

# RAPHIA

## Newsletter of Caño Palma Biological Station



Jaguar, Jaguar, burning bright,  
 In the forests of the night;  
 What immortal hand or eye,  
 Could frame thy fearful symmetry?  
 In what distant deeps or skies,  
 Burnt the fire of thine eyes?

Wm. Blake

Near Caño Palma  
Biological Station

## Our Jaguar Hotspot Pages 6-12



On the Beach of  
Tortuguero National Park



Canadian Organization for  
 Tropical Education & Rainforest  
 Conservation

What's up dock? --  
 See Pages 13 & 14

## In This Issue of Raphia



<b>3</b>	<b>Dr Clement Meets Dr Carr</b> •• Clement Lalait presents his research findings from the Carr Wildlife Refuge
<b>6</b>	<b>Our Reclusive Neighbor</b> •• Amy discovers jaguars in our backyard
<b>7</b>	<b>When jaguars discover turtles</b>
<b>8</b>	<b>When one endangered species preys on another endangered species</b> •• by Stephanny Arroyo-Arce & Ian Thomson
<b>11</b>	<b>More on Jaguars</b> •• Keystone Species & Researching Their Health
<b>12</b>	<b>Panthera and the Jaguar Corridor Initiative</b>
<b>13</b>	<b>Notes from the Station</b> •• A few thoughts from Charlotte on the year past and the new dock
<b>15</b>	<b>Appreciations</b>
<b>16</b>	<b>Station Happenings</b>
<b>17</b>	<b>Costa Rica's Money Problems</b>
<b>19</b>	<b>Teddy Roosevelt Sees the World</b>

We don't see a lot of jaguars in our area. That doesn't mean they're not there. It's just that they're nocturnal and reclusive.

In fact, jaguars are present in our area in increasing numbers. In Tortuguero National Park alone, recent counts have identified 16. And, as Amy's story on Page 6 indicates, we sometimes find jaguar tracks around the station when doing mammal survey. Recently, Manuel saw his first ever jaguar in our neighborhood.

Why are there more jaguars? We'll look into that on Page 7, but one reason might be that jaguars are dining on turtles in ever increasing numbers on Tortuguero Beach. Is that a menace to nesting turtles? We have a special contribution from the folks at Coastal Jaguar Conservation (CJC) that examines that subject (Page 8).

**Cover Photos** -- The upper photo, taken at night, was caught by one of our camera traps that's triggered by a motion sensor. The lower photo is not the whole picture. This jaguar was actually eating a turtle, but stopped to investigate the photographer, and then took off back into the refuge of the forest.

**Follow  
Us  
On**

**Website** - [www.coterc.org](http://www.coterc.org)

**Facebook** - Canadian Organization for Tropical Education and Rainforest Conservation

**Instagram** - [canopalmabiostation](https://www.instagram.com/canopalmabiostation)

**Twitter** - [@coterc](https://twitter.com/coterc)



## Dr. Clement Analyzes Dr. Carr ... For Flora & Fauna by Clement Lalait



*From the Université Grenoble Alpes, Clement came to the station for a 6-month internship, working his way towards a masters in ecology and environmental management. Previous studies were completed in his*

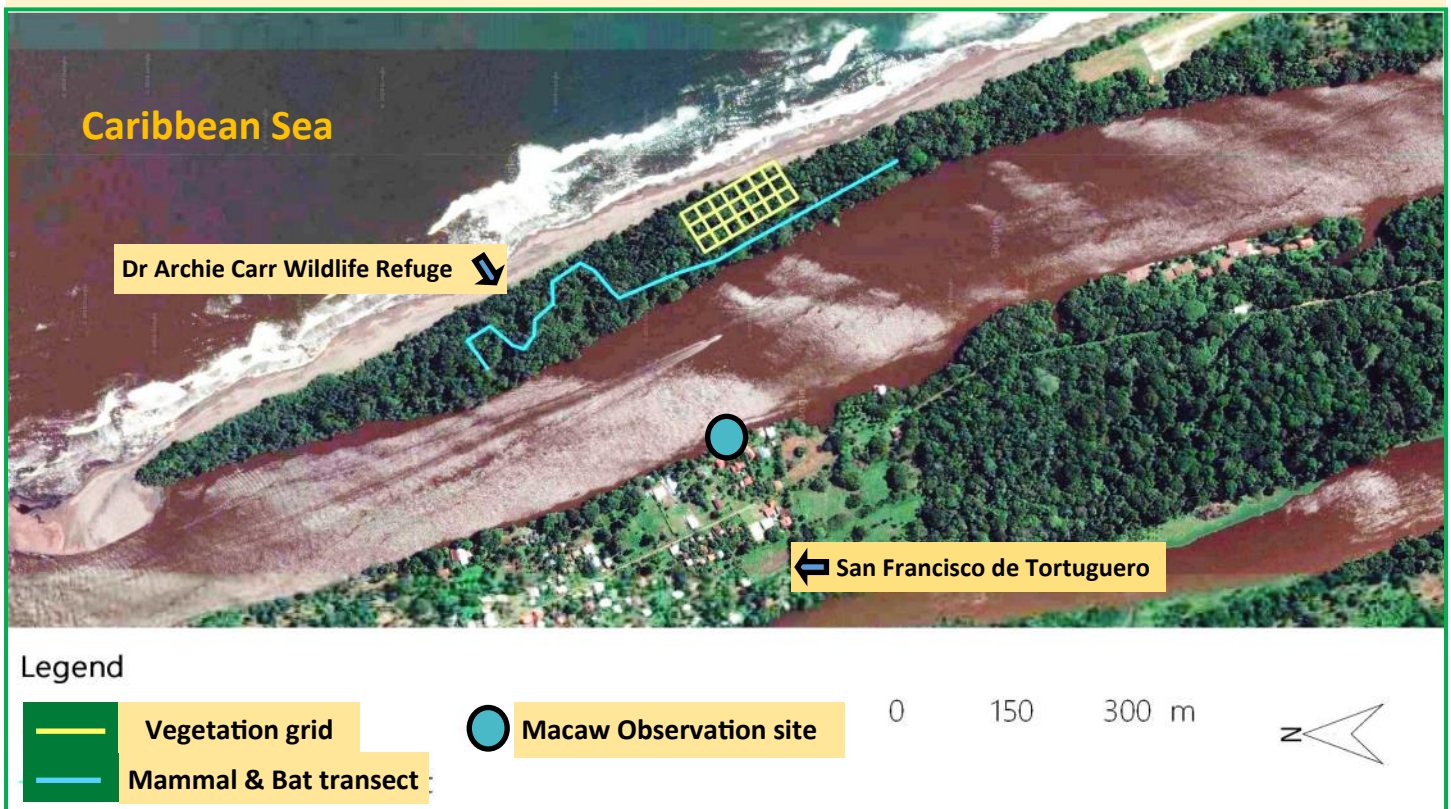
*hometown of Bordeaux and Quebec City. Clement is staying on at Caño Palma for an extra 6 months. After that, he plans to go back to Europe and work with farmers with the purpose of introducing biodiversity conservation into their standard practices.*

We picture tropical explorers with brown jackets and baggy pants, full of pockets, topped by safari hats and round glasses, sweating like Niagara Falls, macheting their way through dense vegetation. Then there they are, in the heart of the sacred forest with a plethora of species to discover. My arrival on the Dr. Archie Carr National Wildlife Refuge peninsula was somewhat similar. Except I had my French rubber boots, a black rainjacket (it's like honey for mosquitoes - they love it), and some mammal-survey datasheets in my hand instead of a machete.

Inevitably, I ended up at Caño Palma Biological Station. My mission: perform the first scientific biological description of the Refuge. Even better, I had the opportunity to get a reforestation plan going by recommending the plant species that should be conserved or introduced in order to improve habitat quality. One reason for this study is that the Refuge has suffered in the past. During the 1950s, 60s and 70s, logging reduced tree density quite a bit, certainly compared to surrounding primary and secondary forests. My project is meant to positively affect the composition of the Refuge's wildlife species and marine turtles' use of their beach.

Hence, we started in February 2018 by conducting surveys on species composition and the activity of large mammals, tent-making bats, macaws as well as the trees. As you can see on the map below, we covered a large part of the narrow peninsula through the tree grid (yellow), the mammal and bat transect (blue), and the macaw observation spot (turquoise circle). As you can also see, for we surveyors, it's not much more than one step into the river, the next step into the Caribbean.

(Cont'd on next page)





## Clement (Cont'd)

This narrow peninsula that the Refuge sits on is just like a nice croissant: a small thing that can host more than expected (which, on the Refuge, is not the quantity of butter). As a matter of fact, this peninsula, only the size of 250 ice-hockey rinks (or soccer pitches if you prefer), harbors many species: nine large mammals, one tent-making bat, two macaws, and at least 36 trees. It's impressive to see how, in tropical ecosystems, forests are not dominated by just a few tree species. The most common species in the Refuge makes up only 11% of the total trees. The understory is the most surprising, with an extremely high abundance of pioneer species: *Heliconia* and *Calathea* species, as you can see behind me in the pictures.

Over time, I became an expert in identifying the foraging evidence left by nine-banded armadillos as they represent more than 66% of the mammals encountered! Sadly, being a nocturnal species, the only armadillo I actually saw was headless. Other mammals spotted were sloths, dogs, porcupines, pacas, opossums, tayras, deer and raccoons.

Tent-making bats modify leaves by chewing the ribs, making them collapse in a tent-like structure. We only found one cluster of five Watson's fruit-eating bats (*Artibeus watsoni*), including two juveniles, using at least 8 tents. Seemingly, the harem male was not very fatherly as the juveniles have been unseen since August. Probably enjoying their youth and making their own life in their own tents now. As for the macaws, (cont'd on next page)





## Clement (Cont'd)

the great greens (aka the star of the summer issue of *Raphia*) formed more than 88% of macaw sightings. They use the Refuge as a daily migration corridor and meeting point, and are most active in December-January and May-July -- that is, before and after caring for their nestlings.

To discover any seasonal changes in the wildlife, we're continuing to do all the surveys that we started last February.

This project couldn't be done based on field work alone. I had to do a lot of research into Neotropical plants. As well, I ran statistical analyses of data from the monitoring surveys conducted near the station on both mammals and plant phenology. When everything was put together, I came up with a list of trees, tall grasses and epiphytes to conserve or introduce in order to attract more of the animal species that the study was focused on. This list includes the mountain almond (*Dipteryx panamensis*), a tree favored by great green macaws.

All this work has been summarized in a report, now in the hands of the Ministry of Environment of Costa Rica (MINAE). We hope to start on-site reforestation experiments soon, and then implement a restoration plan for the whole Refuge. This responsibility of founding the very base of a reforestation effort is an extraordinary opportunity I've been given by COTERC. More than the macheting explorer discovering an unknown nature, I have a motherly feeling for the Dr. Archie Carr National Wildlife Refuge, acting for its preservation and the rebirth of its forest heart.



**Mountain Almond**

## Our Reclusive Neighbor -- the Jaguar by Amy Cocksedge



*Amy, seen here on the Cerro, is a former intern at Caño Palma. The first half of this article is her tale of mammal survey. Amy's complete account appeared in the Fall 2017 issue of Raphia.*

"Five a.m. Untuck the mosquito net. Lazily pull yourself out of bed. Pull on long pants and long-sleeve shirt. Socks, still damp from previous outings, are pulled over pants to stop unwanted visitors. On top of all this, add rain pants and rain jacket. Despite the heat, you know this is the only way to keep from being eaten alive by mosquitoes. Just grin and bear it. After meeting with your team in the kitchen, you're soon on your way into the rainforest in search of animal tracks because you're doing mammal survey.

Today you're on the Raphia trail, which runs behind the station. This is always an exciting survey because not only is there usually

an abundance of tracks, but it also means the animals that made them were right behind the buildings where you live.

You find the usual stuff: a few agouti footprints, tracks of a red brocket deer, and evidence of an armadillo digging for food. Then things get exciting-- jaguar footprints cut across the path. Though not unheard of, jaguars are far less common than the other critters out here. But the tracks are unmistakable-- overnight rain has made the soil perfect for leaving imprints. So when did the jaguar leave these? You're especially excited by this question because two nights ago you were on the Raphia trail looking for snakes. Knowing jaguars are primarily nocturnal, there's a chance this mysterious beauty was on path at the same time you were!

You continue on, searching for more tracks but all the while wondering just how close you were to seeing the jaguar-- or it seeing you."

### Paseo Pantera -- The Path of the Jaguar

The trail Amy walked is a tiny piece of the Paseo Pantera, the 'Path of the Jaguar', that connects jaguar habitat in Central America. Our area provides ideal habitat as jaguars prefer to live by rivers, swamps, and in dense rainforest with thick cover for stalking prey. Unfortunately, one reason jaguars in Central America are listed as Endangered or Critically Endangered is the fragmentation of their territories.

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

What happens when action isn't taken? Our station is situated in a great stretch of coastal wilderness that extends from Limón all the way north into eastern Honduras. Unfortunately, the connectivity of jaguar habitat between Honduras and Guatemala has been lost. Jaguar populations north of there are now isolated.



## When Jaguars Discover Turtles by Doug Durno

Costa Rica has become one of the best places in Central America to see a jaguar. As noted in the Fall *Raphia*, that's because Costa Rica has made the best effort to preserve wild spaces like forest and wetlands. Not only that, but Costa Rica has been implementing SICAP's strategy of protecting and restoring corridors between these protected areas.

Within Costa Rica, the Tortuguero area is one of the best places to find jaguars. An estimated 16 jaguars now inhabit Tortuguero NP where they have the corridors and the swampy, rainforested habitat they prefer.

And our area also has some of their preferred prey like the white-lipped peccary, red brocket deer, paca and agouti. In addition, jaguars have a taste for sea turtles. Here's a recent video from Tortuguero National Park:

<https://www.youtube.com/watch?v=woy3XsWguvs>

And another video with the jaguar first going after a vulture:

<https://www.youtube.com/watch?v=8qjfSp0z-EA&feature=youtu.be>

When the stars threw down their  
spears  
And water'd heaven with their tears:  
Did he smile his work to see?  
Did he who made the Lamb make  
thee?

Blake again

### Significance of Turtle Kills

How many turtles have been killed by jaguars? Well, Coastal Jaguar Conservation has been collecting data along a 29-km stretch of Tortuguero coastline for 8 years (see article on next page). Evidence of jaguar predation is based on the presence of their tracks and the jaguar's telltale way of eating a turtle. CJC is finding an increasing number of kills. The 2017 number is about 400, and almost all of these are green sea turtles.

Still, researchers don't consider jaguar predation rates, about 2% of nesting greens, a significant threat to them. They're more worried about the greater losses caused by human activities such as poaching, commercial exploitation and inadvertent captures in fishing gear.

The jaguars of Tortuguero provide another surprise. Jaguars are supposed to be solitary creatures with large territories. But the estimated 16 jaguars of Tortuguero NP exist in a space that would typically hold only two or three. Why this throng? Some research indicates that jaguars are being pushed here by the destruction and fragmentation of other suitable habitat as a result of human activities around the National Park and its buffer zone. And, as noted above, for an opportunistic feeder like the jaguar, Tortuguero NP offers up many of the prey species it favors, including the green turtle. However, illegal hunting in the Park is causing a decline of the jaguars' other prey. Thus jaguars are pushed to seek out the greens. At least that reduces pressure on the populations of those other prey species for a few months.

**Note** – Despite the fact that a jaguar is eating a leatherback in the first video above, that's unusual. Greens are by far their favored dining choice among turtle species.

### References

<https://blog.nationalgeographic.org/2018/03/15/coastal-jaguars/>

<https://www.cambridge.org/core/journals/oryx/article/jaguar-panthera-onca-predation-of-marine-turtles-conflict-between-flagship-species-in-tortuguero-costa-rica/D4714DC0E58BA056AABAC8A6AD38E0AA>

## Jaguars & Sea Turtles -- Investigating their Relationship

By Stephanny Arroyo-Arce & Ian Thomson of Coastal Jaguar Conservation (CJC)

Since 2011 'Coastal Jaguar Conservation' has been working in Tortuguero NP to better understand the predator-prey relationship between jaguars and the four species of sea turtles that nest in the area: the green turtle (*Chelonia mydas*), the leatherback (*Dermochelys coriacea*), the hawksbill (*Eretmochelys imbricata*) and the loggerhead (*Caretta caretta*).

Conflict between flagship species such as these, who already face immense pressures on their long-term survival as a result of human activity, can present challenging issues for researchers, local communities and governmental organisations working to ensure their long-term survival.

When faced with situations such as this, we must attempt to look at them objectively. Images of jaguars predating sea turtles can be incredibly emotive, and while emotions can be a powerful driving force behind our work, our decisions must be based on scientific data. To this end, as a research project we must collect accurate data over long periods of time to allow us to correctly interpret and understand the nature of the relationship we are studying. This then allows us to present our findings and recommendations in an accessible format to key stakeholders, who then have the information they require to make informed management decisions.

We must understand that the bases for this relationship are primarily an indirect effect of human activities (e.g. deforestation, poaching) and that the decline in the local sea-turtle population is not the result of jaguar predation (which has only been documented in a few locations across the Americas), but rather human activity throughout their entire geographic range. It's precisely human activities that have brought together these species in Tortuguero National Park and triggered this peculiar predator-prey interaction.

Our long-term research has allowed us to determine that current predation levels do not represent a threat to the local green-turtle nesting population. As for leatherbacks, we need more information to determine if jaguars are having a significant effect on that turtle's population decline. We believe it is not the main cause as this population was in decline before the first jaguar predation event was recorded. Finally, since there are not local population estimates for the hawksbills and loggerheads, it's difficult to ascertain the effect that jaguar predation may be having upon these species.

For more information about 'Coastal Jaguar Conservation', please visit us at <https://www.facebook.com/JaguarConservationCostaRica/>

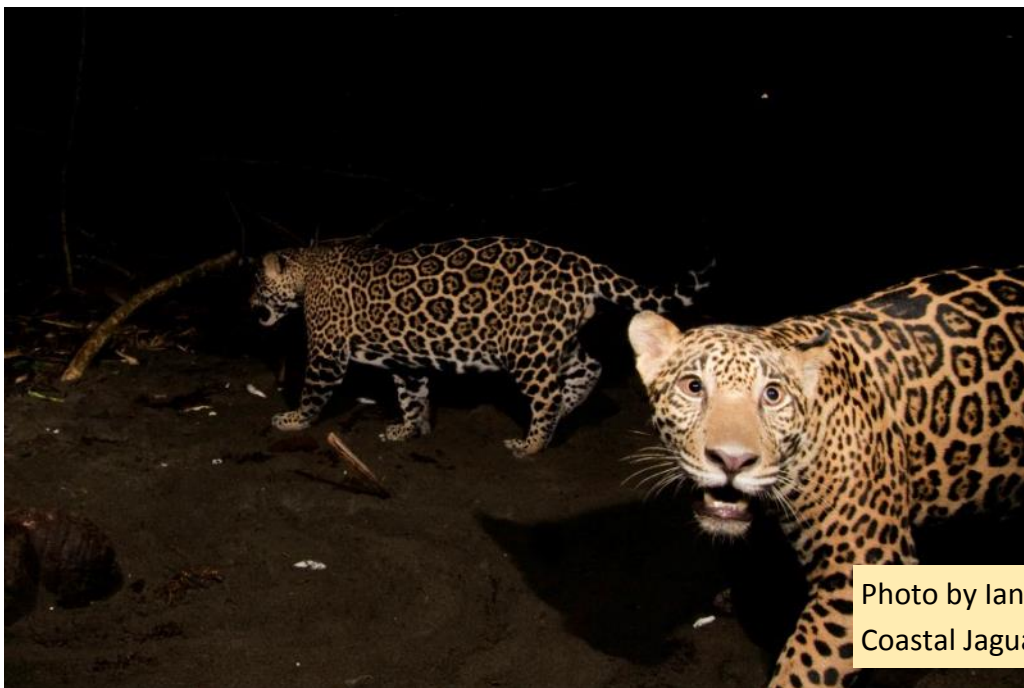


Photo by Ian Thomson of Coastal Jaguar Conservation



Photos on Tortuguero NP Beach by Ian Thomson of CJC



© IAN THOMSON



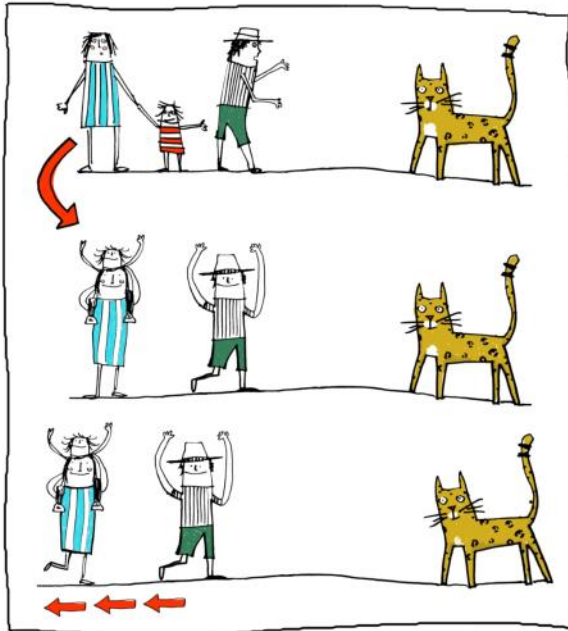
© IAN THOMSON

## Hints for Introducing Yourself to a Jaguar

¿QUÉ HACER EN CASO DE ENCONTRARSE CON UN JAGUAR ?

*What to do in case of a jaguar sighting?*

COASTAL JAGUAR CONSERVATION



Paso 1. Siempre mantenga la calma

*Step 1. Always keep calm*

Paso 2. Levante los brazos lentamente, sin hacer movimientos bruscos o repentinos

*Step 2. Raise your arms slowly, avoid sudden or abrupt movements*

Paso 3. Si va acompañado de niños, levántelos lentamente sin agacharse

*Step 3. If children accompany you, lift them up slowly without bending over*

Paso 4. Aléjese del jaguar lentamente sin darle su espalda

*Step 4. Slowly back away, never turn your back on the animal*



CONTÁCTENOS Coastal Jaguar Conservation sturnina@gmail.com • ianithomson@hotmail.com

## Threats to the Jaguar

① **Habitat destruction** -- As we develop land for agriculture and other uses, jaguar habitats are lost or fragmented, isolating populations and jeopardizing the genetic integrity of the species.

② **Ranchers** -- Some kill jaguars in retaliation or because of their perceived threat to livestock and livelihoods.

③ **Overhunting** -- Lack of natural prey, like peccaries and deer, due to overhunting by humans, contributes to population declines and forces jaguars to prey on domestic animals, further fueling human-jaguar conflict.



## Keystone Kats

Like the other big cats – tigers, lions, leopards, snow leopards – jaguars are **apex predators**. That means each is at the top of its food chain. As well, they have no wild predators due to their strength, speed, ferocity and other hunting adaptations like stealthiness and powerful jaws. All are in the genus *Panthera*.

Besides being an apex predator, the jaguar is a **key-stone species**. As an opportunistic carnivore,

feasting on so many of the herbivores in its range (see box), the jaguar helps to regulate the populations of these animals, thus reducing the pressure on plants, which helps maintain the delicate balance necessary for a healthy rainforest. This could possibly save some of those herbivore species from extirpation.

As for the plants, they support insects that are food for birds. And those insects might be decomposers. If their numbers are greatly reduced, soil composition might be altered so that plants are negatively affected.

So, the elimination of the jaguar can affect its entire food chain.

### Herbivore prey:

- peccaries
- red brocket deer
- pacas
- agouti
- capybaras
- monkeys
- tapirs
- armadillos

## Cat Scat: Studying Jaguar Health

Mapping areas where jaguars live is difficult because of their reclusive nature. Getting their DNA is even harder. Researchers want DNA so that they can study the genetic health and gene flow between populations. As discussed in the Fall issue, these are important because they give a good idea of how likely isolated populations are to survive.

Claudia Wultsch, a research fellow with the American Museum of Natural History as well as *Panthera*, has worked out a noninvasive method to get DNA by obtaining it from the jaguar's scat. Finding the scat ain't easy either. To solve that problem, they started using professionally trained scat-detector dogs in some areas like Costa Rica. They also appear to have solved the problem of storing the DNA, which degrades rather rapidly in the hot, humid climes of the tropics.

So far, research has shown that, among Central American jaguar populations, an isolated group in northeastern Mexico exhibits the lowest genetic diversity along with moderate levels of inbreeding. Not far behind were jaguars in Honduras where habitat loss and fragmentation could be reducing population sizes and increasing isolation of remaining populations. Unsurprisingly, since Costa Rica has the best forest preservation and biological-corridor system, jaguars there showed the highest levels of genetic diversity.

### One similarity between Field Biologists and Dung Beetles



Reference - <https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0162377>

## Panthera and the Jaguar Corridor Initiative

*Panthera*, founded in 2006, is devoted exclusively to preserving

wild cats and their critical role in the world's ecosystems. Panthera's team of leading biologists and wild-cat advocates develops innovative strategies based on the best available science to protect cheetahs, jaguars, leopards, lions, pumas, snow leopards and tigers along with their vast ranges. In 36 countries, Panthera works with a wide variety of stakeholders to reduce or eliminate the most pressing threats to wild cats – securing their future, and ours.

The jaguar's range is huge – 6 million km<sup>2</sup>. It's found from northern Mexico to northern Argentina. Yet the area of forest lost where jaguars historically roamed is even huger – about 9 million km<sup>2</sup>. Such habitat destruction has left many isolated populations, of which Panthera has identified 90. To connect such populations, they've identified 182 potential corridors, ranging in length from 3 km to 1607 km. However, 44 of these corridors are too narrow in places, leaving them in danger of being severed.

Enter Panthera and its Jaguar Corridor Initiative. It's working with governments and corporations to restore corridors. Of course, restoration doesn't just benefit jaguars. Many other animals also use these corridors.

One is the white-lipped peccary whose range widely overlaps the jaguar's. And, because peccary herds can be quite large, they have to travel great distances to find enough of the fruits and other vegetation they consume. As noted, a better corridor system benefits this Vulnerable species. And that's important for jaguar conservation as the white-lipped peccary is a main item on the jaguar's menu.

When their habitat is clear cut for farms, the peccaries are forced to relocate. If jaguars can't find peccaries or other prey, they start looking elsewhere for a meal. Nice and handy are the cattle of the farmers who cut down the forest. The farmers will then go after the jaguar. Reducing conflict between farmers and jaguars is another of Panthera's goals.

In November of 2018, Panthera and leading international conservation organizations and key countries with jaguar populations joined together to launch the [Jaguar 2030 Conservation Roadmap for the Americas](#).

By saving jaguars, we gain other benefits: we're maintaining forests, carbon reservoirs, biodiversity, watersheds, and cultural heritage.

### Where Does Caño Palma Fit In

As Amy documented in her article, besides jaguars, we find lots of peccary tracks on our mammal surveys. So, when we preserve the forest in which these two species live and roam, we're contributing to their welfare since our area is a corridor, which keeps jaguar and peccary genes flowing among separate populations. Not only that, but our long-term mammal monitoring contributes to the knowledge base needed to study jaguars. As well, we can pass on our knowledge to local people.

### In Memoriam

**Dr Alan Rabinowitz**, the top dog in big-cat conservation, co-founded Panthera as an organization devoted to protecting the world's 40 wild-cat species. He worked all over the world, convincing governments and local populations of the importance of protecting animals, particularly jaguars, tigers and leopards. One magazine called him "the Indiana Jones of wildlife protection". He authored several books, including his first "*Jaguar: One Man's Struggle to Establish the First Jaguar Preserve*", which describes his efforts in sparking the creation of the Cockscomb Wildlife Sanctuary in Belize. Alan died recently at 64.



**Dr Rabinowitz on the beach at Tortuguero NP in 2012**



## Notes from the Station by Charlotte Foale

As we hurtle into 2019, we need to take a moment to step back and remember some of the achievements of 2018. An incredible group of researchers, interns, volunteers and COTERC Board members joined together to support us in so many different ways. With otter and macaw projects running full time, we now have started to amass more long-term data, and analysis and preparation of publications are moving along in several areas.

Our turtle project was hard hit by the weather this season, and fast-rising waters saw us evacuating interns to our library in San Francisco. This rapid-rising and long-lasting flood disrupted surveys, damaged infrastructure, and delayed the major maintenance project of the year, the construction of our new dock.

As water levels lowered, work on the dock began apace, and we slowly began the realization of the years-long dream. Everyone agreed to maintaining the upper boat dock, or "bird's nest" - but to afford a more stable structure, and to create a much-needed social space, it was extended the full length of the dock. This space immediately became an escape, with room for yoga and hammocks, and a cool breeze making it the most comfortable spot on base.

The dock is taller than its predecessor, so flood waters won't restrict the entry of our boats. And with a steel and concrete construction, we're hoping to enjoy this structure for many years to come. A massive thank you needs to be expressed to everyone who contributed to the Save-an-Acre fund, and who let us use these monies to improve our little spot in the rainforest. Research and conservation being the reason for our existence, having a safe and comfortable Station for our researchers to stay is essential if we want to continue our work. We are hopeful that we can slowly continue to improve the Station infrastructure in order to accommodate the challenges that this environment throws our way.

We also thank our tireless contractor Leon Solis who did the majority of the work single-handedly, and did a truly amazing job!

Best wishes for 2019, and thank you for all the hard work, the donations and love we've enjoyed, with you as part of the Caño Palma family!



**New dock showing triple pierage and extended birds-nest up above**



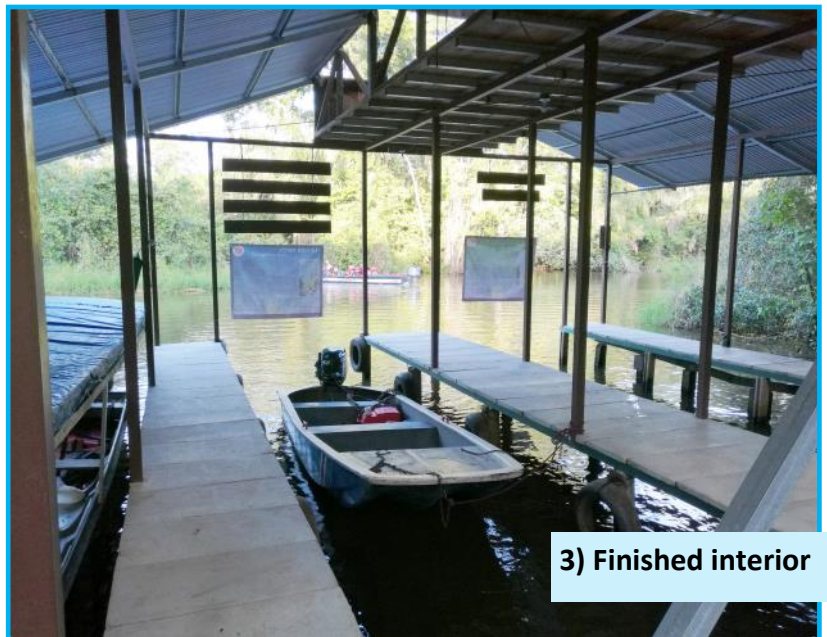
# Replacing the Dock



1) First, set the foundation into the bottom of the channel. Top with 3 piers and put the walking areas in place as shown.



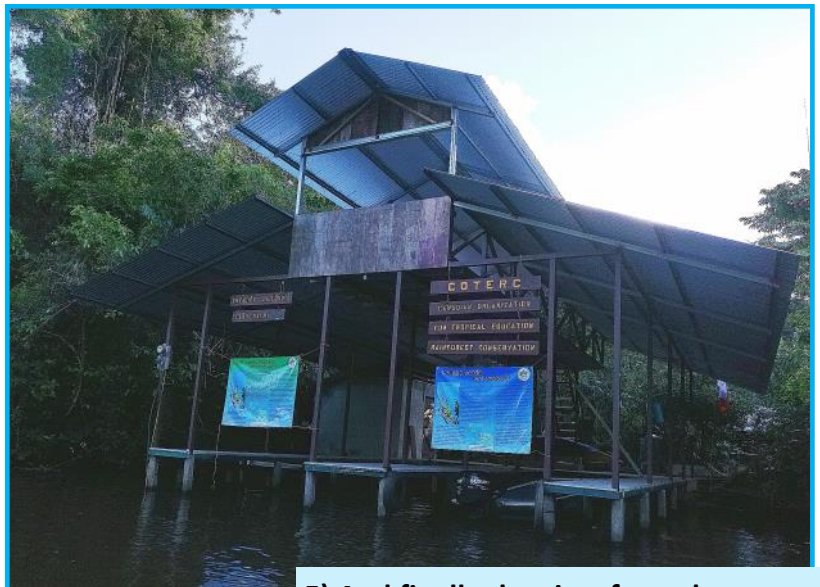
2) Take down the old structure.



3) Finished interior



4) The roomier "birds-nest"



5) And finally the view from the water



## Appreciations

### Pet Expo

Due to the generosity of Pennie Mason, COTERC was able to participate in the Pet Expo on Nov 24<sup>th</sup> and 25<sup>th</sup>. We raised around \$800, all of which will go towards our work at the station. Pennie donated a lot of items from her Pet Valu store in Oakville. As well, Fran and Tom Mason spent a lot of time and effort assisting us with transportation and setup. They also arranged for the booth. And for that, a big shout out to Grant Crossman, the organizer of the Pet Expo.

The tireless Shelley Hutchison was responsible for setting up our booth and taking it down.

And finally, we couldn't pull off an event like this without the people who volunteer to spend a day watching the dogs and the rest of the pet world parade by in front of the booth. So let's recognize the contributions of Kym Snarr, Susan Kunanec and Joanne Smith. Thanks to all.

### Wish List

Due to privacy concerns, I can't have access to the names of all those who responded with cash to the request for items needed at the station. However, I'd like to offer our gratitude to those whose names we do have. So here's to you Kirstin Silvera, Steve Furino, Susan Kunanec, Joanne Smith and Margaret Thompson.

### Special Donation

And a big thanks to Sarah Minter and Shawnee State University for the donation of two microscopes that will enhance the station's research facilities.

## Station Happenings

Taken from Research Coordinator Anna Harris's reports

**October**

**Green Macaw Count** – In the September report, Anna mentioned our participation in a great green macaw count organized by Jack Haines of the Ara Project. From the count, Jack estimated between 36 and 91 greens. The currently accepted population estimate for great green macaws in Costa Rica is around 300, which makes our estimated number seem very low. However, the area where our count took place was limited. For the next one, the inclusion of more sites should produce more comprehensive results, allowing for a larger portion of the population to be counted.

**November**

**Winter rains** - 818 mm this month - brought the canal's peak water level just above the boat dock. The extra rain caused some mammal and snake surveys to be canceled.

**Francesca Bernadini** (Italy) arrived at the station for three months to assist in surveys and participate in our community program.

**Simon James and Katie Lloyd** (United Kingdom) spent a short time at the station. Katie is a biologist who works with Nature England. Simon is an IT guy who was able to assist with software.

## Progress on our Macaw Monitoring Program by Anna Harris

In November, Manuel and I visited the Ara Project's breeding and release center in Punta Islita on the Pacific coast of Costa Rica. The purpose was to learn how to build artificial nest boxes as we're currently looking to expand our macaw monitoring program to include direct conservation actions. The placement of artificial nest boxes throughout the Tortuguero area is one way to do that.

We were hosted by Jack Haines, the Ara Project's field biologist who has placed several artificial nest boxes around Punta Islita and at their new site in the Sarapiquí area (in north-central Costa Rica). Jack showed us the different types of nest boxes, how to make them, and gave advice on how to place them safely in the trees. The Ara Project uses two types of nest boxes, one is for breeding birds and the other is for wild birds. The main difference between the two is that the nest boxes for the wild birds have a plastic base, meaning they're lighter and easier to hoist up a tree. We also went out in the field to see the nest boxes in action. When implementing this project, Jack had to do a lot of experimenting to get it right so we were able to learn from his experience.

We also had a meeting with Sam Williams, the executive director of the Ara Project. During the meeting, we spoke about different ways our two organizations could collaborate in the future in terms of research and our respective macaw festivals. We were also given a tour of the aviaries where the birds are kept, observed the preparation of food for the macaws, and watched as they were fed.

In the end, Manuel and I learned a lot about macaws, artificial nest boxes, and the overall operation of the Ara Project. While we do not plan to start the nest-box project until the next nesting season, we are in the process of brainstorming other ways to expand the macaw monitoring project.



## Costa Rica's Money Problems by Doug Durno

The general strike in Costa Rica began on September 10<sup>th</sup>. It was a reaction to tax-reform legislation proposed by the recently elected government of President Carlos Alvarado. He and his party had campaigned on the need to address the country's growing debt. Past attempts had become gridlocked in the legislature. The government claims the situation is dire because, as the 'Costa Rica Guide' put it: "Costa Rica is broke and the U.S. and other banks refuse to lend any more money to increase the national debt until there's a solution in place."

So, what's been happening with the strike? After it began, the government sued to have it declared illegal. They had to do this in each of the 32 government departments affected. The first 12 judgments went in favor of the government, declaring the strikes illegal. Why? Because Costa Rican law states that workers can only strike to protest salaries, working conditions and other elements of the employer-employee relationship. It's **illegal** to strike in order to manipulate the legal system. Following other judgments that went against both sides, the unions declared a "pause" in the strike, and it fizzled out except for teachers. The government continued to pursue passage of the reforms.

The reforms target:

1. **Tax evasion** – While government spending increases annually, revenues coming in can't keep up. Tax evasion by companies and individuals is a main reason. To make up shortfalls, the government has to borrow. In 2017, interest payments took up about one-third of the government's budgeted spending. Meanwhile, interest rates are starting to rise, and the country suffered a credit downgrade, which of course means even higher rates.

2. **Public-sector compensation** – Outside agencies like the IMF and the World Bank point out that government employees are compensated so well that they're another cause of the country's ongoing deficits. As a percent of its citizens working in government, Costa Rica ranks quite low among OECD countries at 16%. However, total compensation to those employees is over 50% of government expenditures, by far the highest of those same OECD countries. The rapid rise in compensation over the past few years is driven by flaws in the way wages, bonuses, pensions, etc. for government workers are decided. It's a mess. Public-sector unions agree that reforms have to be taken, just not involving their pay envelopes. So the unions instigated the strike.

3. **Structural issues in government budgeting** – The constitution of Costa Rica mandates that a designated percent of spending in the budget must go to health care, education and social welfare. For instance, expenditures for education must amount to at least 6% of GDP. This has resulted in Costa Rica being among the highest spenders on education in the OECD. However, despite all that spending, student scores are among the lowest. Likewise, 7% of GDP must be spent on health care. As a result, the World Bank has called the Costa Rican health system a model for emerging-market economies. Results for social-welfare spending are also positive.

With such positivity attached to the health-care, education and social-welfare systems, what's the problem then? From what I can gather, the structural requirements of the mandatory expenditures cause sclerosis within the system. It's difficult to make changes. Quality and efficiency go downhill. So money is being misemployed, and it's extremely difficult to redirect it.

4. **The sales-tax system** – It's generally agreed that it must be updated. The previous and present governments have tried to institute a VAT, which would now include the service sector, food and other necessities.

(Cont'd on next page)

### Word of the day:

**Tortuguismo** – In the context of a strike, this is a pressure strategy that workers employ-- doing their work as slowly as possible in order to 'encourage' their employer. In North America, we'd call it a work slowdown.



### Phrase of the day:

**Cuatro gatos** - Translated as 'four cats', it's a slang term for something or somebody unpopular: e.g. "Este programa solo lo ven cuatro gatos" = "Hardly anyone watches this program". On the first day of the general strike, a politician referred to it as the movement of *cuatro gatos*. Throwing this insult back in the government's face, the union called their first big protest rally "the march of the cats".

## Money problems (cont'd)

Other complications have arisen. Recently, for the first time ever, the Costa Rican currency, the colon, rose above 600 colones per US dollar. This over-20% depreciation was caused by doubts on whether the legislature will be able to pass the proposed tax-reform bill meant to address Costa Rica's growing annual deficits. Debt has reached almost 50% of GDP, not a good number (it was 24% in 2008). Things are moving in the wrong direction. As someone said: "We can take corrective actions now when the situation isn't too bad. Or we can wait for a crisis that will cause damaging emergency cuts and freezes to public spending." And even if the reforms are passed, Oppenheimer analysts say they aren't enough, and Costa Rican bonds will remain in "junk" territory.

**Note:** I'd never heard of a country where strikers continue to collect their pay even as they strike. But that's the law in Costa Rica. However, for that provision to be in effect, the strike has to be legal. As noted above, the general strike was declared illegal because it was an attempt to get tax laws changed. That means that strikers have to return any pay received while they struck (US\$150 million just for teachers). The Costa Rica Guide thinks that unlikely: "The strikers don't seem concerned probably because Costa Rica's courts are notoriously slow and impotent."



Marcha de los Gatos --  
San Jose



Blockade of  
fuel depot

## Tax-Reform Bill Enacted

On Dec. 4<sup>th</sup>, the Legislative Assembly enacted the tax-reform bill into law by a vote of 34 to 17. If you're interested in greater detail, see <https://costaricalaw.com/costa-rica-legal-topics/taxes-in-costa-rica/tax-reform-law-approved-by-the-legislature/>.

The main points involve:

- Creation Of a **Value-added Tax (VAT)** with the same 13% tax rate as the previous sales tax. However, the VAT expands the number of products and services subject to tax. Many things will be taxed at a lower rate, e.g. basic food necessities at 1%.
- **Tax reform**-- Income-tax rates will be altered, and a capital-gains tax will be implemented.
- **Cost-containment measures** in the public sector-- Pay increases will be tied to performance rather than being automatic. Incentives and bonuses, which now can reach up to 60%, will be limited to a much lower amount. Severance payments, which can reach up to 20 years, will be capped at 8 years.
- **Government spending**-- Increases will be tied to economic growth.



## The Incredible Story of the Expedition on which Teddy Roosevelt Shot This Jaguar



*While looking for this photo, I learned the story of Roosevelt's 1913 expedition in Brazil.*

Seeking adventure and challenge after his recent defeat for a third term in the White House, Teddy Roosevelt agreed to accompany the famous Brazilian explorer Cândido Rondon on the first non-Amazonian-native exploration of the isolated River of Doubt, the headwaters of which Rondon had only recently discovered.

From the expedition's start on December 9th, 1913, it had problems. Insects and diseases such as malaria greatly affected almost all crew members, leaving them in a constant state of sickness, with festering wounds and high fevers. Constant rapids and waterfalls were impassable for the expedition's heavy dugout canoes. They often lost boats, and then lost days building new ones. Food provisions were poorly planned, forcing the team onto starvation diets.

Roosevelt summed up this badly thought-out trip rather understatedly: *"We have had a hard and somewhat dangerous but very successful trip. No less than six weeks were spent... forcing our way down through what seemed a literally endless succession of rapids and cataracts. For 48 days we saw no human being. In passing these rapids we lost five of the seven canoes... One of our best men lost his life in the rapids. Under the strain, one of the men went completely bad... and when punished by the sergeant he... murdered the sergeant and fled into the wilderness... We have put on the map a river about 1500 kilometres in length... Until now its upper course has been utterly unknown to every one, and its lower course... unknown to all cartographers."*

Roosevelt omits that he himself was near death when a wounded leg became infected (he'd jumped into the roaring river to save two boats from smashing on rocks). Luckily, the expedition eventually came upon rubber-tappers. They got the team down the rest of the river where they met up with a relief party on April 26, 1914. The trip took almost five months.

Roosevelt's health never fully recovered. He would live less than five more years. The river was renamed Rio Roosevelt.

**Source:** Based on Wikipedia article: "Roosevelt – Rondon Scientific Expedition"

If you can find it, there's a PBS documentary "New Explorers: The River of Doubt".

## Canadian Organization for Tropical Education & Rainforest Conservation

### **ADVISORY COMMITTEE**

Dr. Robert Murphy

Dr. Fiona Reid

Dr. Peter Silverman, *Order of Ontario*

Dr. Wm. Rapley

Tom Mason

Founder  
Marilyn Cole

### **BOARD OF DIRECTORS**

Chair • Dr. Kymberley Snarr

Vice-Chair • Shelley Hutchinson

Finance • Andrew Morris

Marketing • Patrick Traynor

Conservation & Research • Dr. Nathan Lovejoy

Membership & Archives • Vacant

Education • Vacant

Site Services • Vacant

Special Events • Vacant

Director at Large • Dr. Kevin Kerr

Director at Large • Dr. Roberta Fulthorpe

Director at Large • Steve Gillis

Director at Large and *Raphia* Editor • Doug Durno

**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](mailto:directoratlarge4@coterc.org)**

**Contact us at:**

**[info@coterc.org](mailto: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's charity # is 890096183RR0001



COTERC would like to thank the following individuals for their generous donations over the years. Such contributions greatly 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 like to thank Microsoft for the donation of MS Publisher software.