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MESOAMÉRICA



Boat-Billed Heron

Cochlearius cochlearius

Reserva de la Biosfera Maya (RBM)

Parque Nacional Tikal (PANAT) Peten, Guatemala

Nicholas Hellmuth and Victor Mendoza

February 2023

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2021-2025

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FRONT COVER PHOTOGRAPH *Cochlearius cochlearius.*

Photo by: Edwin Solares, FLAAR
Mesoamerica, Jan. 26, 2023, 2:00 pm. Aguada
Crocodile, Tikal. Camera: Sony Alpha 1 with
Sony 200-600mm telephoto lens.

TITLE PAGE PHOTOGRAPH *Cochlearius cochlearius.*

Photo by: Edwin Solares, FLAAR
Mesoamerica, Jan. 26, 2023, 2:19 pm. Aguada
Crocodile, Tikal. Camera: Sony Alpha 1 with
Sony 200-600mm telephoto lens.

We thank Roxana Ortiz for offering to provide lodging for our research team at the Tikal Inn for our field trips starting in October 2022. Since we are not receiving payments for our field work, our budget appreciates complimentary lodging. Every workday is exhausting because we are carrying and then using very heavy cameras, super-telephoto lenses, sturdy tripods, large gimbals or ball tripod heads. Thus it is crucial for my health to be able to rest and totally recuperate every night in order to be ready for the following day of botanical and zoological adventures in Parque

Nacional Tikal. In order to post photographs on botanical and zoological websites, you can't do this if there is either no Internet or weak Internet. Thus it is very helpful that when we are provided rooms and meals, that functional Internet is also available at the Hotel Tikal Inn.

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Introduction to *Cochlearius cochlearius*

Hérons belong to the Ardeidae family, and are adapted to aquatic systems. This exciting group of birds is of very ancient evolutionary origin, since between 60 and 30 million years ago there are heron fossils. However, fossils with shapes similar to current species only appeared seven million years ago, in the Miocene, a time when aquatic environments were very common (Alvarado, 2020). According to ornithologist Alvarado and other authors, herons are a group of extremely beautiful birds, adapted to aquatic systems and of high ecological importance for the wetlands and other ecosystems they inhabit. They are characterized, for the most part, slender, thin, with long legs, necks and beaks, long necks and lance-shaped beaks. In this part is where there begin to be

differences regarding the bucket-billed heron *Cochlearius cochlearius*. Since said heron begins to have physical differences with other herons, being this more robust, a wider beak, large eyes among other differences. FLAAR Mesoamérica has documented heron species since its foundation, due to the relationship that exists with these bird species and the Mayan culture in Guatemala and Mesoamerica. Because these birds are found in various archaeological pieces where the Boat-billed Heron (*Cochlearius cochlearius*) is no exception and has been photographed in different areas of Guatemala, such as the Chiquimulilla Channel, Yaxha, Livingston and currently in the Laguna del Tigre National Park area, which is where the best

Experience with *Cochlearius cochlearius* by Nicholas Hellmuth

I did not have personal experience with a boat-billed heron until we saw one in a house of local people along the Canal de Chiquimulilla (near where a ferry takes you down river to Monterrico). The FLAAR team did field research on waterbirds and water plants in these coastal inland wetlands area once a year every year for several decades (1990's onwards). There are many areas in Guatemala to study waterbirds but it is easy to get to Monterrico and it is a peaceful town. Also, The local CECON team provided lanchas at a fair price (Alex Cuellar was our boatman for many years and recently his now grown up children also work for the FLAAR team). Since we study house architecture of houses that have thatch of wild native plants, we often stop and ask permission of local people to study the roof thatch material of their house; or the wall material (when they don't use concrete blocks). We quickly noticed the bird near the shore and we noticed that it did not fly away.



Cochlearius cochlearius.

We stopped the boat motor and asked the local people why the bird did not fly away and they said that it had an injured foot and they helped feed it. So, the bird was accustomed to people being around it. Photo by: Erick Flores, FLAAR Mesoamerica, Dec. 16, 2015, 11:57 am. La Avellana, Monterrico. Camera: Canon EOS 60D. Settings: 1/20;sec; f/6.3; ISO 125.



Cochlearius cochlearius.

The bird also hopped through the house, since it knew the local people would feed it. Photo by: Melany Quiñonez, FLAAR Mesoamerica, Dec. 16, 2015, 12:43 p.m. Canal de Chiquimulilla. Camera: Sony DSC-RX100M3. Settings: 1/80;sec; f/2.8; ISO 500.



I have never seen a wild grey heron, because during the day they hide inside the mangroves. They come out at night to fish. But this bird was cared for by the locals. Since the bird knew the children liked to catch it, it accepted my hands when I held them out to see if I could catch it too. At that moment in December 2015, I had no idea that I held in my hands the sacred bird of the Olmecs and the regal bird of the Teotihuacan merchants who plied the trade routes from Mexico to Costa Rica in the 3rd to 5th centuries. When I returned to my office I identified the bird. I was totally amazed to have had a personal experience with this sacred bird. Notice the line down the center with the millimetric pointed end of the beak.



Once we learned more about the Boat-billed Heron we tried our best to find-and-photograph more of these birds on other field trips to the Canal de Chiquimulilla and other streams, swamps, lagoons and lakes around Monterrico.

Photo by: Victor Mendoza, FLAAR
Mesoamerica, Jan. 16, 2020, 9:10 a.m.
Canal de Chiquimulilla. Camera: Sony
ILCE-7RM4, FE 200-600mm F5.6-6.3.

Local names for

Cochlearius cochlearius

- Garza pico de bota
- Garza pico de cucharón
- Garza Cucharona
- Boatbill.
- Martinete Cucharón
- Boat-billed Heron

Most captions in archaeological reports call it a duck-billed bird. This is why we have dedicated effort over years to find and photograph this bird and suggest captioning it as a boat-billed heron, and not as a duck (Hellmuth. 2023)

Full Zoological Name and taxonomy

Cochlearius cochlearius Linnaeus, 1766.

Kingdom: Animalia
Philo: Chordata
Class: Aves
Order: Pelecaniformes
Family: Ardeidae
Genero: *Cochlearius*
Specie: *C. cochlearius*
(García. 2017).

Here are Synonyms for *Cochlearius cochlearius*

Cochlearius cochlearius zeledoni
Cochlearius cochlearius phillipsi
Cochlearius cochlearius ridgwayi
Cochlearius cochlearius panamensis
Cochlearius cochlearius cochlearius
(ECOregistros. 2023)



Cochlearius cochlearius.

Photo by: Edwin Solares, FLAAR Mesoamerica, Jan. 26, 2023, 2:00 pm. Canal de Chiquimulilla. Camera: Sony Alpha 1 with Sony 200-600mm telephoto lens.

Mayan names

No specific Mayan name has been found for the Boot-billed Heron, but we have found that the name for herons in the Yucatec Mayan language is **ajt'o'**. We look forward to comments from linguists for Mayan, Nahuatl and other words for this bird in languages of Mesoamerica. Plus, it would help to learn whether this bird is in local folktales (Hellmuth. 2023).

Physical description

Stocky, medium-sized night heron, large head, large dark eyes and very broad bill, perches on its chest or bent over a branch in shady places, quite vocal, usually with back to observer. Its measurements range between 45-50 cm in length with a weight of 600 grams (INaturalista. 2022).

The adult has a black crown, long crest, and black face. The upperparts, throat, and breast are white, and the underparts are red with black flanks. The wings are pale grey. The massive, broad, scoop-shaped bill gives the species its name and is mainly black. Immature birds have mainly chestnut upperparts and whitish underparts tinged with chestnut, while also lacking the crest (Moraga. 2022).

Habitat and distribution

Is a nocturnal heron that lives Night heron of mangroves and freshwater wetlands in tropical lowlands. Spends the day perched in trees, sometimes in scattered groups. It feeds at night on the banks of lagoons and rivers (García. 2017).

It is a resident species of the American continent that is distributed from southern Mexico, all of Central America, and in South America to northern Argentina (García. 2017).

In Guatemala: it is distributed on the south coast, the Caribbean and in the Maya Biosphere Reserve. FLAAR Mesoamérica has found this bird, specifically in the wetlands of Monterrico, Canal de Chiquimulilla, in the Caribbean zone of Tapón Creek, Río Sarstún, and in the Reserva de Biosfera Maya Biosphere specifically in Yaxha and Laguna del Tigre.

Reproduction

It extends between January and May, remains in isolated pairs, or in groups of about 5 to 12 pairs. Sometimes they form mixed colonies with other ardeids (López. 2011).

Courtship: Courtship displays include crown ruffling, loud bill clicking, slow wingbeats, and short flights by long hops from branch to branch (López. 2011).

Nest establishment: They usually nest in monospecific colonies, in tall trees and mangroves. The nests are usually round and thin platforms, with a slight central depression. Placed at little or medium height above the water (López. 2011).

Clutch size: usually two white eggs with a light blue tint, with cinnamon-colored spots at the larger end, 50-35x36 mm, incubation is by both parents, lasting 25-35 days, the semi altricial young are fed at night. The chicks leave the colony after three months (López. 2011).

Spawning: Lays 2 to 4 eggs that the female and the male incubate for about 23 to 28 days. Chicks have a thick, broad, dark gray bill, and are fed at night, too, by both parents (García. 2017).

Behavior

we can find it forming small colonies of 12 to 14 individuals in some special places of rivers or lagoons that they choose to form their groups, most likely it is related to has a lot to do with obtaining their food; that means, they choose places that are strategically suitable for their reproduction and for forming their populations (Moraga. 2022).

In their reproductive season they begin to socialize by making cackling noises and a type of clicking or loud sound, moving their beaks and making contact in the form of caresses between male and female. Because they are nocturnal individuals, they spend the whole day protecting their chicks, the entire colony remains resting and sleeping near the nesting site, but the parents in charge of the nest are always very alert to external noises from their nest (Moraga. 2022).

When it's too hot, the colony schedules a bath and jumps into the water to cool off; all in turn defecate, leaving the water stained with white spots due to the fecal content that they expelled when they fell into the water. After a brief bath, they climb up to the branches of the trees to dry and groom their feathers (Moraga. 2022).



Cochlearius cochlearius.

Photo by: Edwin Solares, FLAAR Mesoamerica, Jan. 26, 2023, 2:00 pm.
Camera: Sony Alpha 1 with Sony 200-600mm telephoto lens.

Food habits

It is an eminently crepuscular and nocturnal bird, which reveals its large black eyes, although during the breeding season it is possible to see it active in daylight. Feeds at night, hunting in shallow water for crustaceans, especially shrimp that are active at night, amphibians, fish, insects, and small mammals (García. 2017).

It presents its own behavior related to the morphological adaptation of its beak, not only because of its size and shape, but also because it is sensitive to contact. It submerges its closed beak, and when it comes into contact with a prey, opens it suddenly, creating a vacuum effect that favors the rapid entry of the prey along with water and mud. Prey is trapped inside and expels water and mud by raising its head and through an expandable membrane on the underside of its beak (García. 2017).

Curious Facts

- It is an atypical member of the family Ardeidae, due to its extremely broad and thick bill, and large dark eyes in fact (García. 2017).
- Previously it was included in a monotypic family called Cochlearidae, and it was later when it was included in the family Ardeidae together with herons (García. 2017).
- It is the only species of the genus *Cochlearius* (García. 2017).

Recommendation for ornithologists

Nocturnal, yes; that is known and accepted by ornithologists. But we suggest it would help for ornithologists and bird watchers to cite our observations of the boat-billed heron fishing during full sunlight.

Conservation status

Least Concern (LC) according to the International Union for Conservation of Nature (IUCN).

Field experience with *Cochlearius cochlearius*

If all you have is a 200mm lens, you can't get a good view.

Photograph by Nicholas Hellmuth with Nikon D5 and 200mm tele-macro lens, Hotel Tortugal, where Lake Izabal turns into Rio Dulce. This is the hospitable hotel that we prefer to stay in while on flora-fauna-ecosystems in this part of Izabal area of Guatemala (far upriver from the Caribbean Sea). 90% of the time you will see a Boat-billed Heron it will be surrounded by leaves, twigs and branches.





Usually the Boat-billed Heron spends the day deep in thickets. This way no hawk or eagle can grab it while the heron sleeps. Photograph by Nicholas Hellmuth in an earlier year, possibly Sept. 10, 2019.



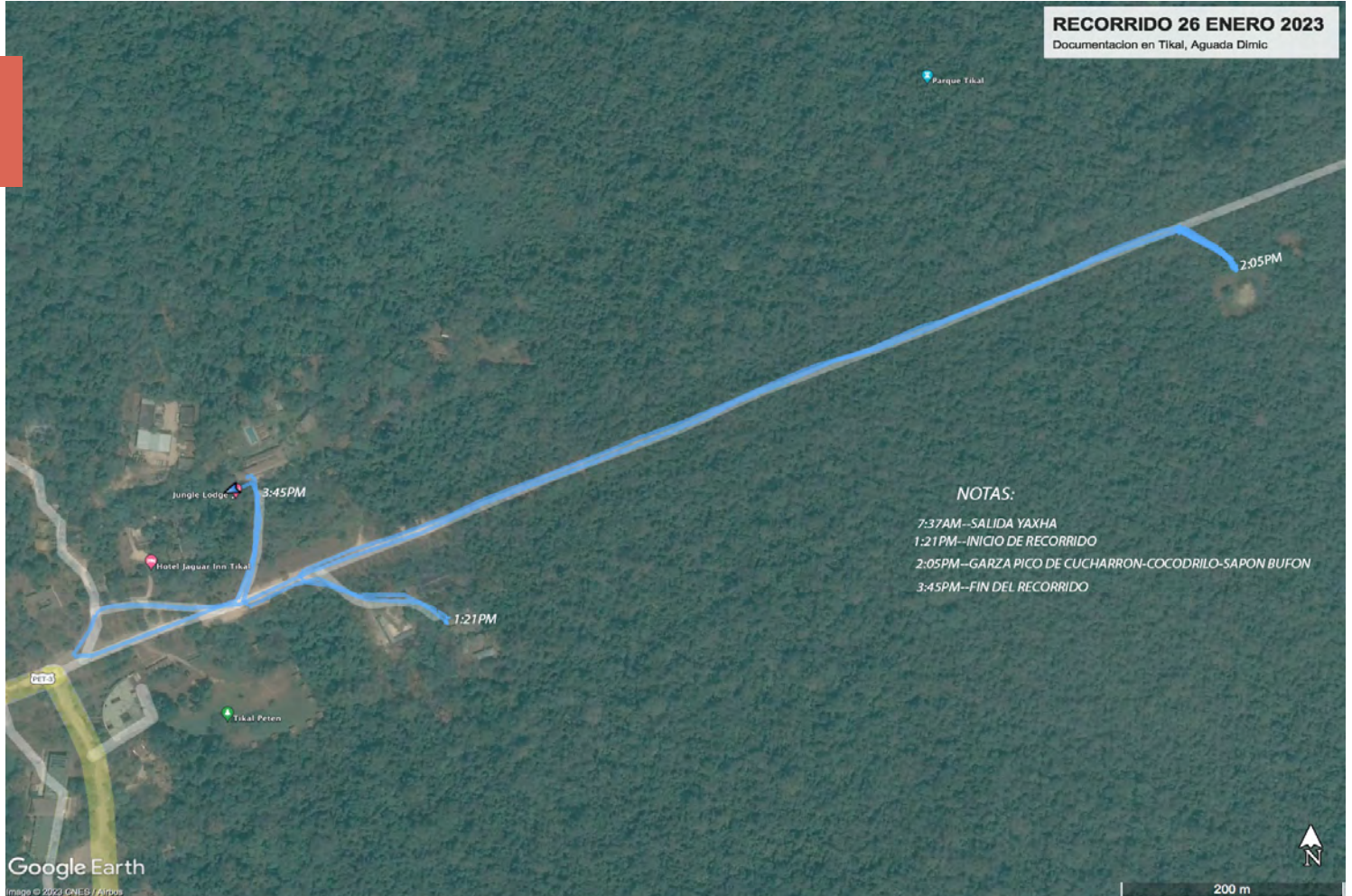
Although often deep in a thicket, you occasionally see the Boat-billed Heron closer to the front of the forest growing along the shore of a river or lake. Remember, most are in mangrove swamps but we now know lots of these birds are also in the Peten forests, far from mangrove areas. Photograph by Nicholas Hellmuth in an earlier year.



Cochlearius cochlearius.

Photograph by Nicholas Hellmuth in an earlier year.

Seeing Boat-billed Heron First Day at National Park Tikal , January 26, 2023



Our team includes a GPS documenter, with a recent model of Garmin. Out field work at Tikal is coordinated and in cooperation with the biologists of each park where we accomplish field work. The local park administrators and biologists let us know what they would appreciate having the FLAAR team photograph for them. And we let them know what flora and fauna and ecosystems that we are interested in:

- All wetlands: swamps, aguada's, streams, pital areas (which are seasonally wet in a wet year).
- Waterbirds
- Stingless bees
- And lots of other flora and fauna.

So Gelber Aldana and Esdras García, biologists of Tikal, suggested we visit the waterhole (or aguada in Spanish) at the far end of the former Aviatega airport of Tikal. On the first day we saw more Boat-billed Herons than I have seen in the previous half-century. I focused first on a Bufo toad and then on the Boat-billed Herons. Since it was about 2pm I realized that if we returned here another morning we might, perhaps, find even more of these remarkable water birds.

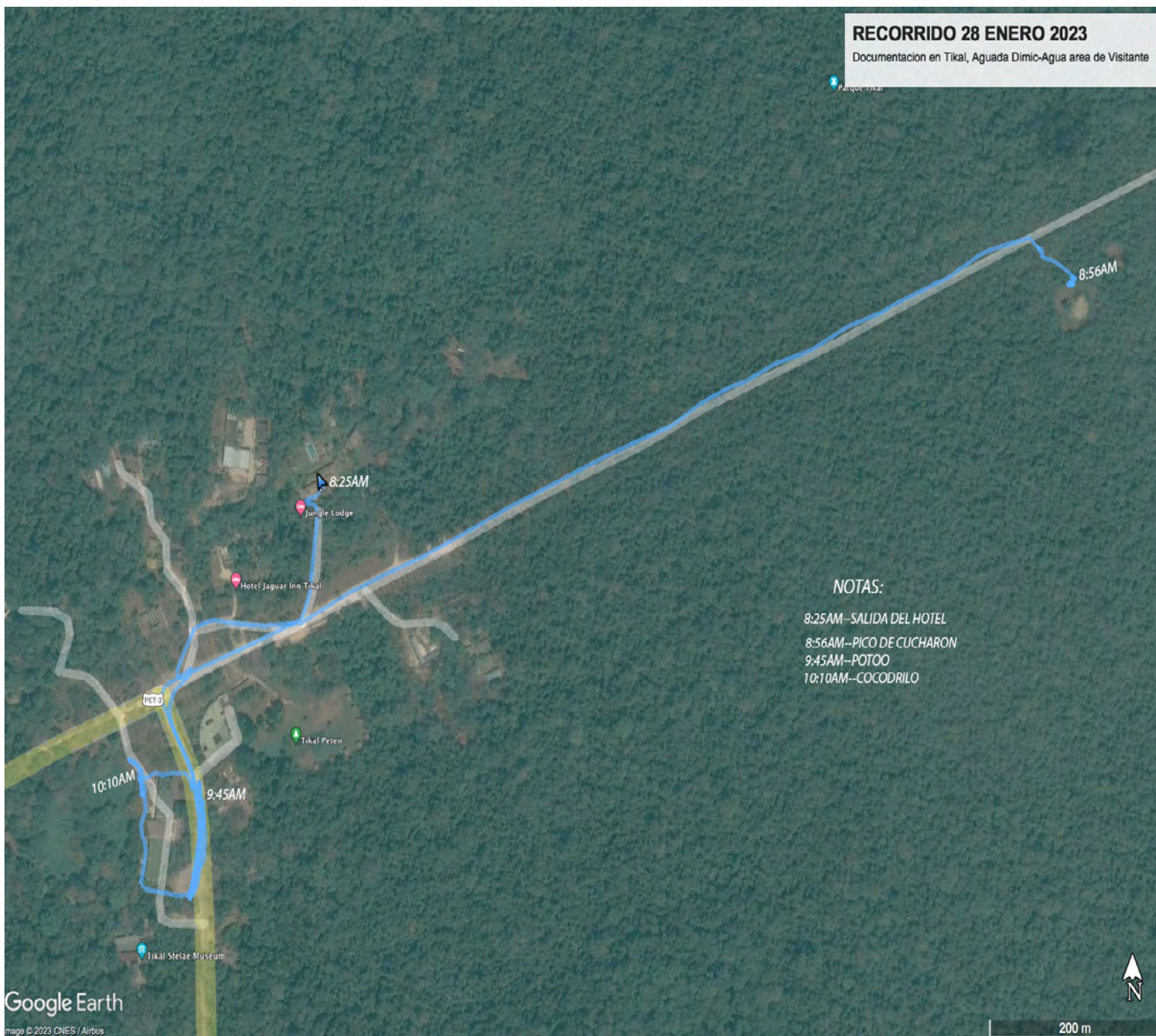
I call this the Crocodile Aguada (Aguada del Cocodrilo) for two reasons:

- There were multiple warning signs saying this aguada was dangerous to visit because of the hungry crocodiles.
- Once we got to the edge of this aguada, there were crocodiles each day.



Aerial photograph of this rectangular aguada. There are also Boat-Billed Herons in the aguada behind the Visitors Center (the museum of carved stone monuments). But we found 1000% more in this far-away swamp-edged aguada. There are more birds in the Crocodile Aguada because tourists (intelligently) do not visit here. Photo from the FLAAR drone, DJI Mavic 3, piloted by Haniel Lopez, January 2023, PANAT. The drone and pilot are registered with CONAP and the park; we do not fly it over pyramids or temples; only ecosystems in remote areas).





On January 28th we were heading to southern Peten because a land owner there had told us he had scarlet macaws all over his hacienda, and that we were welcome to visit. But before we left PANAT we wanted to take a peek at the Crocodile Aguada one more time to see whether there were even more *Cochlearius cochlearius* birds than the first day. And WOW, not only were there more, they are out in the sun; not hidden behind branches, twigs and leaves. So, we spent over an hour happy as hell. Completely content with this experience and photographing a group of 10 boat-billed herons Not one, not two, not three: but FOUR or more Boat-billed Herons.

Boat-Billed Herons in Flight



Boat-Billed Heron in flight to the edge of Aguada del Crocodilo, Parque Nacional Tikal (PANAT), afternoon of January 26, 2023. Photograph by Edwin Solares, Sony Alpha 1 with Sony 200-600mm zoom telephoto lens, ISO 1250, f/6.3, 1/6000th of a second shooting speed (so the wing feathers are not moving).



Boat-Billed Heron in flight to the edge of Aguada del Crocodilo, Parque Nacional Tikal (PANAT), afternoon of January 26, 2023. Photograph by Edwin Solares, Sony Alpha 1 with Sony 200-600mm zoom telephoto lens, ISO 1250, f/6.3, 1/6000th of a second shooting speed (so the wing feathers are not moving).





Cochlearius cochlearius.

Boat-Billed Heron in flight to the edge of Aguada del Crocodilo, Parque Nacional Tikal (PANAT), afternoon of January 26, 2023. Photograph by Edwin Solares, Sony Alpha 1 with Sony 200-600mm zoom telephoto lens, ISO 1250, f/6.3, 1/6000th of a second shooting speed (so the wing feathers are not moving).



Boat-Billed Heron in flight to the edge of Aguada del Crocodilo, Parque Nacional Tikal (PANAT), afternoon of January 26, 2023. Looks like a stealth bomber. Photograph by Edwin Solares, Sony Alpha 1 with Sony 200-600mm zoom telephoto lens, ISO 1250, f/6.3, 1/6000th of a second shooting speed (so the wing feathers are not moving).





Boat-Billed Heron in flight to the edge of Aguada del Crocodilo, Parque Nacional Tikal (PANAT), afternoon of January 26, 2023. Slightly different angle of the feathers in each photograph. Be sure your camera has in-camera stabilization and lens has in-lens stabilization. If not, you will need a tripod to keep the camera from shaking. Solares tends not to use a tripod since it's easier to move yourself and the camera than to have to move a heavy tripod with the camera locked onto the top. Photograph by Edwin Solares, Sony Alpha 1 with Sony 200-600mm zoom telephoto lens, ISO 1250, f/6.3, 1/6000th of a second shooting speed (so the wing feathers are not moving).



Boat-Billed Herons In-Flight carrying Twigs



1.



2.

#1. Boat-Billed Heron in-flight carrying a long twig to the edge of Aguada del Crocodilo Parque Nacional Tikal (PANAT), afternoon of January 26, 2023. This entire series of photographs are by Edwin Solares, Sony Alpha 1 with Sony 200-600mm zoom telephoto lens, ISO 1250, f/6.3, 1/6000th of a second shooting speed (so the wing feathers are not moving)

#2. The length of this twig is what surprises me. The bird can easily fly with this, but once it gets close to any tree, the width of this twig will hit all the other branches. Of course, this bird knows how to handle that. I am not a nest-ologist but I estimate this bird is building its nest. The brown-colored birds are juveniles but this blue-gray colored bird is an adult.



Cochlearius cochlearius.

In certain angles of sunlight parts of the bird's body turn pure white. Photo by Edwin Solares.



Cochlearius cochlearius.

Here you can appreciate the bird's beautiful white plumage. Photo by Edwin Solares. .



1.

#1. This twig is longer and has more twigs sticking out than I would want to fly with. But this bird does it calmly. Photo by Edwin Solares.

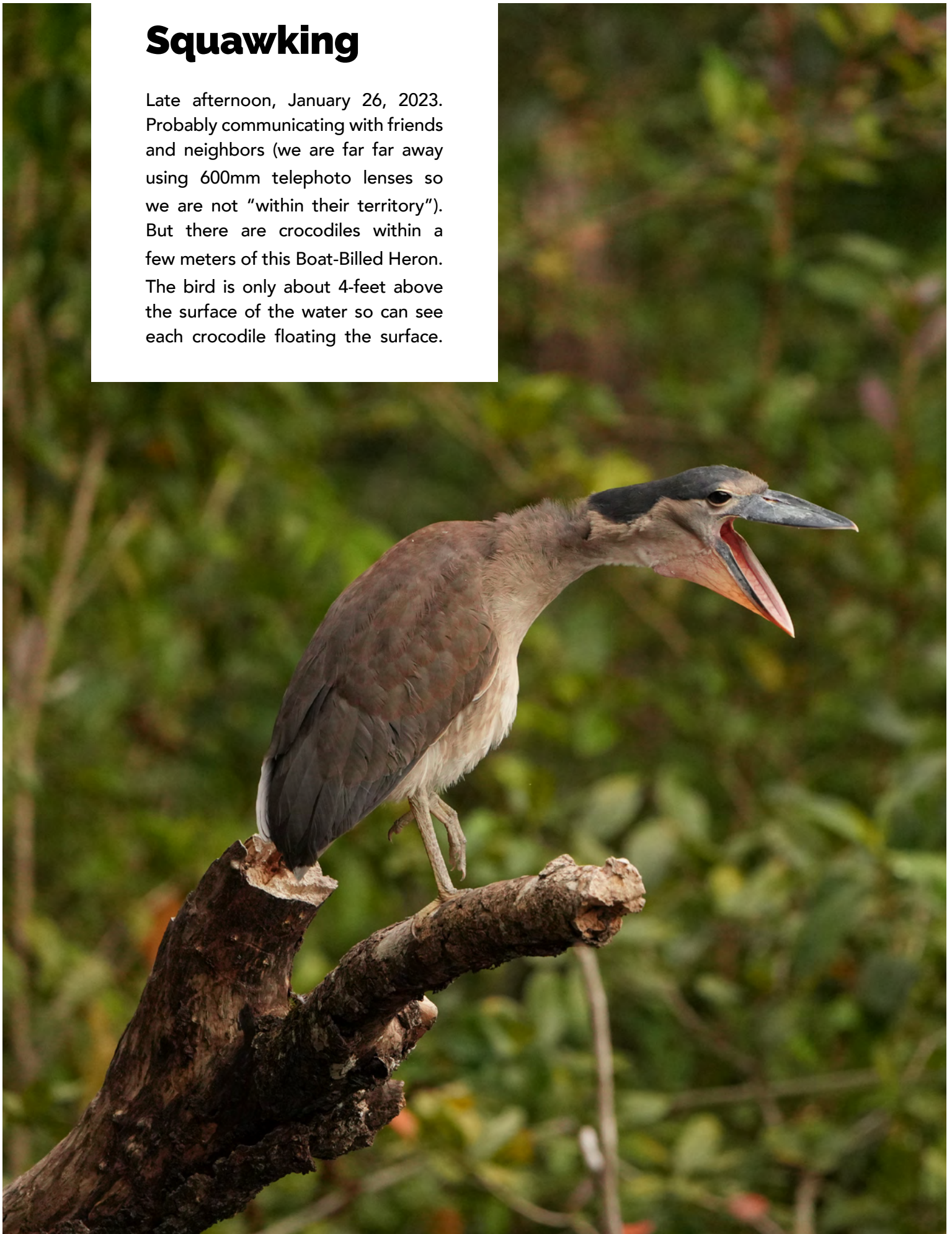
#2. When the tropical sun is directly overhead and beats down on the wings, the wings turn bright-white. Makes the Boat-Billed Heron look like the Great White Egret (but all other parts of the body are different and thus distinguishable). Photo by Edwin Solares, Sony A1, 200-600mm lens, early afternoon, January 26, 2023.



2.

Squawking

Late afternoon, January 26, 2023. Probably communicating with friends and neighbors (we are far far away using 600mm telephoto lenses so we are not "within their territory"). But there are crocodiles within a few meters of this Boat-Billed Heron. The bird is only about 4-feet above the surface of the water so can see each crocodile floating the surface.





Cochlearius cochlearius.

January 28, 2023, 8:58 am, so morning sunlight angle and color. Photograph by Nicholas Hellmuth, Nikon D810, 800mm prime telephoto lens, f/11 at 1/125th (since the bird was not flying and camera is on a sturdy Gitzo tripod and Wimberley gimbal tripod head), ISO 6400. Due to brown plumage, I estimate these are young generation.



Same waterbird but photographed by Nicholas Hellmuth with Nikon D810 with 800mm prime telephoto lens using tripod and gimbal. This duck was quite far away so both photos are cropped to show the duck. January 28, 2023, 9:39am, Aguada del Cocodrilo, Parque Nacional Tikal, PANAT.



I have no idea why the crocodile does not swallow the duck or grebe that is floating on the surface several meters away. Obviously, all the birds know the giant crocodile is here, since the crocodile often suns himself on the shore (see next photo). Photograph by Edwin Solares, Sony Alpha 1 with Sony 200-600mm zoom telephoto lens. Aguada Crocodilo, Parque Nacional Tikal, PANAT.



The crocodiles were within a few meters of the Boat-Billed Heron but did not make any attempt to eat them nor the duck that was swimming in the same small aguada. Photograph by Edwin Solares, Sony Alpha 1 with Sony 200-600mm zoom telephoto lens. Aguada Crocodilo, Parque Nacional Tikal, PANAT



Crocodiles like to sun themselves so along the edges of rivers, lagoons, lakes and this aguada you can see the large crocodile sunning himself. So surely all the birds in the same small aguada know this carnivorous crocodile is present. They surely see the deer and other animals being grabbed by the crocodile when these mammals come to the edge of the Aguada to get drinking water. You see the same in hundreds of videos in Africa of the crocodiles there grabbing animals who come for water. Crocodiles also eat local people and also tourists (literally). So best not to hike here by yourself. Photograph by Edwin Solares, Sony Alpha 1 with Sony 200-600mm zoom telephoto lens. Aguada Crocodilo, Parque Nacional Tikal, PANAT.



We returned to the Crocodile Aguada on January 28th, at an earlier hour

Even though this bird is close to the water, I doubt it is really trying to fish (because it is too high up). But it may be curious to check whether enough fish are floating by so it might decide to go down to a lower branch and get a meal. During the day these birds are “supposed to be” sleeping deep inside a thicket. Photo by Edwin Solares, Sony Alpha 1 with 200-600mm Sony zoom lens, hand-held, morning of January 28, 2023, in the rectangular aguada about 50 meters south of the east end of the former Aviatega airfield (close to a kilometer east of the visitor’s center and parking area at the west end of the former airfield).

Photo by Haniel Lopez, January 28, 2023, with Sony A7c, 200-600mm Sony zoom telephoto lens. This is identical lens as provided to Edwin Solares. Because each photographer will be in a different position and have their own personal style, we have three Sony cameras (two Alpha A1 and one lightweight Alpha A7C). Plus we have two 200-600mm zoom telephoto lenses since all our photographers are at work out in the swamps and forests at the same time. So, it is crucial that each individual photographer has all the different lenses they need.



If a kind individual can provide a more recent technology, the Alpha A7R V, this would help very much. The Sony Alpha A7R V has a 61MP full-frame sensor. The a7R V can track the body, head, and eyes of a bird ("subject detection"). When a bird is flying this helps keep the bird in focus. The Sony Imaging Edge software can accomplish stacked focus (if your camera is on a tripod while taking the photos). Also, the a7R V has better in-camera stabilization (there are times when you are hiking to get near a swamp and you see a bird but there is not time to unpack a tripod and set it up; with in-camera stabilization combined with in-lens stabilization you can capture images of bird without a tripod. That said, when possible, I use a tripod with the super-heavy Nikon prime 800mm lens.



2.



1.

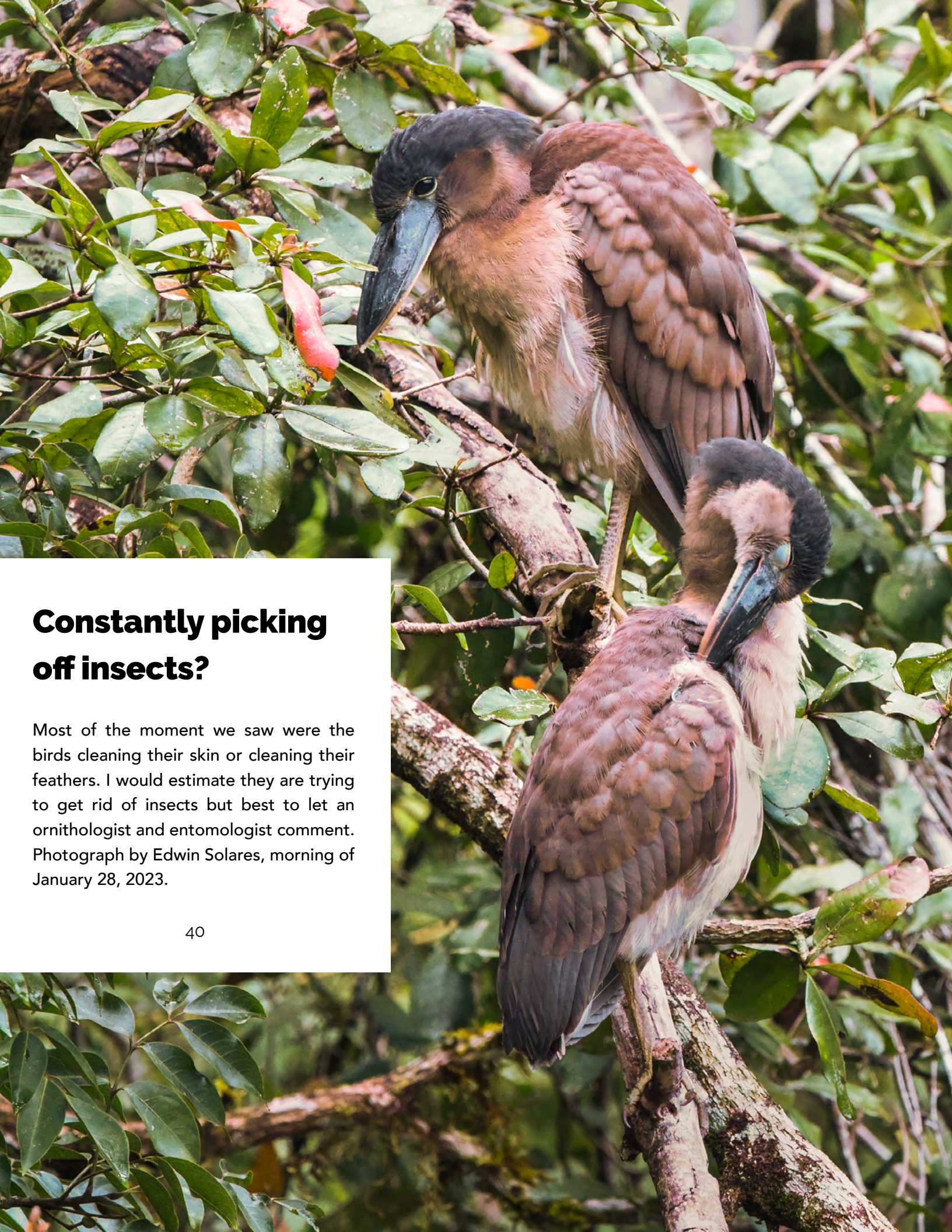
#1. This bird is not supposed to be out in the sun. This bird is supposed to be hiding in a mangrove swamp. This bird is documented by FLAAR in the Tikal National Park. Far from any mangrove swamp. And, most of the birds were out in full sun on Jan. 26 and again on Jan. 28, 2023 (when this photo was taken). Photograph by Nicholas Hellmuth, Nikon D810, 800mm prime Nikkor lens, January 28, 2023.

#2. Since these birds are across a crocodile-filled aguada, it is a challenge to get a view of the beak. Photograph by Nicholas Hellmuth, Nikon D810, 800mm prime Nikkor lens, January 28, 2023.



Cochlearius cochlearius.

I estimate that the bird at the top is in "sleep mode and sleep position". Note that the bird is resting with both feet; often birds rest on a single foot and hold the other foot a bit above and off the perch. Photograph by Edwin Solares.



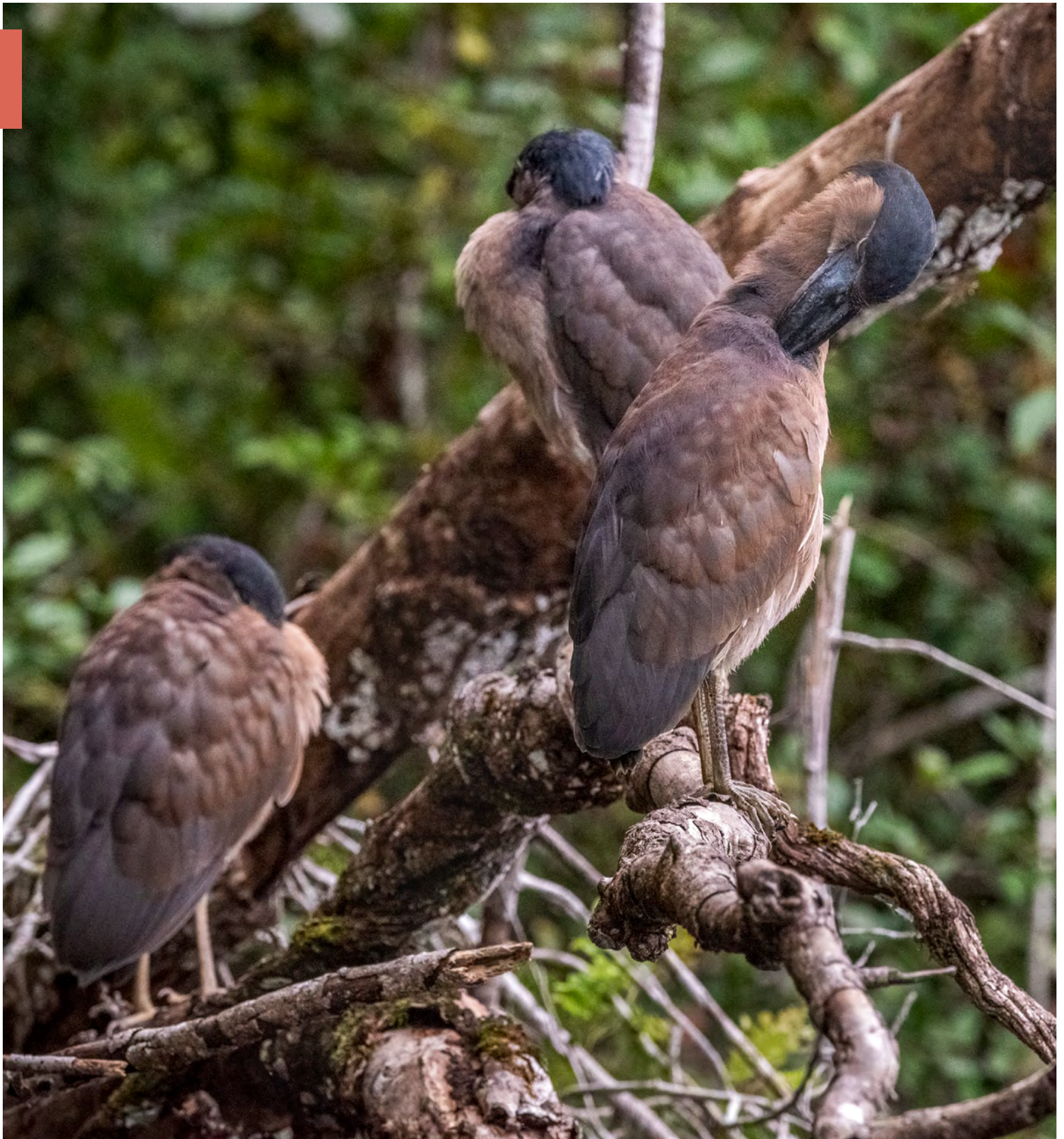
Constantly picking off insects?

Most of the moment we saw were the birds cleaning their skin or cleaning their feathers. I would estimate they are trying to get rid of insects but best to let an ornithologist and entomologist comment. Photograph by Edwin Solares, morning of January 28, 2023.



Cochlearius cochlearius.

It is 9 am in the morning (January 26, 2023). Boat-billed Herons are supposed to be deep inside swamp-edged thickets, sleeping. Not outside in the full sun. We noticed that most of the time these birds were preening themselves. Are they prying insects off their skin? Photo by Nicholas Hellmuth.



Cochlearius cochlearius.

Two of the birds are sound asleep but every few minutes one would awake and pick at their feathers or go under their feathers to pick on their skin. So yes, even juveniles have learned to sleep during the day but they have not yet learned to hide inside the branches of a thicket. These birds are out in full sun on limbs of trees that rot and fall over (because these trees are on the edge of the aguada and this year the water level was higher than usual). Photo by Nicholas Hellmuth, circa 9am, January 26, 2023.



Boat-Billed Herons are supposed to sleep and rest all day and fish only at night?

Bird did not scoop down into the water; it just bit down. Photo by Nicholas Hellmuth.



Same bird, same location but Edwin Solares is on a different part of the bank of the aguada. The bird is finish (not drinking; he was on this branch for over 30 minutes so is not here to drink).



Now the bird is moving to the other side of the branch. This is a tree that fell over into the water in a recent year. As the bird moves from one branch to another, he uses his wing to balance himself. Rare to capture this movement. Photograph by Nicholas Hellmuth.



Cochlearius cochlearius.

This is how and where you usually “see” a Boat-Billed Heron (cleverly hiding behind leaves and branches). This is our view of a traditional place for the birds to sleep during the day. On the north shore of Lake Yaxha; it is easier to see these birds on the west side of Rio Ixtinto, upstream from Topoxte Island.

We show this normal position so you can understand why we were so elated in January to find multiple Boat-billed Herons out in full sunlight, posing for the FLAAR team of photographers. Photo by Nicholas Hellmuth, Nikon D5, 800mm prime telephoto lens, July 5, 2019.



Learning about Size and Shape of the “Duck-bill” of the Boat-billed Heron

Photo by Nicholas Hellmuth with iPhone 14 Pro Max, January 26, 2023. Downside of iPhone is that it has no polarizing filter (to remove the shiny reflection from the leaves). With the tropical sun shining down the leaves turn into mirrors and lose their color. You need a circular polarizing filter to remedy this reflection. It is important to document each part of the beak so you can document that this Boat-billed Heron is not (yet) found as a model for any Maya deity or logo bird.



Cochlearius cochlearius.

Photo by Haniel Lopez, Sony A7C, 200-600mm Sony telephoto lens, January 26, 2023.

Is the **Tuxtla Statuette** really a **Duck-Billed Bird**?

Out of courtesy to archaeologists that I respect, I will not cite the individuals who caption the A.D. 159 Tuxtla Statuette as a duck-billed bird. The famous Tuxtla Statuette was found in San Andres Tuxtla, more or less 60 kilometers from where La Mojarra Stela 1 was found (G. Stuart 1993: 1700). The La Mojarra Stela is dated to A.D. 159 (ibid., citing Justeson and Kaufman 1993 in the same issue of Science).



Cochlearius cochlearius.

Relatively close view of the beak of *Cochlearius cochlearius*, Boat-billed Heron, Aguada el Crocodrilo, Parque Nacional Tikal, PANAT. Photo by Nicholas Hellmuth with Nikon D810, 800mm prime telephoto lens, on Wimberley gimbal head atop at sturdy Gitzo tripod. January 26, 2023, close to 9 am.

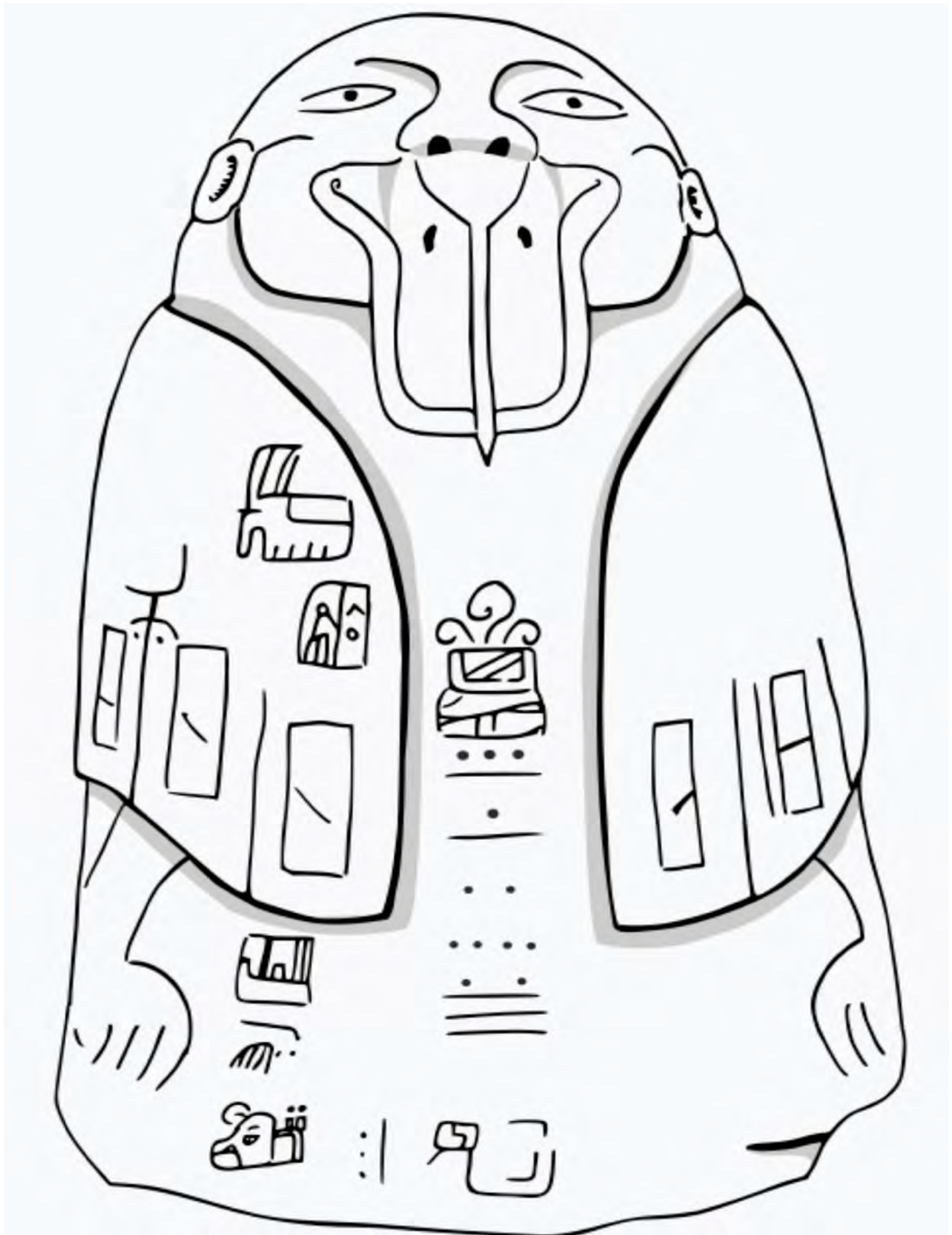


Cochlearius cochlearius.

Standing on the edge of a crocodile swamp aguada it was a challenge to get good photos of the bill of the Boat-Billed Heron. But this shows the length (long as the head). 800mm prime lens. 90% of the photos in this report are cropped since we could not get closer to the birds due to the crocodiles in front of us; plus, the entire rim of the aguada was thick swamp forest (no way to walk around the edge).



Drawing by John Justeson, front cover illustration from article by Justeson et al. 2020 in Latin American Antiquity, Vol. 31, No. 4, Dec. 2020, SAA.



Cropped from the drawing of the Tuxtla Statuette from Wikipedia. The point at the end is what is most telling that this is a Boat-billed Heron beak.

Photo by Nicholas Hellmuth, Tikal, Jan. 28, 2023, FLAAR Photo Archive.



Should also study the "Olmec Duck-Face Ornament" in the MET Museum,

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Turner 2015: Figure 2.67,b citing Taube 2004: Plate 36.
Dumbarton Oaks.



Taube 2018: page 38, Fig. 18, no caption. Without a central ridge, a challenge to identify. Rather wide. Captioned in Taube 2004: Fig. 81.a.

Capable and experienced iconographer Karl Taube shows lots of “the duck-billed wind god”. An actual Boat-Billed Heron has no upward raised area on the top and no lower-bump 90-degrees to the bottom. The Tuxtla Statuette is the best example of an obvious *Cochlearius cochlearius*. The Tecomate fragment, Cuauhtemoc, Chiapas (Turner 2015: Figure 2.67a, citing Rosenswig 2003: fig. 3) is missing its end so tough to say what it is. In his monumental over 500-page PhD dissertation, Turner shows “wind god” bird-bills that are rarely pictured elsewhere. So, sooner or later an iconographer should be able to find a Boat-billed Heron in Classic Maya art. Seibal Stela 3, beak of bird-man at the right (Turner 2015: Figure 2.70,b) has the end-of-beak barb that is expected; but since you see the profile and not the top it’s a challenge to call it a Boat-billed beak for sure. Some ducks also have this sharp aspect to the end of the center of their beak. I am open to researching Mallards, Teal, Grebes and all the other “duck-bill” waterbirds of Guatemala. *Spatula clypeata* is definitely a contender. This Northern shoveler has gorgeous diversity of colors, has a wide bill. I will be studying other duck-bill birds but this is definitely a possible model. Challenge will be to find *Spatula clypeata* in the wild and be able to photograph it close-enough so we can see its beak from front, side, above and below.



Cochlearius cochlearius.

At this angle you can see both the main straight central raised ridge and the wobbly adjacent ridges, plus the slight ridge of the edge. The previous minute this bird grabbed something from the trunk of this semi-fallen dead tree (so this is still hanging from the left side of the beak). *Cochlearius cochlearius*, Boat-billed Heron, Aguada Crocodrilo, Parque Nacional Tikal, PANAT. Photo by Nicholas Hellmuth with Nikon D810, 800mm prime telephoto lens, on Wimberley gimbal head atop at sturdy Gitzo tripod. January 26, 2023, close to gam.



Cochlearius cochlearius.

Notice the millimeter-thin pointed end of the beak. That sharp point is visible on the Epi-Olmec Tuxtla Statuette. But several duck species also have a thin pointed end of their upper beak. These juvenile birds are finally resting; but out in the open, several meters from the thick forest around the crocodile-filled aguada. So yes, they do rest during the day but not the way they are supposed to according to most web pages.

Photograph by Nicholas Hellmuth, Nikon D810, 800mm prime Nikkor lens, January 28, 2023. All Hellmuth photos are of the birds around the rectangular aguada to the south of the far east end of the old Aviateca airfield (all together over a kilometer east of the visitor's center of Tikal).



Cochlearius cochlearius.

Here is a profile view of the beak; it is very "high", so not "low or flat". The bird above is asleep; the bird in front was asleep until it began to pick on its feathers and skin. This photo is a minute after; where the bird is about to move his head back to resting position. We fire dozens of photos while out in the field and then back in the office we can select which views document an aspect we wish to show to iconographers (the shape of the beak) and to ornithologists (the number of times these supposedly sleeping birds were actually using their bills to pick at their feathers and skin).

Is this a **Boat-billed Heron?** held by Noble Women, Costa Sur, Guatemala

I have always estimated that these were not ducks. The raised area that clearly drops down at end of the beak reminds me of a Boat-billed Heron (though many ducks also have similar end to their beak). Since these 4th-5th century ceramic effigies are over a thousand years old, there is no sharp point remaining (or perhaps the artist just put a bump on top and curving down a tad). Since I photographed in museums throughout Guatemala half a century ago in the 1970's, my notes were destroyed by the earthquake of 1976. So I apologize I can't name which museum(s) though the one in 3-quarters view is on exhibit in the Museo Popol Vuh, Universidad Francisco Marroquin.



Previously I estimated that this bird is the Boad-billed Heron. But after looking waterbirds with wide beaks on Early Classic Lowland Maya basal flange lid handles, I will consider other options such as *Spatula clypeata*. The muscovy Duck is native to Guatemala out in the wild; but domesticated Muscovy Ducks were brought to Guatemala by the Spaniards quickly after the conquest.

The Popol Vuh Museum has about three or four of these seated female's ceramic effigy vessels holding a bird. Some of the birds are tiny but most have the bird at healthy size that we show in the present report. Ironic that in the thatched house on the side of Canal de Chiquimulilla, I also held this same sacred bird in my hands. Like most birds and animals, if people don't pester them, the birds and animals get used to being with people.

Would be helpful to find all publications which show these noble women holding a wide, flat-billed bird, and see whether they called them duck-billed or boat-billed? There are many of these large ceramic 3-dimensional seated women statues. Some hold a bowl (probably once had cacao beans?). Others hold a Tlaloc-eyed butterfly. But most hold these birds. Why did the Classic Maya not absorb these birds into their mythology? Why is this ritual limited to the Costa Sur of Guatemala (which is not a Mayan-speaking area)?

Why are these birds not shown at Teotihuacan murals or decorating cylindrical tripods? Is this bird included in the water scenes around the murals of Cacaxtla? I have not yet noticed this bird in those murals. There's a lot of material for a thesis or PhD dissertation. Lots of material for iconographers of both Mexico and Guatemala. And, is this bird found in the Teotihuacan-related art of Copan, Honduras? These questions have not been raised which is one of many reasons why I wrote this FLAAR Report. Here is a water bird, a nocturnal wading bird, *Cochlearius cochlearius*. It was clearly an icon of the Epi Olmec and of Teotihuacan merchant trade route through the Costa Sur of Guatemala.

Our goals

What we want to achieve with this documentation is to provide photographs to researchers so that they can complement their studies or find new topics of interest to be studied. In this case, something that caught our attention was finding this bird active during the morning, since records indicate that *Cochlearius cochlearius* sleeps all day and its activity occurs mainly at night. It is true that it was mainly the juveniles that were out in full sun at 9am in the morning, but we also observed an adult individual flying around 2pm. Then it is last to make these observations so that the existing information can be updated.

To see a *Cochlearius cochlearius* fishing during the day was an unexpected surprise. This is precisely one of our goals: to document with photographs flora, fauna and ecosystems that have not been studied in-depth. Most studies of the Boat-billed Heron are in other areas of Mesoamerica. This bird is obviously known and documented for Tikal but is missing from most bird maps. A dedicated goal is to put this bird-on-bird maps. So, we have documented this bird in:

- Lake Yaxha, north side
- Rio Ixtinto, west side
- Rio Dulce, on branches of swamp between parking lot and Hotel-Marina Tortugal.

As a result of these field work photos a student or ornithologist can come to the Crocodile Aguada and accomplish even better documentation. There is a viewing platform where you can set up the necessary equipment and take notes. Obviously, it is important to request permission from the park administration in advance. FLAAR has a 5-year project with CONAP for the entire 21,600 square kilometers of the Reserva de la Biosfera Maya (RBM), Peten, Guatemala. Plus, this project is registered for each national park and biotope and nature reserve in the southern portion (since we do not have outside funding, so can cover only a limited part of the huge RBM area). A donation or a grant could enable the FLAAR (USA) and FLAAR Mesoamerica (Guatemala) teams to accomplish even more. We are open to working with university biologists, with zoological and botanical organizations, with wildlife conservation agencies and with bird watchers who would like to come with the FLAAR team on future bird-finding and bird-photographing field trips.

Final considerations

As already mentioned above, it would help to update bird maps of Guatemala

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to add Tikal, Lake Yaxha, the nearby Rio Tinto and Rio Dulce. I am amazed that the field team from FLAAR (USA) and FLAAR Mesoamérica (Guatemala) have been so successful.

Plus, these *Cochlearius cochlearius* birds at Tikal are happy many hundred miles away from any mangrove swamp or even brackish water. So, it would help for our documentation of at Lake Yaxha and Rio Ixtinto area of Yaxha (PNYNN) and this aguada at Tikal (PANAT) can be cited in future discussions of where this bird can thrive.

Rio Dulce has brackish water plus mangrove swamps even far inland. We will be curious to see whether there are boat-billed herons in the in-land mangrove swamp remnants along the shore of Rio San Pedro downstream from the town of Naranjo, Peten. Rio San Pedro flows into Tabasco (Mexico) where the inland mangrove swamps have been well documented. In Guatemala this mangrove area along Rio San Pedro is known, listed on maps but adequate photos are totally missing.

Since these birds are present in Epi-Olmec art and very common in Teotihuacan-influenced art of the Costa Sur of Guatemala surely it should be present in Early Classic art of the Peten and adjacent regions. The best documentation of “duck-like” billed birds in Tzakol art is in the excellent PhD dissertation of Patrice Bonnacoux especially his Figure 5.28, a, b, and c (Bonnacoux 2008). His 5.28, a and c have the points at the end of the beak. We need more photos to see if these Tzakol beaks have a ridge down their middle. But I would estimate that 2008: Figure 5.28 a and c are potentially a boat billed heron. But we definitely need to find and photograph the beaks of the *Spatula clypeata* before we can be sure that “no duck has a bill like these.”

(a) *bcn02*
canard stylisé

(Becan, structure IX, terre cuite, détail du couvercle)

Dessiné d'après *Arqueologia Mexicana*, sept-oct 2005, vol XIII, n°75 : 50



(b) *k9121*
canard stylisé
(terre cuite, détail du couvercle)

Dessiné d'après Kerr 9121



(c) *ckml10*
canard stylisé

(Calakmul, terre cuite, détail du couvercle)

Dessiné d'après *Arqueologia Mexicana*, jul-aug 2002, vol X n°56, p. 34



The Vasija Tumba Roja de Mundo Perdido (Tikal) big-billed beak has upraised front top end, so unlikely *Spatula clypeata* and unlikely a Boat-billed Heron. There are probably dozens of bird head handles of Tzakol basal flange bowls and tetrapods that have wide beaks. Bonnafoux shows a sample; more surely exist in museums, collections and in bodegas of archaeological projects. So hopefully the present FLAAR Report will inspire a student to do a better-than-average MA thesis or a PhD dissertation on "Duck-Billed Birds as 3-Dimensional Lid handles of Tzakol Basal Flange Bowls and Tetrapods." Also search should include



Opening his mouth to say hello. Photo by Nicholas Hellmuth, Nikon D810, 800mm lens, Aguada Crocodilo, Tikal, PANAT, morning of January 28, 2023. This bird is documented that it should be asleep deep behind branches and leaves; this bird is documented that it should not be out in the full sun at gam in the morning. This bird is documented that most are found in mangrove swamps.

Now can be added to more locations of Guatemala and its daily behavior can be described in a more open comprehensive manner. In future field trips 2023, 2024, 2025 would be great to have bird-watchers and eco-tourism groups with us so we can share our experiences and they can chip in to cover our recent and current years of field trips. This is only one waterbird; there are dozens more pictured in Classic Maya art: on stelae, vases, bowls, plates and in murals. Join our team and we can share or findings.

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Since the Boat-Billed Heron is not (yet) found in Classic Maya art, this bird is not (yet) in this edition. There are several editions: one has a Scarlet Macaw on the front cover; the edition listed above as the King Vulture on the front cover.

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JUSTESON, John S. and Terrence KAUFMAN

2019 The Epi-Olmec Text on a Teotihuacan-Style Mask with Special Reference to Ritual Practices Referred to in Epi-Olmec Hieroglyphic Texts. Pages 59-139.

Although there are no Boat-Billed Herons on Veracruz-area sculptures with Epi-Olmec hieroglyphic texts (other than the large Boat-Billed Heron on the Tuxtla Statuette and its text), it still helps to read all of the helpful discussions by Justeson and Kaufman on the Epi-Olmec texts since in many aspects these were an aspect to predecessor to hieroglyphic writing of the Preclassic Maya.

I suggest joining ResearchGate and even more to join Academia.Edu (other comparable sites want your money and are not scholarly friendly despite their website names and pretensive PR). It is very helpful when scholars post their articles and books on either Academia.edu and/or ResearchGate.

JUSTESON, John S., POOL, Christopher A., ORTIZ Ceballos, Ponciano, RODRIGUEZ Martinez, Maria del Carmen and Jane MacLaren WALSH

2020 The Environs of Tres Zapotes as the Find-Spot of the Tuxtla Statuette. Latin American Antiquity. Volume 31, Number 4, December 2020, pages 747-764. Society for American Archaeology.

I highly recommend signing up to Academia.edu so you can download these articles at no cost per article.

https://www.academia.edu/83745267/The_Environs_of_Tres_Zapotes_as_the_Find_Spot_of_the_Tuxtla_Statuette

KAUFMAN, Terrence and John S. JUSTESON

2001 Epi-Olmec Hieroglyphic Writing and Texts.

MORA-Marin, David F.

2002 An Epi-Olmec Jade Pendant found in Costa Rica. *Mexicon*, Vol. 24, No. 1, (Februar 2002), pages 14-19.

Not-available on a friendly scholarly website (Academia.edu and ResearchGate are the most authentic scholarly download sites).

PÉREZ de Lara, Jorge and John JUSTESON

2006 Photographic Documentation of Monuments with Epi-Olmec Script/Imagery. FAMSÍ. 18 pages.

Helpful list of all artifacts (mostly sculptures) with Epi-Olmec hieroglyphs known at that time (2005).

STUART, George

1993 The Carved Stela from La Mojarra, Veracruz, Mexico. *Science, New Series*, Vol. 259, No. 5102, pp. 1700-1701.

https://www.researchgate.net/publication/6023295_A_Decipherment_of_Epi-Olmec_Hieroglyphic_Writing

STUART, Peter

2015 Birds and Environmental Change in the Maya Area. Thesis, with contributions by David Stuart. 189 pages.

Already seven years ago this thesis has the absolute best database of birds in Classic Maya art. Helpful that it includes all birds; waterbirds and every other kind. As I expected, the boat-billed heron is not present (so far) in Classic Maya art. But is present in pre-Columbian ceramics of Guatemala: but Teotihuacan-oid style of the Costa Sur (definitely not Maya nor shared).

Sections credited to David Stuart. Peter De Smet also did comparable in his PhD dissertation, crediting sources as authors of the actual segment of the dissertation (in De Smet's Appendix B, shown appropriately as authored by Hellmuth). This is more realistic. We are doing this by adding contributions by other authors as separate chapters within a FLAAR Report.

Available as a helpful download.

TAUBE, Karl A.

2004 Olmec Art at Dumbarton Oaks. Dumbarton Oaks Research Library and Collection. 228 pages.

Excellent coverage of the Olmec art in the collection of Dumbarton Oaks and a good coverage of Olmec art per se. Dumbarton Oaks also has a helpful download archive for this book:

https://ia801809.us.archive.org/23/items/taube-olmec-art-at-dumbarton-oaks/Taube_Olmec%20Art%20at%20Dumbarton%20Oaks.pdf

TAUBE, Karl A.

n.d. Introduction: The Origin and Development of Olmec Research. Dumbarton Oaks.

The “Duck-billed” face (Taube, Figure 0.7), photo by Michael D. Coe, does not show any raised area down the center. The end is missing so you can’t tell whether there was a curved sharp downward pointing end (as on the Boat-Billed Heron). Thus this generic beak needs further study.

Helpful download from a scholar-friendly website:

<https://www.doaks.org/resources/olmec-art/introduction>

TAUBE, Karl A.

2018 Author’s Introduction. Precolumbia Mesoweb Press. 75 pages

TURNER, Andrew

2015 Cultures at the Crossroads: Art, Religion, and Interregional Interaction in Central Mexico, AD 600-900. PhD dissertation, UC Riverside. Impressive 536 pages.

Suggested Web Pages with good photos and/or good description of Boat-Billed Herons

- <http://10000birds.com/boat-billed-heron-cochlearius-cochlearius.htm>
- <http://avibase.bsc-eoc.org/species.jsp?avibaseid=743689848534F1F7>
- www.backyardnature.net/yucatan/bb-heron.htm
Two photos, miscellaneous information.
- <https://biodiversidad.gt/portal/taxa/index.php?taxon=3447&clid=21>
UVG (Universidad del Valle de Guatemala), USAC (Universidad de San Carlos de Guatemala) and ASU (Biodiversity Knowledge Integration Center, Arizona State University).
- www.birdinginbelize.com/bird_checklist.html
- <http://naturalista.conabio.gob.mx/taxa/5036-Cochlearius-cochlearius>
Several useful photographs. Information, however, was not very thorough.
- http://neotropical.birds.cornell.edu/portal/species/overview?p_p_spp=115356
Ramos-Ordoñez, M.F., C. Rodríguez-Flores, C. Soberanes-González and M.C. Arizmendi. 2010 Boat-billed Heron (*Cochlearius cochlearius*), Neotropical Birds Online (T. S. Schulenberg, Editor). Cornell Lab of Ornithology, Ithaca.
- www.waza.org/es/zoologico-virtual-galeria/cochlearius-cochlearius

- https://en.wikipedia.org/wiki/Tuxtla_Statuette
Even Wikipedia mis-identifies the Tuxtla Statuette as having a duck-like bill. But further down they recognize it as a boat-billed heron citing the 2001 update of Justeson and Kaufman of their original 1993 caption.
- <http://yukjotp.blogspot.com/2011/03/origenes-ii-el-hombre-con-pico-de-garza.html>
Correctly identifies the bird as a Garza pico de bota (*Cochlearius cochlearius*).

Videos

Almost everything about birds of the Neotropics is from Costa Rica; Guatemala deserves more attention.

- **Interesting facts about Boat billed Heron by weird square**
Moves too fast between scenes but otherwise shows helpful info, albeit primarily for mangrove swamps.
<https://www.youtube.com/watch?v=U8XABUCyX9Y>
1:43
- **Boat-billed Heron in Costa Rica**
www.youtube.com/watch?v=Z5ZkIF5CKMc
3:53
No music; but clear views of the birds (in Costa Rica, not Guatemala).
No text, no information. Bird spends most of its time trying to clean "insects?" off its body.
Shows a spike at end of beak that you only see at certain angles. At 3:19 you can see the "pointed" aspect at end of the beak.
- **Garza cucharón Boat billed heron**
<https://www.youtube.com/watch?v=Ojm4wkGldJs>
2:44; first part is other local fauna (of Colombia).
Nothing new.
- **What a Strange Bird! The Boat-billed Heron IN THE WILD!!!**
<https://www.youtube.com/watch?v=4bOFnAL-y9Q>
1:04, short and sweet, no text, no information

Caption for back cover photograph:

When you come to Guatemala, you can find me around the north edge of Lake Yaxha or west side of Rio Ixtinto. When you visit Tikal, you can find me on the edge of most aguada's (be sure to have a guide and don't wade into the aguada water because there are crocodiles under me). You can also see me along Rio Dulce or along the sides of all the wetlands near Monterrico, inland from the Pacific Ocean.

ACKNOWLEDGEMENTS TO FLAAR MESOAMÉRICA

Flor de María Setina is in charge of the financial administration of the institution and supports the supervision of daily activities.

Vivian Hurtado is the current project manager of the FLAAR divisions: Flora & Fauna and MayanToons. She is also an environmental engineer and a passionate researcher.

Victor Mendoza environmental engineer in charge of the photographic database and its taxonomic identification. He also helps with the coordination of research activities.

Sergio Jerez agronomy engineering student involved in the identification of plants and support in research topics.

Belén Chacón biology student who organizes, tabulates and updates our ethnobotanical list.

Diana Sandoval agricultural engineer who compiles scientific information that is added to our flora and fauna reports.

María José Toralla biology student collects information and bibliographic references to feed our electronic library of flora and fauna and support research for reports and websites.

Samuel Herrera is in charge of processing maps of our field trips and helping with the identification and investigation of species.

Pedro Pablo Marroquín is part of the editing team, review and add information to our photographic reports

Alejandra Valenzuela is a biology student and part of the photographic reports editing team. She also supports the realization and analysis of web statistics.

Maria José Rabanales is part of the photographic reports editing team

Byron Pacay is our assistant during the field trips.

Norma Cho is our assistant during the field trips.

Roxana Leal degree in communication, manage all our social networks and digital community.

Isabel Rodríguez Paiz is in charge of fundraising and partnership development.

Edwin Solares is a photographer and videographer during our expeditions. Later, he edits this content to be used in our different materials.

Pedro Pablo Ranero with a degree in communication is responsible for editing videos of flora and fauna to create content on our sites.

Andrea Sánchez graphic designer who helps prepare the graphic line of our publications. She is our editorial art director.

Jaqueline González graphic designer who combines text layout and photo editing to create our reports.

Heidy Galindo graphic designer who combines text layout and photo editing to create our reports.

Alexander Gudiel graphic designer who combines text layout and photo editing to create our reports.

Cristina Ríos graphic designer who combines text layout and photo editing to create our reports.

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María Alejandra Gutiérrez is an experienced photographer who is now in charge of the preparation of photographic catalogs. She was also coordinator of the field trips for the research project in Livingston, Izabal.

Paulo Núñez is an engineer and our webmaster. He is the person in charge of the maintenance and programming of the entire network of FLAAR websites.

Juan Carlos Hernández is a graphic designer and part of the web team. Receive the material we produce to place on our sites.

María José García is a graphic designer and part of the web team. Receive the material we produce to place on our sites.

Andrés Fernández is a graphic designer and in charge of keeping our websites updated and more efficient for the user.

Valeria Áviles is a graphic designer and illustrator. She is in charge of coordinating the activities of MayanToons, as well as making illustrations for the different materials that we prepare.

Laura Morales is a digital content engineer, She is in charge of directing the animation area of our MayanToons project.

Paula García is part of our MayanToons animation team. Her job is to bring our favorite characters to life.

Niza Franco is part of our MayanToons animation team. Her job is to bring our favorite characters to life.



Isabel Trejo is a graphic designer and illustrator for MayanToons and for social media posts.

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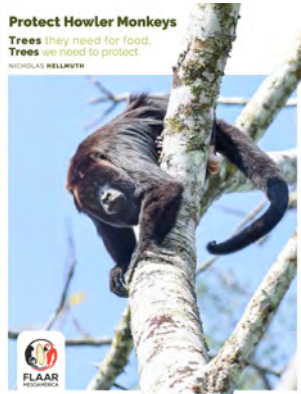
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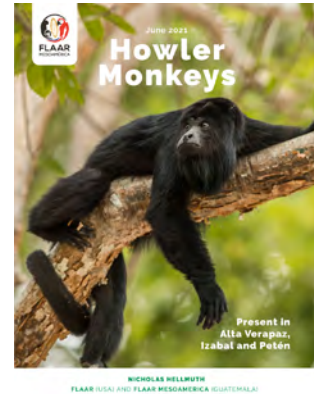
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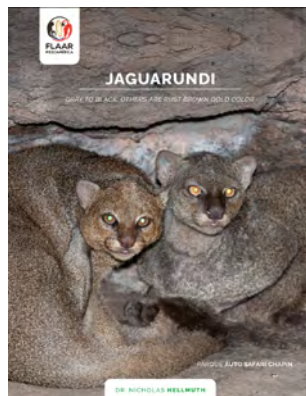
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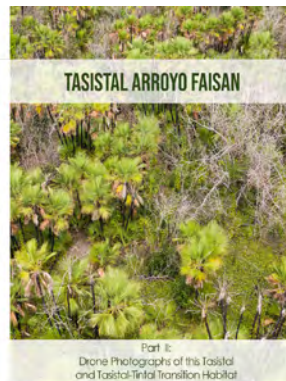
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