

## THE LOOK of INTELLIGENCE?



**Why Spider Monkeys Are Considered So Smart (Page 3)**



Canadian Organization for Tropical Education  
& Rainforest Conservation

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### Looking forward to the future, and feeling grateful for the past

As is usually the case, much of this issue is devoted to research that has taken place at Caño Palma. So it's timely that Dr Snarr, the chair of Coterc's Board, takes a look (on Page 4) at where our organization has come from and the changes that the Board has made over the past year that will make it even better.

One change involves some of those who have traveled to the station for an extended period in the past and who have now teamed up with Coterc by becoming members of the Board. This brings us a new generation with fresh insights who can help map out our path into the future.

Though research is basically what the station does, beyond that Caño Palma provides life experience and tropical experience for so many of the young people who join us there. And, when they eventually move on, they take all that they've learned about nature and about life with them. On Page 12, you'll find part of a research paper that, in its entirety, sums up such learning from the point of view of 'research-based tourism'.

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

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## Spider Monkeys (Part 2) -- Intelligence --

by Doug Durno

In a surprise finding, spider monkeys were rated the third-smartest nonhuman primates. Based on a meta-analysis, the 7 species of the *Ateles* genus edged ahead of gorillas, ranked behind only orangutans and chimpanzees.

The frugivorous (fruit-based) diet of spider monkeys is considered to be a primary explanation for their high-ranking intelligence. In their dense forest habitat, ripe fruit is usually limited to a few trees at a time. So troops maintain large territories - up to 8 square kilometers - so that they'll always have fruit available. It's thought that they memorize locations of recent fruitings so they can go directly to them rather than searching around randomly.



Another reason for their intelligence is their fission-fusion society. Subgroups of 2 to 6 individuals split away from other troop members (fission) to forage. In the evening, these subgroups rejoin a larger group (fusion). During the day though, the subgroups are continually in flux, typically staying as a unit for only an hour or two. Influenced by the stay-and-leave decisions of others on the team, individuals evaluate whether to stay with their present group or whether they'd be better off switching to another. Collectively, the monkeys are working out a range of team sizes that's favorable for the quantity of fruit available in each location. In other words, by frequently coming together and splitting up, they're pooling information about the resources (fruiting trees) available to them, broadening their knowledge about their situation. When your dependence on difficult-to-find fruit requires a large territory and you're traveling about two kilometers a day in search of it, it's quite advantageous to have as much information as possible about where to find it.

Their actions can also be framed as social intelligence - the mental capacity to know yourself and to know others. That develops from your ability to assess your successes and failures in social settings. In large groups that change in size and composition, this can be a challenge even for humans. Spider monkeys exhibit this social intelligence better than other monkey species when they're faced with a large new group. They don't just jump right in, possibly creating conflict with other troop members. Rather, they first assess the social situation within their new group before doing anything. In other words, they inhibit their actions. Along with orangs, chimps and bonobos, they're top of the heap in this behavior. It's not a coincidence that these species all live in fission-fusion societies. Other primates living in closer-knit groups, such as gorillas and capuchin monkeys, show lower levels of inhibitory control.

Such actions – altering their responses based on new information as well as inhibiting their behavior – are functions that involve the prefrontal cortex. This brain region is responsible for such tasks as planning, decision making and moderating social behavior. This is higher-level thinking.

You might be wondering, if they're successful in smaller groups, why do spider monkeys even bother rejoining a larger social unit for the night? Well, the larger group gives an individual more chances of mating as well as additional security from predators like jaguars and pumas.

### **References**

[Do Some Taxa Have Better Domain-General Cognition than others? A Meta-Analysis of Nonhuman Primate Studies \(sagepub.com\)](https://www.sagepub.com)

<https://www.sciencedirect.com/science/article/pii/S0960982208010968#:~:text=Spider%20monkeys%20clustered%20with%20great%20apes%20characterized%20by,spider%20monkeys%20and%20bonobos%20on%20the%20other%20side.>

[Frontiers | Collective Computation in Animal Fission-Fusion Dynamics \(frontiersin.org\)](https://www.frontiersin.org)

[Spider monkey groups as collective computers -- ScienceDaily](https://www.sciencedaily.com)



## Notes from the Chair by Dr Kym Snarr



Recently, COTERC celebrated its 30<sup>th</sup> year in our tropical paradise at Caño Palma Biological Station where so many of us have had the opportunity to dig into all the biological information available from the rainforest, wetlands and beach.

30 years is a long time. So much has changed in our world. Certainly our knowledge of what Caño Palma is and can be has changed. We've learned what works. We've learned what doesn't work. We see the past. Then we try to look into the future.

So now seemed a good time to take a look at COTERC's vision, mission statement and goals, and refresh them where necessary. Grappling with the mission statement has made all Board members think hard about what it is that COTERC does and how we can translate that into our offerings at the station. You can see below what we finally envisioned the soul of Caño Palma to be.

We've also transformed the makeup of our Board. When Marilyn Cole and Ozzie Teichner made the daring decision to establish Caño Palma, they had a narrower pool of talent to draw from. It was basically a local endeavor with accomplished members from Toronto Zoo and York University, and all their connections. All of these Board members made it work. Caño Palma attracted people from all over the world.

Now, as so many people from that larger world have experienced what the station has to offer, some are excited about getting involved with the work that the Board does. Thus we've expanded into the USA. We have Dr Emily Khazan presently working in Georgia, Nick Humphreys from Florida, Dr Sarah Ivers in Ohio and Jess Sutton in California. In Canada, we're blessed to add dynamos from both Quebec, Brandee Diner, and from Ontario, Amy Cocksedge. All have spent a lot of time at the station and two have brought their students. With their Caño Palma experience, they bring a wider range of ideas on how COTERC can continue to fiscally and scientifically support the station. Having them on Board advances the good work of past Boards and reinforces our ability to plan for the future.

And if you feel as pumped about that future as we do, you might want to add your support by going to [coterc.com](http://coterc.com) and hitting the "Donate Now" button.

**Vision: A wellspring of tropical biodiversity in perpetuity.**

**Mission Statement: To provide immersive learning experiences that deepen comprehension & appreciation of tropical ecosystems.**

**Goals: ▪ Facilitate research related to ecosystem conservation and restoration**

- Maintain an active monitoring program on multiple taxa
- Publish results of research and monitoring
- Distribute educational materials regarding tropical ecosystems
- Provide a location where people from around the world can be encouraged to act for other species
- Convey research findings to the public to increase awareness of conservation issues
- Provide financial stability so that Caño Palma Biological Field Station can enhance its facilities and maintain a state of good repair



## Large mammal community composition and density under a disturbance gradient in Northeast Costa Rica

by Dr Emily Khazan, Manuel Arias and Luis Fernandez

This is an edited version of the paper that appeared in the December 2016 issue of *Revista de Biología Tropical (International Journal of Tropical Biology and Conservation)*. It can be found at [View of Large mammal community composition and density under a disturbance gradient in Northeast Costa Rica \(ucr.ac.cr\)](http://www.ucr.ac.cr)

**Authors** **Dr Emily Khazan** was a Research Coordinator at Caño Palma Biological Station and is presently on the COTERC Board as Director of Research & Conservation

**Manuel Arias** is the Assistant Station Manager of Caño Palma

**Luis Fernandez** was the Assistant Research Director at Caño Palma

Large-mammal communities, integral components of Neotropical ecosystems, are increasingly threatened by habitat fragmentation and degradation due to anthropogenic pressures and climate change. Lowland Neotropical palm forests harbor diverse mammal communities, including threatened and endangered species. We set out to document baseline densities of large-mammal communities, including primates, in Barra del Colorado Wildlife Refuge in northeast Costa Rica. This information can be used as preliminary data for future comparisons.

From February 2014 until April 2015, we monitored three transects in the refuge and detected 25 mammal species: 19 at the Cerro, 22 in Tortuguero National Park (TNP), and 23 at Caño Palma Biological Station (CPBS),

The highest anthropogenic disturbance was at the Cerro, followed by CPBS and the lowest levels in TNP.

Conversely, we found higher diversity and increased presence of endangered species in



**White-lipped peccary**

TNP and the lowest diversity and lower presence of those species on the Cerro. The most influential species driving the differences of communities between the three transects included the white-lipped and collared peccaries. Both species were present in higher densities in the transects with lower disturbance and higher levels of protection. Peccaries require large tracts of land for foraging and are hunted for food.

Jaguars, while not largely influential, represent an important animal found in significantly higher abundance in the more protected, larger Tortuguero National Park. The higher presence of jaguars within larger tracts of contiguous forest and with lower levels of disturbance helps to explain the reverse trend in ocelot abundance as jaguars can predate ocelots and, given their role as intraguild predators, may displace ocelots.

Besides domestic dogs, the only other terrestrial mammals that we found in significantly higher densities at the Cerro, compared with the other two transects, were the nine-banded armadillo and agouti. The difference in armadillo densities is likely due to (1) their robustness to disturbance, (2) the lack of hunting of armadillos in the area, and (3) the fact that their subterranean burrows never flood on the Cerro. The last also applies for agoutis since frequent flooding on the other two transects often makes seeds for nesting sites/shelter and feeding inaccessible.



**Emily**



**Manuel**



**Luis**

(cont'd on next page)

## Large mammal community composition and density under a disturbance gradient in Northeast Costa Rica (cont'd)

Contrary to the above findings that higher disturbance (or proximity to humans) leads to less diverse and abundant large-mammal communities, the same does not hold for primate communities. Monkeys are seldom hunted or kept as pets, and seem not to be affected by human settlements in the area. We found significantly higher relative densities of mantled howler monkeys at the Cerro and TNP, compared with CPBS. As those two sites flood much less frequently and thus have more floristic diversity compared to the palm-dominated forest of CPBS, there is more available foliage for howlers to eat. The marginally higher density of Geoffroy's spider monkeys at CPBS compared to the Cerro and TNP is probably a reflection of the presence of a resident troop that commonly feeds on the few large fruiting trees close to the station buildings.



Howler monkey

Despite being an under-studied habitat type, the importance of the palm-dominated swamps of northeast Costa Rica cannot be discounted for the maintenance of populations of ecologically invaluable and vulnerable mammals. To preserve these communities as they currently exist, ongoing conservation efforts to prevent hunting and further habitat degradation must be maintained. Further, this monitoring program will be invaluable for documenting and analyzing long-term changes in communities and for understanding the mechanisms behind such changes.

## Progress on New Staff Building



On the left, León and Manuel install the footings that will keep the building above any flooding. The photo at right shows just how high above the ground the floor is.



# Progress on New Staff Building (cont'd)



As of mid-October, building is nearly complete



2nd floor - Roof installed with bird's nest of dock in background



2nd floor - Ceiling installed with dock in background

Photos courtesy of Charlotte Foale



## Notes from the Station by Charlotte Foale

As the turtle season winds down, we're all breathing a sigh of relief!

The beach is still bursting with life, as hatchlings start to emerge in quantities from their nests. Nights where we had 25 turtles nest mean mornings when we have 25 nests hatch – and this means that morning teams are incredibly busy marking hatched nests for later excavation, and placing bamboo mesh to protect nests close to reaching the end of incubation in order to protect them from the many dogs who live close to the beach.

At the peak of turtle nesting, we were lucky to be able to share the chaos with students and staff from the Durrell Institute of Conservation and Ecology, a department of the University of Kent in the UK. This was a special visit for many reasons, including that it was our first British university group. It also signaled the return of former Turtle Project Coordinator now Doctor, Helen Pheasey. It's been lovely to watch her career develop as she's returned here for her PhD work and now as a fully fledged university professor. Dr. Jake Bicknell completed the group's staff team, and with the knowledge he has from his extensive experience in similar environments, it very quickly felt like we'd worked with him for years. (Photos of Kent Uni group on next page)

Of course, the visit wouldn't have been as great as it was without the students who accompanied them – our second all-female group of the year, and some of the most enthusiastic people I've ever met. They impressed with their amazing attitude, their great work ethic, and their ability to complete even a caiman census in an electrical storm and describe it as "a Jurassic Park experience". Nothing fazed these women! We are extremely grateful to everyone who made this trip possible, and to the participants who

made it so memorable.

While we get a lot of great people here, another outstanding visitor was Dessi Sieburth, a young ornithologist studying at Stanford. He's well known in his local

area for authoring an extensive list of birding articles (more than 40) including Audubon newsletters, the Auk blog and national Birding. This passionate young man has also won awards for his conservation efforts and is someone to keep an eye on. He joined us thanks to a scholarship from LA Birders and did them proud. His quiet passion and energy were an inspiration and extended beyond birds, as he immersed himself in all of the research projects we have on offer.

While all of these great people were here, construction on the new staff building started, with Léon Solis at the helm. Despite stormy weather and a little flooding delaying us a bit, we're now very close to completion. It's already proving to be a great work and meeting space that will definitely be used to its full potential once the finishing touches are completed. Again, we extend our thanks to all of those who contributed the funds for this construction.

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





# University of Kent





## Moths on the Cerro by Jake Wickham

*This edited article first appeared in Raphia in the Fall 1999 issue (Vol 8, #4). Jake was attending Fredonia University in western New York State at the time.*

The sun had beat me this time, adding near darkness as a challenge to my climb up the Cerro. At the top, my generator whirrs and hums to life, and a white sheet I've brought is illuminated far above the Cerro's canopy layer. The view is spectacular. Surrounded by the pink of fading light and its lights shimmering in the distance, the village of Tortuguero, five miles south, takes on a lonely, secluded look. Though it's dark, I take a picture. Then I sit down, waiting, ready for anything.

The electric hum of the insects gives the rainforest its mystical feel. Thousands of species, many probably awaiting discovery, fill the forest with soothing sounds, piercing rattles and whispering whirrs. I wait for the night's first arrivals in front of my UV light with the glowing sheet behind it. My camp is ready, but I won't be sleeping tonight. There are too many discoveries to be made. It's big moths I'm after. Nocturnal by nature, some are rarely seen. Deceived by my own eyes, it's amazing the way some moths resemble inanimate objects such as bark, brush or dead leaves.

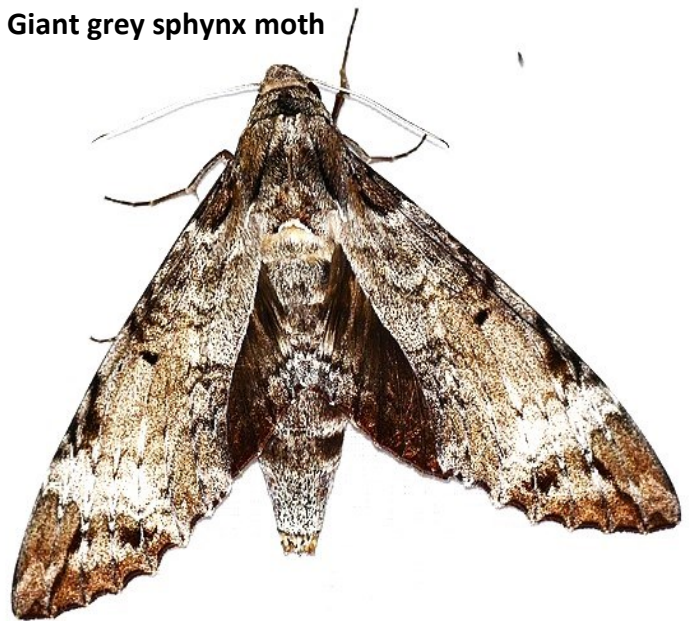
Ah-ha, my first arrival. If it hadn't landed on a white sheet, I know I'd never find this moth in the forest in daylight. It looks exactly like a dead leaf, lining up a mock central vein on each of its four wings. I touch it and it falls just like a leaf. Amazing. Other moths have a perfect blend of greens and browns, probably to imitate a specific tree species. Zooming by my ear is a giant grey sphinx moth (*Pseudosphinx tetrio*) - a female loaded with eggs. With a wingspan of about 6 inches (14 cm) and a thick body, these sphinx moths are often sighted by local boatmen at night over the canals. Look at this one. It looks and behaves like a praying mantis with its legs folded in front. It's attack-

ing me. Harmless of course, but it had me fooled for a second.

By midnight, the sheet is blanketed with moths. Looking out over the Rio Tortuguero, I realize I'm attracting more than moths. Curious locals are making their way towards the mouth of the river. When the armada reached the base of the Cerro, I could imagine how weird my lights must seem to them, with the white sheet and the light-blue tent illuminated on perhaps the most sacred of places. How and why would anyone pass the night up there, let alone have a generator and a 250-watt light? Rumors apparently floated around town that aliens had landed on the Cerro.

(cont'd on next page)

**Giant grey sphinx moth**





## Moths on the Cerro (cont'd)

By morning, all my collecting bags are full. As I disassemble my camp, the sun peeks up over the Caribbean, gradually working its way down the Cerro to the beach. Shortly, planes pass by almost at eye level. I make my way down to a rendezvous point near Caño

Palma where I was met by Ross, the station manager. Exhausted but happy, my night on the Cerro is over.

*The original article can be found on Page 2 at:*

<http://www.coterc.com/uploads/1/6/1/8/16182092/raphiafall1999.pdf>

Chrysalis of giant grey sphynx



Defoliated tree



### Giant Grey Sphinx Moth

The larval and adult phases of this moth have wildly different coloration that demonstrate two very different strategies for protection from predators.

**Aposematism** - The caterpillar (on far left) wants to stand out. Its bright colors announce that they're not worth eating because of the toxic plants they consume. Not all predators are deterred as birds like the squirrel cuckoo (at bottom) and smooth-billed ani will whack the giant grey sphinx caterpillar against a branch until the toxic stomach contents are gone after which they eat the remains.

The caterpillar also has hairs that embed deeply and cause irritation.

**Camouflage** - Drab would be a good word to describe the adult giant grey sphinx moth, dressed as it is in various shades of brown and grey. These colors camouflage them quite nicely on bark as well as making them harder to distinguish in shadows.

As Jake's article indicates, this is a big moth, reaching up to 14 cm in length. The caterpillar (larval) stage can be slightly longer.

This moth is quite ravenous. Each caterpillar can eat up to 3 large leaves in a day so that a few of them can strip a tree bare relatively quickly as can be seen in photo of the defoliated tree. Since they're so conspicuous, the best defense is just knocking them off the leaves.

The giant grey sphinx moth can be found from the southern USA to Brazil.

# The Impact of Research-Based Tourism on the Tortuguero Area

## Part 3 by Laurentian University students

*This is a lightly edited version of a paper produced by students of Laurentian University in Sudbury, Ontario. Participants were Carole Anderson, Gregory Robillard, Alexandra Stankiewicz, Katrina Tisdale and Mitch Harrow. Project Head was Dr. Snarr, Chair of the COTERC Board. Part 4 will appear in the Winter 2023 issue of Raphia. Original paper can be found at:*

[research based tourism 2016 snarr laurentian university class report 1 .pdf \(coterc.org\)](#)

### **Citizen Science/Research-based Tourism/Quality**

**Data** (cont'd from P. 14 of original paper linked above)

Citizen Science is defined as: "Scientific research conducted at least in part by nonprofessional scientists". So, citizen scientists might be researchers-in-training, interns or ecotourists, offered a chance to develop their research skills as well as better their understanding of conservation. It also benefits their intercultural awareness, communication skills and language proficiency. In return, these citizen scientists offer much-needed manpower for the station's many ongoing projects. For instance, without them, the turtle-monitoring program at Caño Palma Biological Station (CPBS), which requires 60, 70 or more hours of manpower daily from March to November, could not exist. Citizen scientists are the "bedrock of biological recording".

Accuracy of data is also very important - and studies have found that volunteer data is quite good. To ensure citizen scientists are working to a high standard, certain criteria must be met:

- volunteers must be trained to reach a certain level of competency.
- field protocols must be standardized.
- protocols must be detailed.

To ensure that the quality of data collected is at the highest standard, CPBS puts each research-based tourist through both practical and theoretical train-

ing. First, all protocols are in written format to ensure all procedures are followed in the same way by everyone. Then a research coordinator takes each trainee through a PowerPoint presentation. That's followed by a hands-on task where the trainee is put in a mock situation and must respond to it appropriately.

Data is also sent to MINAE, which helps them manage the environment. With this data, guidelines can be set and new rules established. The data is also used by many researchers who then publish scientific articles on a particular research topic. Publication of the data also helps to increase knowledge on a particular subject, which in turn helps facilitate further research.

### **Communication and Overcoming Language Barriers** (Page 16)

CPBS hosts people from around the world. Since English is the first language of most, it's used as the lingua franca. However, with 25% or more of the guests having another first language, clear communication is important not only to ensure data quality, but also to ensure the safety of visitors.

When questioned about this, several staff and volunteers said they recognized misunderstandings could be an issue. To ensure understanding between people with different first languages and/or cultures, some used 'formulation and reformulation' as a strategy. This means they would **(cont'd on next page)**

## Impact of Research-Based Tourism on the Tortuguero Area - Part 3 (cont'd)

repeat their message in a different way when they thought there could be a mix-up. As well, several said they often observe body language to see if the person they're talking with has not quite understood a message.

Communicating in writing is also a good way to ensure everyone is on the same page since written communication is more easily understood compared to verbal communication. As discussed, that applies to protocols in regard to data quality. But it also applies to everyday communication. For example, CPBS uses a chalk board to show the weekly schedule

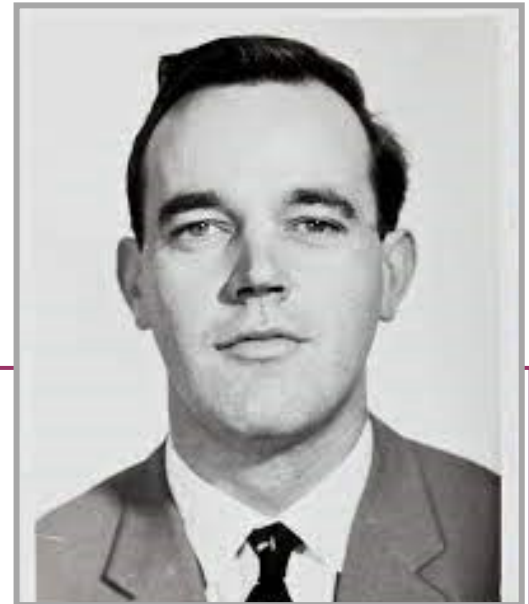
of everyone's tasks.

**Language and Intercultural Communication** (Page 17)

Research has shown that, although a person may speak a second language, he/she still retains the communications skills acquired through their culture. Visitors with a better-developed intercultural awareness have extra competence in communicating with people from diverse cultural and linguistic backgrounds. Our interviews found that's one of the positives many people take away from their Caño Palma experience.

## Sea Turtles and Climate Change by Dr Robert Bustard

*Dr Robert Bustard has studied sea turtles for about 60 years. Early on, he was instrumental in getting legislation passed to protect hatcheries on Australian beaches. Beginning in the 1970s, he organized conservation projects for sea turtles and crocodiles in India. He wrote the first comprehensive text on sea turtles in 1972 - "Sea Turtles: Their Natural History and Conservation". He was a member of the IUCN's first Specialist Group for sea turtles.*



Much of the recent literature on this topic has tended towards my view expressed below stating that "effects of climate change on the viability of sea-turtle populations are likely to be less acute than previously suspected".

Sea turtles are an ancient reptilian group with the fossil history going back to the late Triassic about 200 million years ago. During this very long period of time, they have survived great temperature fluctuations. In fact, they have survived in enormous numbers until the recent effects of man. Therefore, it is reasonable to assume they will be able to not just

survive, but successfully cope with climatic changes.

Sea turtles have temperature-dependent sex determination with higher temperatures favoring females. Much has been written about the implications of global-warming temperatures on the production of males, suggesting numbers hatched may be inadequate.

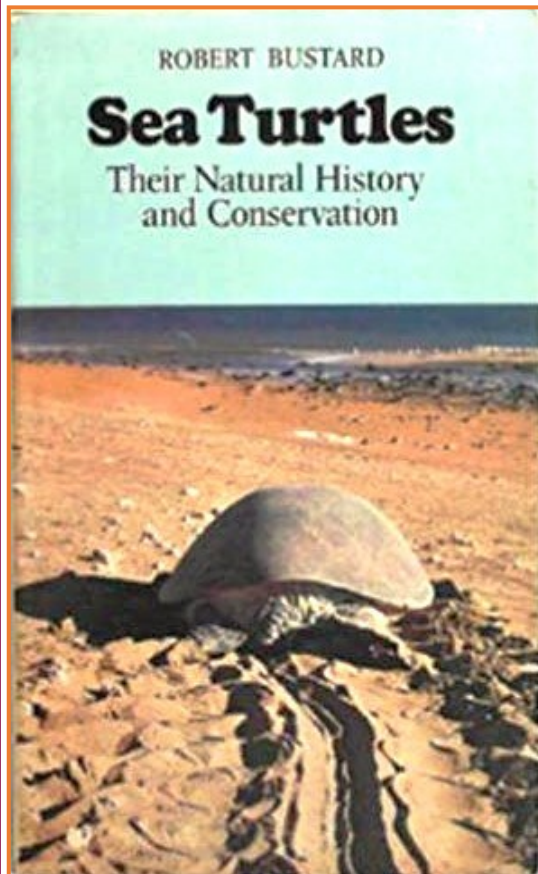
**(cont'd on next page)**



## Sea Turtles and Climate Change (cont'd)

Anyone with more than a passing interest in sea turtles will be aware that males are extremely promiscuous. For example, Fijians catch sea turtles during mating season by sitting out over the water using wooden lures as the males will try to copulate with anything resembling a turtle.

Furthermore, female sea turtles are able to retain viable sperm from one successful mating for at least an entire nesting season.



Hence a much lower proportion of males in the population will not be deleterious.

On the contrary, I suggest that an ideal sex ratio would comprise a minimum of 80% females. Such an 'imbalance' will actually increase growth in the size of the population compared to a 50-50 sex ratio due to the high proportion of breeding females.

I provided information on the way nesting turtles can mitigate the effects of rising temperatures on their existing nesting beaches.

Green turtles climb the bank, if present, and move into the vegetation zone which offers a mosaic of light and shade, which can alter the temperature within the clutch of eggs. As well, I've found that the sex ratio is determined earlier in the incubation period before much rise above ambient occurs.

Most important is the depth of the nest. Deeper nests are incubating in cooler conditions. Turtles dig the egg chamber to the maximum depth the rear flippers can reach. Naturally, larger turtles can dig deeper; hence their nests are laid in cooler conditions.

Sea turtles are also able to alter the timing of the nesting season. In olive ridley sea turtles nesting in Bhitarkanika NP, India, I've noted evidence to suggest that the main arribadas - numbering several hundred thousand nesting females - are occurring earlier in the year when the weather is cooler, lessening the effects of rising temperatures.

The most effective way for sea turtles to mitigate rising temperatures, however, is to change the nesting site. Sea turtles are highly mobile, and can move their nesting rookeries huge distances north or south as required. The literature says they return to their natal nesting beaches to nest as adults. However, this too is a misleading statement. Not all first nesters do this and this is one way in which new rookeries are formed.

Further, anyone who's carried out a tagging program will know that only a proportion of the tagged population returns at the next nesting cycle. The rest must nest elsewhere. They certainly haven't died - obvious because of their sheer numbers - and tag losses, if recurring, could not account for the numbers involved.

To sum up: I do not believe that the future survival of these incredible reptiles will be brought to extinction by global warming. They have successfully survived enormous climatic changes in their very long history and will, I am sure, continue to do so in future. Their main problem is not climate change, but increasing loss of their nesting beaches due to human intrusion.

## Kemp's Ridleys Nest For 1st Time in 75 Years in Louisiana

Original article, taken (and edited) from 'Environment News', can be found at <https://dnyuz.com/2022/08/17/kemps-ridley-sea-turtle-nests-1st-in-75-years-in-louisiana/>



Kemp's ridley, the world's smallest and most endangered sea turtle, has hatched in Louisiana for the first known time in more than 75 years. They were found on the Chandeleurs, a chain of barrier islands just east of the Mississippi River delta. Aerial surveys found 52 sets of tracks.

"Louisiana was largely written off as a nesting spot for sea turtles decades ago, but this demonstrates why barrier-island restoration is so important," Chip Kline, chairman of the Louisiana Coastal Restoration and Protection Authority, said.

Once upon a time, tens of thousands of Kemp's ridley, which grow to about 2 feet (0.6 meter) long, nested along the western Gulf of Mexico, 95% of them in the state of Tamaulipas, Mexico. But, in the 1980s, the number of nesting females reached a low point of only about 250, according to the National Oceanic and Atmospheric Administration.

The Chandeleurs have frequently been hit by hurricanes, eroding the islands. Two Louisiana agencies have been closely monitoring them as part of work to restore the islands.

It's well known that the Chandeleurs provide key habitats for a host of important species. Many species of sea turtles use them, feeding in and around the state's only marine seagrass meadows. Threatened loggerhead sea turtles nest there. However, with this recent discovery of successful Kemp's ridley hatchings, the islands' value to the region has been elevated, and will help ensure their nesting habitat is preserved and improved, officials said.

Juvenile Kemp's ridleys feed in Louisiana's estuaries.





## Research Coordinator's Report by Alex Lascher-Posner

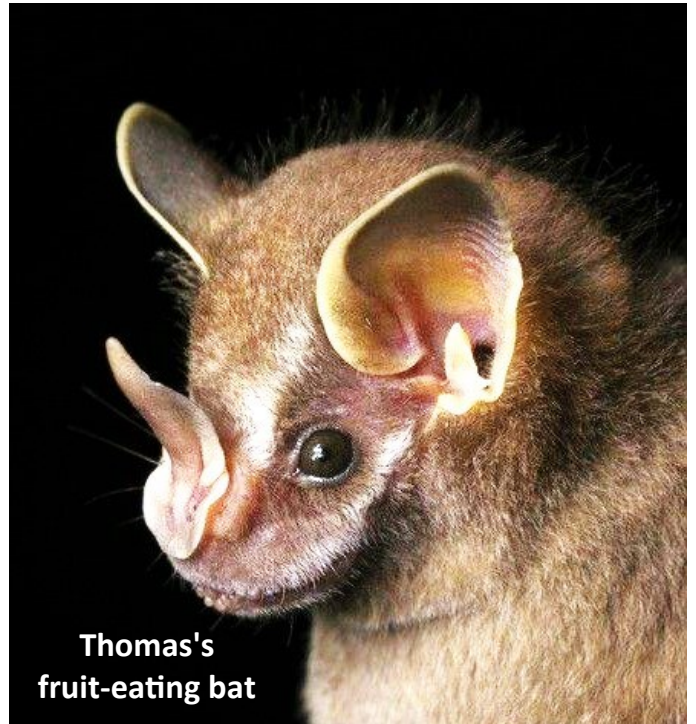
### September

Due to the presence of a group of students from the University of Kent, we were able to complete all surveys in September.

**Mammal Survey** – One of the highlights was the sighting of 17 jaguars this month – 5 near the station and 12 in Tortuguero National Park. The Kent students were using camera traps and recorded a jaguar just 600 meters from the station.

As well, 998 white-lipped peccaries were observed, mostly in the Park.

**Tent-making bats** – in 3 surveys, we checked 285 unique tents for their condition, presence of bats, or signs of foraging and feces. On average, we checked 168 tents per survey. Bats were present in 19 of those tents in at least one survey. In total, 54 bats were observed, 26 of which were Thomas's fruit-eating bat (*Dermanura watsoni*). On our transect, 15 newly constructed tents were found. Furthermore, we're initiating a pilot study to determine the diversity of fruit consumed by the bats. So, we've placed seed traps under some tents. Once we've established a reliable method for trap placement and seed identification, we can roll it out on a larger scale (i.e. more seed traps with more frequent placements). As of now, we know the seed traps work, and we'll start the identification process shortly.



Thomas's  
fruit-eating bat

For a primer on Thomas's fruit-eating bats in Costa Rica, here's a link to a video - <https://www.youtube.com/watch?v=EM7BJHTT6Rk>

**Neotropical river otters** – On 5 surveys through our 3 transects, only 1 scat sample was found. Further, no anal jelly or otters were observed on the transects. Yet 2 otters were observed from the station dock. Back on the transects, we had more luck with camera traps I put up to capture footage of otters on logs for Manuel Santiago, a PhD student. Manuel is studying population density and behavior of this otter across a gradient from Mexico to Costa Rica. Things worked out - we got two separate footages of an otter on a log.

**Macaws** – In addition to the 7 surveys we carried out this month, we also participated in a great green macaw count that was done to establish locations of roosting trees that the greens use. From El Cerro, 40 roosting trees were observed .



## El Salvador Introduces "The Coolest Dictator in the World" by Doug Durno

If outsiders know of Nayib Bukele, the President of El Salvador and self-described "coolest dictator in the world", it's likely as the guy who thought it a good idea to make Bitcoin legal tender in his country. That's been a bust so far as the value of the government's Bitcoin purchases are presently down over 50%. And Salvadorans are reluctant to use it.

But what do Salvadorans think of Bukele overall? Well, after 3 years in office, they like the job he's doing – as of October, his approval rating, according to the Gallup polling firm, is 86%. That's the highest of any Latin American president. (btw, the recently elected Costa Rican president, Rodrigo Chaves, is second with an 81% approval rating.)

So, what's Bukele been doing right? Of all Latin American countries, El Salvador is considered to have had the best response to Covid. As well, the gov't has redirected public spending to the poor. Healthcare has received more resources, leading to less infant mortality. And, in a country with high illiteracy, Bukele has focused on increasing student enrollment.

But what about the issue that grabs most of the headlines – crime? El Salvador has a huge gang problem. An estimated 78,000 Salvadorans are members. They live by drug smuggling and extortion. The latter could afflict any citizen. Violence is widespread. The murder rate has long been one of the highest in the world. To reduce it, Bukele apparently made a deal with the gangs – control the violence and we'll give you some benefits. Sure enough, the murder rate drastically declined. That helped Bukele's party (Nuevas Ideas) win a big majority in the 2021 parliamentary elections.

But, in March 2022, the gangs reneged on the agreement and murders spiked. The Bukele-controlled parliament declared a 30-day state of exception, giving the government emergency powers to use



against the gangs. Various constitutional rights were suspended, e.g. the right to counsel; the right to be informed of the reasons for your arrest; some elements of free speech; plus arrest warrants were no longer required. The state of exception has been extended each month since then. By August, the government was boasting that 50,000 gang members had been imprisoned. The outcry from human-rights organizations has been loud. But, as one young Salvadoran put it - though it's a big pain to be constantly harassed by police searching for gang members, they're a "plague who shouldn't have human rights". A journalist usually critical of Bukele said: "What is the rule of law if you live in a neighborhood filled with gangs?" In other words, Bukele has brought some stability to the lives of Salvadorans long plagued by the fears that gangs impose. A Gallup poll in August showed 95% approval of the crackdown.

That's just one sign of Bukele's 'cool' dictatorial tendencies. Freedom House, an organization that assesses a country's degree of political freedom, has cut El Salvador's rating from 70 (out of 100) in 2015 to 59 in 2021, two years into Bukele's term.

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

## El Salvador Introduces "The Coolest Dictator in the World" (cont'd)

What else has Bukele done to earn this poor mark from Freedom House? Well, after his party gained control of the legislature in the 2021 elections, its first action was to replace the 5 judges who made up the Constitutional Court, the branch of the country's Supreme Court that decides cases related to the constitutionality of laws. As well, the attorney-general, the nation's top prosecutor, was replaced by a Bukele acolyte. These moves enabled Bukele to amend the constitution to consolidate power in himself. And it didn't take long for the Constitutional Court to rule that Bukele could seek a second consecutive term as President, which El Salvador's constitution forbids. And to gain even further control of the courts, the legislature passed a law that purged judges over the age of 60, enabling Bukele to replace them with judges who would do his bidding.

Now let's look at Bukele's grand plan to adopt Bitcoin as legal tender. Bitcoin to Bukele is economic salvation. To economist Frank Muci, it's "magical thinking". He says El Salvador is "sleepwalking into a debt default". The idea that Bitcoin could be the country's salvation only increased the interest rates lenders wanted for loans to the government. And it's thought that the International Monetary Fund won't bail El Salvador out unless the country gets rid of Bitcoin because of its "large risks for financial and market integrity, financial stability and consumer protection". In a country dependent on remittances from the 2 million Salvadorans living in the USA for 26% of its GDP, it's hard to see what will fix its debt problems. And El Salvador can't bail itself out by printing more money because the U.S. dollar is its currency. Then consider how impractical Bitcoin is in a country where most people don't have bank accounts, credit cards

or internet access? In September, Fitch ratings agency lowered El Salvador's credit rating for the second time in 2022, stating that it's likely the country will default on an upcoming bond maturity.

Regardless of Bukele's celebrity as a social-media hipster, he's persisting with the traditional autocratic and corrupt ways of recent governments of El Salvador.



Architect shows President Bukele (on right) the planned layout for the world's first bitcoin city to be built at the base of the Conchagua volcano, which would provide geothermal energy to power bitcoin mining.

Though Bukele announced construction is to start in 2022, the \$1 billion so-called 'volcano bond' that would finance it has been continually delayed because of "unfavorable market conditions" among other reasons.

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