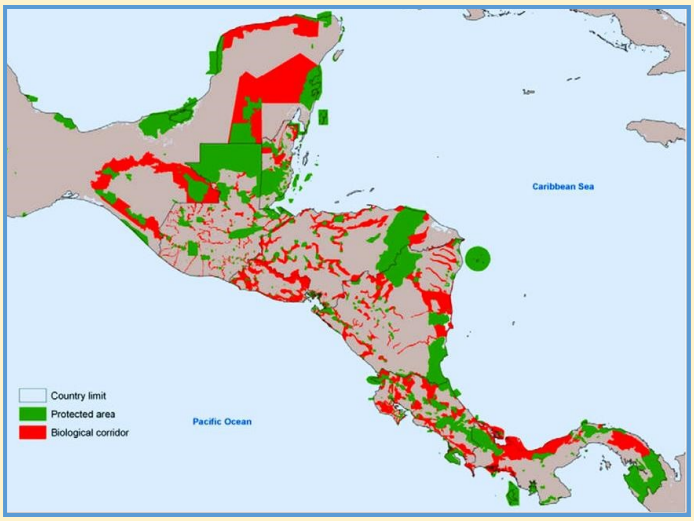
from Grace

The Mesoamerican Biological Corridor - Biodiversity and Gene Flow

by Doug Durno

Throughout its 3-million-year history, the Central America land bridge between North and South America has served as a **natural biological passageway** between the two continents. That is, animals and plants could freely migrate back and forth. That also means that their genes could flow back and forth.

But we modern-day humans are good at building. We built cities that now take up huge expanses of land. Farms big and small take up even more space. Unfortunately, this means we're also good at destroying. To inhabit the land and feed ever-growing populations, we cut down forests, fill in wetlands, and pollute waterways. Our destructiveness is a very effective way to impede the flow of animals, plants and their genes. With gene flow interrupted, the end result for many species can be small, isolated populations with a high risk of local extinction as inbreeding leads to a lack of variety in their gene pools.



Enter Archie Carr. In the late 1980s, he was made aware that fragmented habitats were becoming common. To maintain biological diversity in small populations, Dr. Carr suggested that passageways (biological corridors) between populations be restored. Corridors may be narrow strips of remnant vegetation, forests along rivers, large expanses of natural forest, even tunnels under roads. Their crucial quality is that they maintain connectivity in order to avoid the isolation of populations, ensuring the conservation of natural and restored habitats along with biodiversity.

For the reborn corridor along the Caribbean coast, Dr. Carr came up with the name Paséo Pantera (Path of the Jaguar).

In the bigger picture, if corridors could be reestablished locally up and down the Central American isthmus, eventually the original Central American land bridge would be functionally restored. Genes would flow between populations.

In 1997, all the Central American countries plus the five southern states of Mexico coordinated their efforts to prevent biodiversity loss and create a huge system of interconnected parks, reserves and wildlife corridors that would seamlessly link North America to South America. This program was called the Central American System of Protected Areas or **SICAP**. The World Bank agreed to provide funding. To indicate that the corridor now encompassed the entire breadth of the isthmus, the land bridge was renamed the **Mesoamerican Biological Corridor** (MBC).

While a lot of work has been accomplished on implementing the plan throughout the region, some critics consider that the project is failing because most countries have focused on protecting and enhancing revenue-generating parks while neglecting the main purpose of reconnecting them. Primarily, this is because the distribution of funds is in the hands of national governments who are more interested in enhancing revenue flow rather than gene flow. One exception is Costa Rica.

Costa Rica — A Success Story

The countries that have best committed to SICAP's goals are Mexico and Costa Rica. And, as Costa Rica has demonstrated, corridor development should concentrate on getting local people and organizations involved.

So, Costa Rica has established a national **Biological Corridor Program** with a strategy of working with community groups and environmental organizations to create a chain of local biological corridors. To spur local involvement, Costa Rica decided that 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 that forests with their trees, birds, water (cont'd on next page)

Costa Rica -- A Success Story (cont'd)

and biodiversity have intrinsic value. When plants and animals have homes, biodiversity is strengthened. With biodiversity, ecotourism can flourish, bringing in dollars and providing lots of jobs.

But current conservation incentives are not keeping pace with the rising value of land in Costa Rica and, for that matter, coastal areas of other countries. So, while corridors have been reestablished throughout the country, locals still encroach on protected areas to some extent, cutting down trees and using the deforested land for pasture or small-scale crops. As well, monoculture crops like pineapples are more lucrative than the PES.

Key takeaways from Costa Rica's efforts so far are:

- For corridor development to be successful, it's important that it be heavily centered on **local involvement**.
- Local job creation should concentrate on creating **livelihoods that carry on into the future** rather than on short-term work that is only available during a project's development.
- An **array of measures** such as tax incentives, preservation easements, education, decentralized administration, partnerships with international organizations, and outright land purchases should be considered.

About one-third of Costa Rica is classified as biological corridor.

Where Does Caño Palma Fit In?

The Summer issue of *Raphia* featured stories on the great green macaw and how Caño Palma and other organizations on the Caribbean side of Costa Rica are contributing to saving this beautiful bird from extinction. As Charlotte noted, we have put in place a monitoring program to track populations in five different locations in our area. Two interns, Matthieu Jegu and Chris van Roosmalen, have done research projects that not only monitored populations, but also investigated the greens' nesting habits, diet and their use of an introduced tree, the beach almond. Such research could be useful in other areas such as the San Juan/La Selva Biological Corridor (story on next page) where efforts are being made to reconnect biological pathways and restore habitat for the great green macaw and other organisms such as the greens' favored tree, the almendro.

The viability of the region's protected-area system depends largely on the conservation of a few large areas of intact natural habitat connected by strips of sustainably managed habitat.

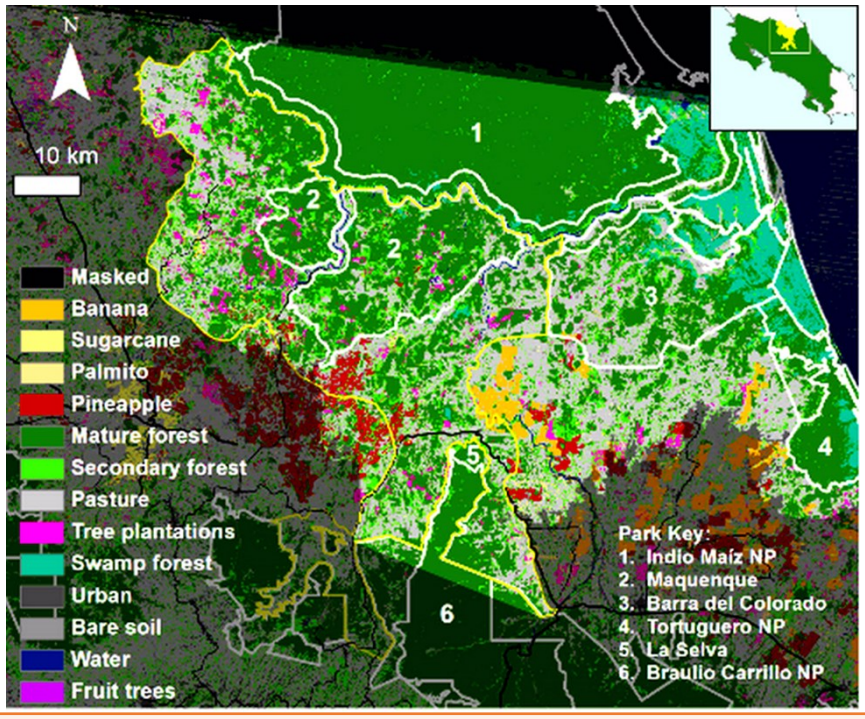
As well, I came across an article on the Osa Peninsula Biological Corridor. Efforts to reconnect pathways in that region are a good example of how the Biological Corridor Program is working in Costa Rica. Environmental and government organizations are helping to reconnect important wildlands. By supporting landowners located between the Corcovado National Park, Piedras Blancas National Park and the Terraba Sierpe National Wetlands, forest connectivity on these private lands is being reestablished. This is crucial to the survival of keystone species such as the jaguar, tapir, and white-lipped peccary.

Of course, the reason I'm bringing this up is that those three animals (jaguar, tapir and peccary) are regularly recorded on our mammal surveys. Such monitoring activity puts in place a foundation for understanding the changes in animal and plant populations in the wild over time. The ultimate goal is to contribute to the development of programs that can help save habitat and species.

So, when you're out there on a beach, in a marsh or on a path through the forest participating in any of Caño Palma's monitoring programs, you'll have the satisfaction of knowing that you're contributing to the preservation of a species.

Our Region: The San Juan/La Selva Biological Corridor

Anyone who has driven the road from Guapiles to La Pavona, the transfer point to get to Caño Palma, will have noted the extensive amount of grazing land along the way. That's land that used to be forested. Throughout the 20th century, trees were cut down at an accelerating rate to make way for pasturelands. It's estimated that only 30% of the region's original forest remained standing by the year 2000. (cont'd below)



That's been happening throughout our region, referred to as the San Juan/La Selva Biological Corridor as highlighted on the above map. In need of a symbol that would attract support for saving this region, the great green macaw was an obvious choice. It had the potential to be an 'umbrella species'. Though only around 30 breeding pairs of great green macaws remained in the Maquenque NWR (2) and La Selva (5) area by the mid-90s, the region maintained its great biodiversity including stands of the almendro trees that the greens favor for feeding and nesting. But deforestation continued. It threatened the greens, the almendros and other species with eventual eradication. A **Council** of over 30 organizations, along with MINAE, that share an interest in this region's preservation was set up. Their ultimate goal was the restoration of forests and biological corridors. As a priority project, the Council set out to produce an extensive data base for the great green including information on breeding range, nesting, nest sites, nest fidelity, nesting resources, nest productivity, first-year survival of juveniles, and foraging behavior. And Caño Palma fits right into this as we do similar research.

An **umbrella species** is a plant or animal with a wide range that has requirements for living that are as high or higher than other animals in its habitat. This means that if the umbrella species' requirements are met, then those of many other species in its area will be met as well – in other words, they fall under the umbrella of the main species. As such, umbrella species are commonly used in conservation.

The San Juan/La Selva Biological Corridor was born in 2001. It connected six existing parks in northern Costa Rica and southern Nicaragua, uniting a whopping 700,000 hectares of reserves and forests that are home to dozens of endangered species. In 2005, the Maquenque Mixed National Wildlife Refuge was approved, protecting several important ecosystems. This region now plays a substantial role in the broader Mesoamerican Biological Corridor. And it's easy to see how Caño Palma belongs via Tortuguero National Park (4) and Barra del Colorado National Wildlife Refuge (3). As well, connections go up into the highlands of the Cordillera Central (6) and its remnant forest patches. (continued on next page)

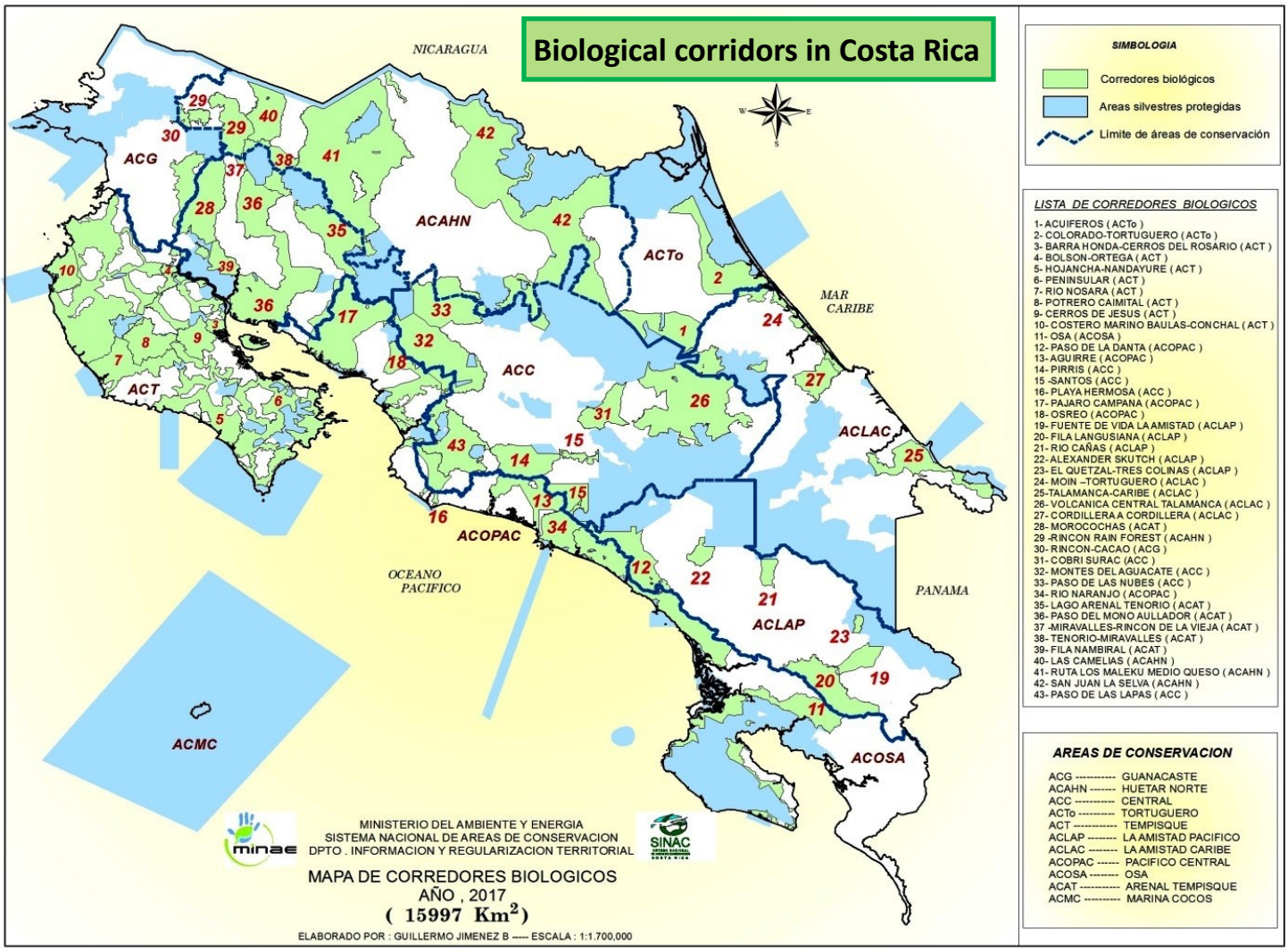
Our Region: The San Juan/La Selva Biological Corridor (Cont'd)

By the way, the "Mixed" designation in the Maquenque Mixed National Wildlife Refuge means that locals can continue to live on and own land within the refuge, but with restrictions on development. So, privately-owned land constitutes a considerable amount of this large area. To encourage these landowners to conserve forested land and/or regrow forests, the Costa Rican government instituted the Payment for Environmental Services (PES) scheme as outlined on Page 4. To resolve poaching of young green macaws from nests, the Council developed an intensive environmental-education program for local communities. Also, in this economically depressed area, the Council hopes to create employment opportunities in ecotourism. One such development is the San Juan/La Selva Birding Route, a series of lodges providing guiding and service jobs in mostly isolated areas.

The San Juan/La Selva Biological Corridor is home to about:

- 6,000 species (36 of which are endangered) of vascular plants
- 139 (32) species of mammals
- 515 (64) birds
- 135 (35) reptiles
- 80 (45) amphibians.
- 6000 to 7000 butterflies and moths

The Council's mandate also includes teaching young people about the Corridor project and the importance of biodiversity in their country's culture. This falls into line with our educational efforts in the village of San Francisco where we encourage young people to participate in the national program to "Save the Great Green Macaw".



The Great Flood of 2018

Here's how the dock area looked in July during the Great Flood. And no, the roof was not washed away. Reconstructive surgery was being done on the dock at the time of the flood.

One problem was the speed with which the water rose. At its peak, it stayed at knee height in the kitchen for 10 days. Some building supplies were lost, in particular 15 bags of cement. The main damage was to the quarters next to the dock, which will have to come down and be rebuilt. Some materials from the old dock will be able to be used. The library also sustained some damage. Ever the optimist, Charlotte says that all in all, things went reasonably well.

Fulfillment = Researching Green Turtles by Marieke Zobel

Having always wanted to be a veterinarian, Marieke studied animal care and worked in an Amsterdam vet clinic. But she dreamed of becoming a wildlife vet, somewhere far away. The 3rd year of her bachelor's program in Applied Biology at the HAS University of Applied Sciences requires that students do two internships, one of which has to be outside the Netherlands. After an email from a friend working with the endangered Lesser Antillean iguana on the Caribbean island of St Eustatius, she applied for an internship there, and was soon catching snakes at the Quill volcano. As she enjoyed working abroad so much, she applied for an internship at Caño Palma - so here's the rest of Marieke's story.

What an awesome time I had in Caño Palma! When Charlotte and Molly first asked me if I would be capable of walking 6 hours a night, 6 nights a week plus daytime fieldwork, I bluffed and said: "Sure! If I can walk the Quill volcano 6 hours a day, I can do that too!" I have to admit, walking the beach every night is a whole different story. Charlotte managed to get me through the first blistering weeks with all her love and care (in the form of her amazing food including fresh-fruit overload!). Then I got used to the hours.

Leatherback

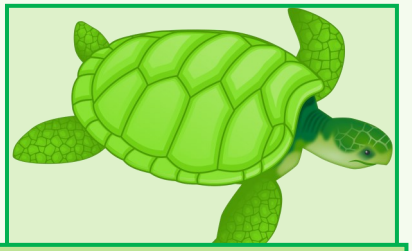
I remember the first time I saw a leatherback. I had seen green turtles before and frankly, I thought the leatherback was a little... I'm a little scared to say it but... ugly. Until my turtle coordinator asked me to perform the body check. The moment I touched her ginormous shoulders, tears caught my eyes... This amazing creature (being at least 30 years old) had roamed the big blue mysterious waters way before I was even born. A sense of pride and humility overwhelmed me.

Green

Green sea turtles get their name because the fat under their carapace is green due to their diet - like kelp or, as this one is munching on, sea grass. Unlike the other species of sea turtle, greens are herbivores.

But I was to be studying green turtles for my final thesis in my program at HAS. My research would investigate whether the incubation periods and nest success of the greens at Playa Norte had changed over the years. Such studies are valuable because they might provide critical information on the optimal incubation parameters for the green turtle, information that may be applicable in other nesting regions. This is important as the green turtle is endangered and their numbers are trending downward. (I should interject here to give a big thank you to all those who did the hard work of collecting the data.)

Anyway, back to my paper. I used historical data for the entire green-turtle nesting seasons (March to October) on Playa Norte over 10 years (2007 to 2016). Significantly, I found a longer average (mean) incubation period compared to a couple of other studies done elsewhere that reported mean incubation length as 55 days. The lowest mean I found in the station's data occurred in 2007 – 54 days. The highest was 63 days. And the increase from the first year to the final year was 6 days. What I wasn't able to conclude from my study are the reasons for these longer (cont'd on next page)



This is NOT a green sea turtle, just a turtle colored green.

Fulfillment = Researching Green Turtles (Cont'd)

incubation periods.

On the other hand, the influence of the amount of sunlight that a nest gets fell in line with studies from other regions. Nests exposed to more sunlight had shorter incubation periods. Conversely, the more vegetation cover and thus less sunlight resulted in longer incubation periods.

Finally, the longer incubation periods didn't affect nesting success. The percent of hatched eggs and the percent of newly hatched turtles that emerged from the nest were basically the same for any length incubation period. What remains to be uncovered is whether the longer incubation periods can bring increased fitness for the greens as has been found in other reptiles. Increased fitness would include such things as enhanced locomotor performance and a higher survival probability through the first year. Since that wasn't part of my study, further research will be necessary to shed light on that question.

I was so proud that I had gotten the opportunity to work with these animals and that I took it. It wasn't always easy – like seeing the turtles being taken away by poachers, finding their carcasses in the bushes, being yelled at by young poachers, and being watched from the bushes while working a turtle and knowing their eggs were doomed. Luckily, the happy feelings were definitely dominant! Digging up the hatched egg chambers and counting the high percentages of eggs that were hatched, partly thanks to our presence on the beach, was heartwarming. It gave me all the extra energy I desperately needed at the end of a long week. I remember one time when four hatchlings had hatched, but hadn't managed to leave the nest yet. At first, it looked like they had not survived their time in the sand. So we placed them next to the excavated nest while digging for the rest of the egg shells. Soon, one started to move its flippers slowly, and the others followed! We saw them crawling towards the sea! In broad daylight! Anyhow, to summarize my experience: "**If you're truly passionate about conservation, want to gain experience, and are willing to take 'working' to another level? Then Caño Palma is THE place to be!**"

Corazón, An Ecological Coffee with a Big Heart by Julie Nicolini

Julie, from France, is a dedicated environmentalist who spent a couple of weeks at the station earlier this year. From her time there, she put together a video, which you can view here: https://www.youtube.com/watch?v=sWWpUUATpL4
Her blog can be found at: http://now-is-good.com/category/blog-english/

Are you a coffee lover? Well, I am! And I was starting to get a little desperate to find a delicious coffee whose production wouldn't affect the health of our planet too much. That's when I found out about the **ecofriendly coffee**, **Corazón** – 100% Costa Rican. It's **ethical**, **sustainable**, and **soooo tasty**. I'm telling ya!

Last March, I met Jon Estessabian in Costa Rica. He is an American lawyer specializing in environmental law. Though born and bred in the States, his soul belongs to the Costa Rica lands. When we talked about his project with Corazón, I was so pleased (and relieved) to know that there are some **sustainable, ecofriendly and economically viable solutions** for the present (and the future) of the coffee industry. You just need to know where to look.

And Jon knew where to look. On behalf of *SurfRider Foundation of San Diego*, Jon was travelling Costa Rica in search of that one **100% sustainable and ecofriendly rare gem of a coffee producer**. Why Costa Rica? Because Costa Rica is **THE land of coffee in Central America**. The coffee plants are endless – and the **Tarrazú valley** (about 70 K south of San José) produces the most renowned coffee in the country. Yet "the most renowned" does not necessarily mean the most ecofriendly. Even when there is an organic label stamped on the coffee bag to assure the opposite.

To ensure that **production rates increase** and meet **consumer demand,** the big-name coffee companies use **pesticides and GMOs** to enable more intensive growing of the coffee plants. These coffee plantations spoil the natural environment that they stand on: The soil asphyxiated. The groundwater tables gone dry. The wildlife deserted. And a 2014 study reported that **coffee-production methods are becoming worse than ever for the environment,** responsible for land erosion and the **pollution of streams, rivers** and ultimately **oceans**. Their motto seems to be "let's deforest, plunder and replant under the warming sun with some pesticide spray to look nicer".

It was in the Tarrazú valley that Jon met Henry Gutierrez totally by chance, and discovered that he was **the only one in the country** who didn't buckle under the weight of money. In contrast to the big-name coffee companies who produce for the masses, not caring one second about the massive destruction of the land they exploit in the process, the Guitierrez family, proud and happy owner of its land for many generations, never uses chemicals or GMOs. They let Nature be the guardian of their lands. Coffee plants grow naturally under the dense canopies of forests thriving with biodiversity. They believe to the core of their being that it's about respect for Mother Nature and respect for future generations.

- The coffee plants are naturally shaded by fruit trees and bush.
- The soil is naturally provided with nutrition by decomposing fruits, flowers, wood and seeds from different trees species (which gives different shades of flavors to the coffee, always so tasty).
- They use natural carbon ash (from underground fires on their fields) if the plants are infected by pests.
- Their water system produces little if any waste in the coffee-making process.
- The coffee beans are dried in direct sunlight.

(cont'd next page)

Corazón (Cont'd)

Working with the Guitierrez family, Jon created Corazón a few years ago. It's an **organic coffee brand** but it's also an **ecological movement**. Corazón is involved in **environmental conservation in many ways**.

Small but fiercely strong !

If you want to know more about their methods of production, go to their website.

Would the secret of ecofriendly agriculture be to stay small?

In 2017, Corazon's coffee plants produced about **20,000 pounds of coffee beans**. To increase that number, they plan on planting more **natural and endemic coffee plants** in the next four years, always with an **ecological approach**. Henry, Jon and the SurfRider Foundation hope to increase awareness of their growing process for sustainable (really) organic coffee with local producers. Corazón wants to set an **example of both good methods and good benefits**. They know they can **be an inspiration for other agricultural farms** by showing them that their system pays off and can be more rewarding than any industrial-type production. Gradually, they want to inspire more and more farms to join them in their **100% ecological movement**.

Julie's word...

We are not always **aware of the environmental aspects** and of **what is at stake** in every cup of coffee - **water pollution**, **soil exhaustion**, **loss of biodiversity**. All of that for one cup of coffee? That's way too expensive! We can choose to consume the product we love by choosing the **local producers** who believe in **ecofriendly methods of production**. When you start consuming with an ecological approach, you develop an environmentalist mind. That's what loving the Earth is all about. Being aware and acting accordingly.

If you're in Costa Rica and want the Corazón experience, their website gives out further information on visiting and even staying there. Go to http://www.corazoncr.com/cabinas/

Station Happenings

Taken from Research Coordinator Anna Harris's reports

July **The Great Flood** - This month is, on average, one of the rainiest at the station. However 2018 brought what I'll call the Great Flood. Canal depth peaked at 3.04 m, which was above my knees in the kitchen. With such inundation, many surveys had to be cancelled. This included snake, otter, shorebird, and mammal surveys. We even canceled a handful of night patrols while we evacuated volunteers over to our library in San Francisco. Furthermore, our weather box was knocked down by a kayak while maneuvering people through the flood water. The box crashed into the water, submerging our data loggers. They were quickly grabbed from the water and placed on rice in a dry box, and are functioning normally now. However, for two weeks, we couldn't record weather data. Once everyone was back on base and everything started to dry out, we started getting back into the normal routine of surveys.

Macaws – We managed to do 37 surveys and observed 1127 great green macaws including a group of 75 green macaws observed in Tortuguero.

Among those departing the station this month were:

Laura Tilleman (Netherlands) – This HAS University student spent her internship at the station examining the effects of microplastics on sea-turtle nest success.

Kiana Cuypers (Belgium) spent most of her month here working on the sea-turtle project.

Jason Falcone (Virginia, USA) ended his six-week turtle internship.

Marco de Haas (Netherlands) completed his two-month internship working with mixed taxa.

Savannah Neb from Colorado arrived for a 3-month internship. A recent graduate, Savannah looks forward to gaining some field experience while she looks to attend graduate school, hopefully working in a lab focused on marine-turtle research.

Helen Pheasey (UK) made another visit to continue research on her PhD. You can learn more about Helen's research on Page 15.

August **The Great Flood** – Water levels had dropped far enough that the boat dock was clear and usable. So the station was almost fully back in business except for the snake survey, which wasn't conducted because the forest was still extremely wet, making for a challenging night hike. Some surveys were not done in the usual number.

Our dogs - As I'm sure you all are well aware, we have two dogs that live at the station. As we often observe on the beach and on mammal survey, dogs can have a big impact on wildlife. In the past we have seen our dogs' tracks on the CPBS mammal transect – they love to chase the monkeys in the afternoon. To combat this, we began taking the dogs to the beach with the morning turtle census to tire them out. The six-mile morning walk seems to have done the trick as we have not found their tracks on the CPBS mammal transect in months. If you're wondering how we know this, you've probably never been in the field with Manuel, who has an incredible eye for detail, especially for mammal tracks. We are happy with our lowered impact on the forest and grateful for our slimmer guard dogs.

Clement Lalait – We are very proud of Clement as he has successfully defended his thesis in his pursuit of an MSc. As MINAE has plans to introduce ecotourism to the Dr. Archie Carr Wildlife Refuge in the future, they want to do some restoration and reforestation work first. Clement has produced a report and recommendations based on our data on forest composition, mammal surveys, tent-making-bat surveys, and macaw survey. Clement has been at the station since February, and plans to stay until the end of 2018. (The next issue of *Raphia* will include a summary of Clement's work.)

Yu Liang (China) – From York University, Yu was a mammal intern who also spent her time here helping with otter surveys.

Station Happenings (Cont'd)

Alessandra Fernandez (India) – Also from York, Alessandra was a patrol leader in the marine-turtle program.

Interns **Linnea Ulrich** (Regina, Sask)**, Nick Kyner** (Indiana) and **Anna Tomczyk** (Massachusetts) also departed after 6-week stays.

Former research coordinator **Molly McCargar** and former turtle-project coordinator **Helen Pheasey** also left at the end of August to continue their research elsewhere. They will return sometime in the not too distant future.

September

Surveys – Even with the floodwaters having receded, we weren't able to get back to a normal schedule for all surveys conducted on base as several interns left to return to university. This left us in a situation where we only had enough people to do turtle surveys as the green-turtle season reached its peak. As more volunteers/interns arrived, we got the other surveys back on track though some were on a limited basis.

Ara Project – As described in the Summer issue of *Raphia*, the Ara Project has two locations in Costa Rica dedicated to breeding and releasing macaws. Recently, we hosted two of their people, Jack Haines, their lead field biologist for their new site in Puerto Viejo de Sarapiqui near La Selva, and Meg Hill, their media communications officer. We talked about potential collaborations and where the future of macaw conservation should go. To further the relationship, Anna and Manuel will be visiting their Punta Islita site in November to learn how to make artificial nest boxes for great greens.

In order to get a better understanding of the status of great green macaws in Costa Rica, Jack has organized a country-wide count in which Caño Palma participated. The count took place over two days and followed the same basic protocols as our own macaw survey. The survey took place at dusk and dawn with the intention to catch macaws leaving and returning to their roosting sites, thus reducing the double counting of birds. We conducted the macaw counts at the station and San Francisco. Once the data has been collected and analyzed, Jack will be sending out a report with the results of the count.

Annulated Tree Boa

Chava Joosten – This Dutch student from HAS University arrived to complete her overseas project. She will be analyzing our historical data on the annulated tree boa (*Corallus annulatus*) in order to get a better insight into this snake's morphology and distribution in our area.

Sam Orpin – In otter news (ha ha - it never gets old), Sam will be spending a year at the station examining otter scat with the intention of improving our scat-aging methods.

Melina Damian and Kat Zagorulko – These two young ladies from York University in Toronto finished up their projects and returned back to school. Melina, from Venezuela, worked on the marine-turtle project. Kat, from Canada, was a mammal intern. Both showed great leadership during their three-month stays.

Savannah Neb – Thanks too to this turtle intern from the state of Colorado. She also was at the station for three months.

The Lesier family – Here's a great family vacay – come to Caño Palma and work on the turtle surveys. Clara, Chloe and Fabrice from France enabled us to get an additional team out on the beach each night during their two-week stay.

Much thanks to all.

Anna's Research -- Update

To bring everyone up to date on my own research project, I've been studying aquatic macroinvertebrates in the canals of Tortuguero National Park to assess water quality. If a body of water supports macroinvertebrates that are sensitive to water quality and toxins, the water quality is probably very good. If the body of water only contains macroinvertebrates that can tolerate lower-quality water and none that are sensitive to it, the water quality is probably poor.

For this project, three samples are taken from five canals within the Tortuguero National Park. The macroinvertebrates in each sample are identified back at the station under a microscope. As they are tiny and mixed in with leaf litter, this can be a very tedious task. Luckily, there's been a few interns willing to pitch in for a few hours to help with sample sorting.

From the macroinvertebrates we find in the samples, we can determine the quality of the water based on an index created specifically for Costa Rican streams. As more samples are taken and the macroinvertebrates are identified, we should be able to inform the ministry of the water quality in the canals and how it changes over the course of the year.

Helen Pheasey -- Appearing on PBS

Helen is a former turtle project coordinator at Caño Palma. And she has been returning to the station as part of a project she's been working on. This project involves putting fake eggs in turtle nests so that the eggs can be tracked if they're poached. But let's get the story from PBS, the Public Broadcasting Service out of the United States.

https://www.pbs.org/newshour/show/cracking-down-on-poaching-with-3d-printed-fake-turtle-eggs

PBS has also featured Helen in other NewsHour stories this year.

Waiting in the Dark for Sea Turtles to Nest — https://www.pbs.org/newshour/science/reporters-notebook-waiting-in-the-dark-for-sea-turtles-to-nest (Scroll to bottom of story for video)

Plastic Lasts More Than A Lifetime — https://www.pbs.org/newshour/show/plastic-lasts-more-than-a-lifetime-and-thats-the-problem

Endangered Sea Turtles Found Dead Off Mexican Coast

By Jose Cortes – Reuters plus additional information inserted from Fox News
August 28, 2018

About 300 endangered sea turtles were found dead off the southern coast of Mexico, trapped in fishing nets. This occurred not long after more than 100 dead turtles were recovered in a separate incident.

Fishermen in the southern state of Oaxaca discovered the 300 olive ridleys in the seaside community of Barra de Colotepec, said Heliodoro Diaz, the coordinator of the state's civil protection agency.

According to the Federal Attorney's office, the animals became trapped in nets used for riparian fishing on riverbanks. **These nets, it explained, are not used to fish shrimp and tuna from the ocean.**

The olive ridley turtles, which Mexican authorities say are at risk of extinction, measure about 75 centimetres (29.5 inches) in length and weigh some 45 kilograms (100 pounds). From May to September, they descend on various Mexican states along the Pacific Ocean to lay their eggs.

Mexico, which is home to six of the world's seven species of sea turtles, has a permanent programme to protect the reptiles, including criminal penalties for those who kill them. The office of the federal attorney for environmental protection (PROFEPA) said it would investigate the case.

Earlier this month, authorities said they were investigating the deaths of 113 sea turtles at risk of extinction - 102 olive ridley turtles, six hawksbill, and five belonging to the green turtle species - in a sanctuary in the southern state of Chiapas.

Experts said asphyxiation, fish hooks or harmful algae could have killed the turtles, but the cause is still being investigated, PROFEPA said.

If you have the stomach for it, here's a link to a short video of the floating dead turtles and their burial - https://www.thequint.com/videos/news-videos/300-sea-turtles-found-floating-dead-off-mexicos-pacific-coast

Costa Rica - 2018 Election by Doug Durno

The 2018 presidential and legislative elections in Costa Rica had two major issues as a backdrop:

First up is cement. Usually used as a substance to bind things together, cement blew the 2018 elections open. It became the scandal known as 'Cementazo'. The state-owned Banco de Costa Rica had loaned a businessman, Juan Carlos Bolaños, about $35 million to import cement from China. Bolanos organized an elaborate scheme via offshore companies to buy cheap Chinese cement in order to sell it at much higher prices in Costa Rica. A legislative committee found that the businessman used influence peddling to protect himself from prosecution. The impressive list of casualties from the investigation include the president of the Supreme Court, the attorney general, the aptly named Vice-minister of Finance, many politicians, plus the manager and board of directors of the Banco de Costa Rica. It's likely that then-president Solis was also involved.

The second issue involved a ruling by the Inter-American Court of Human Rights, which surprised many in Costa Rica by extending all rights enjoyed by heterosexual couples to same-sex couples.

The following lightly edited analysis of the April 1 election was written by Alberto Matamoros of the Atlantic Council, a Washington, D.C.-based think tank.

"**Carlos Alvarado Quesada's** election as president of Costa Rica, which defied every recent opinion poll, in the second-round runoff on April 1, marks the rejection by Costa Ricans of fundamentalist populism.

The 38-year-old ruling party candidate won 60 percent of the vote. The election, despite taking place amidst rampant corruption, rising crime and inequality, and a looming financial crisis, was defined by the issue of same-sex marriage.

Quesada's opponent, Fabricio Alvarado Muñoz, an ultraconservative evangelical preacher, relied on family-values rhetoric and opposition to same-sex marriage to garner support.

New president Carlos Alvarado Quesada with VP Epsy Campbell

Costa Rica's election received more international press coverage than usual because of an advisory opinion issued by the Inter-American Court of Human Rights that appeared to legalize same-sex marriage in Costa Rica, and described same-sex marriage as a human right. The Court's opinion caused outrage in deeply religious Costa Rica.

Muñoz made his opposition to the opinion the central issue of his campaign. He called for Costa Rica to withdraw from the Inter-American Court. Such rhetoric was enough to catapult him from an afterthought to leader in the polls, and earned him a surprising victory in the election's first round.

The Court's opinion and Muñoz's unexpected surge polarized the country and sparked a national debate on human rights, the separation of church and state, so-called gender ideology, and the rise of evangelical churches as a powerful political force.

Quesada inherits the presidency from the most unpopular administration in years. Outgoing President Luis Guillermo Solis, a member of the new president's center-left Citizens' Action Party, leaves behind a largely dysfunctional country. Mismanagement of public funds and unchecked spending by the Solis administration have stoked fears of an economic crisis – Costa Rica closed 2017 with its highest (cont'd on next page)

Election 2018 (Cont'd)

fiscal deficit in almost four decades. In 2017, it also witnessed the highest levels of violence in its history with more than 600 homicides. According to some estimates, 2018 will be even worse.

Finally, the Solis administration left Costa Ricans with the Cementazo: the single-largest corruption scandal in the country's history. The Cementazo uncovered a complex and far-reaching influence-trafficking network that involved deputies from all of the country's major parties, the Supreme Court, and many of Solis's closest allies.

Despite the deep polarization in the country, there are reasons to celebrate. Voter turnout was high. The Supreme Electoral Tribunal officially announced Quesada as the winner just two hours after polls closed. Less than an hour later, Muñoz delivered a concession speech in which he called for national reconciliation and respect for the results, an increasingly rare gesture in Latin America. The election also made a bit of history. One of Quesada's vice-presidential candidates, Epsy Campbell, will be continental America's first black-female vice president.

One of Quesada's biggest challenges during the campaign was to convince Costa Ricans that despite belonging to the same party as Solis, he's different from his predecessor. He must now address the fiscal deficit, the most ominous cloud hanging over his incoming government. A first step would be to push tax reform through the legislative assembly and impose legal limits on the growth of public spending. He must also deal with the ballooning homicide rate, which, out of all countries in Central America, is the only one going up. He must also implement anti-corruption reform, a task made all the more urgent by the Cementazo.

Finally, and most importantly, he must heal the deep divisions that are the consequence of the recent election. He has already started down this path by offering half of the ministerial-level positions to opposition parties as long as they agree to help push forward a negotiable legislative agenda. The new president will also need to rebuild bridges with the marginalized and rural coastal areas that voted against him. As a Costa Rican journalist succinctly stated, it was necessity, not ignorance that led these communities to vote for Quesada's opponent."

Postscript – As the new president undertook tax reform, unions opposed some of the proposed measures by instituting a general strike. Unions claim that the reform package of new taxes falls too heavily on the lower income sectors, although the government says that 80 percent of the new taxes fall on the richest 20 percent of the population. But others claim that taxes are not so much the issue as "the profligate waste of any tax money the government collects, which goes to pay enormous (by CR standards) government salaries, benefits and pensions. The average Tico is much more concerned with the exorbitant inheritable pensions than with some tinkering with the sales or value added tax. No government can be viable while paying such absurd pensions to retirees, and then to their descendants." (As of distribution date, the strike is in its seventh week.)

- Presidents are elected for a 4-year term.
- If no candidate receives 40% of votes cast on the first ballot, the two highest vote-getters meet in a runoff.
- Sitting presidents may not immediately re-run for president, but must sit out at least two election cycles (8 years) before being eligible to run again.
- Two vice presidents are elected on the same ticket as the president.
- Deputies of the Legislative Assembly are also elected for 4-year terms. They're elected on a proportional-representation basis by province.
- To run again, deputies must sit out at least one election cycle (4 years).

Canadian Organization for Tropical Education & Rainforest Conservation

We welcome any comments or suggestions from our members to ensure 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 send it along to us at directoratlarge4@coterc.org

Contact us at:

info@coterc.org

OR

Box 335

Pickering, Ontario L1V 2R6, Canada

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.

COTERC would like to thank the following individuals for their generous donations over the years. that will assist in furthering the research we do at Caño Palma.

Pennie Mason	Michelle Hunwicks
Jim Taylor	Rob Hamilton
Lillian & Larry Hall	Lauren Stewart
Susan Kunanec	Durham Region Aquarium Society
Vanessa Phelan	

We would also like to thank Microsoft for the donation of MS Publisher and Windows 10 software.