

# Mysterious Island of *Thalia geniculata*

## in the middle of the Savanna East of Nakum



**Part II: Why is this an “Island”?**

Parque Nacional Yaxha, Nakum and Naranjo  
(PNYNN) Reserva de la Biosfera Maya (RBM)  
Peten, Guatemala

**Nicholas Hellmuth**

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**Nicholas Hellmuth**

FLAAR (USA) and FLAAR Mesoamerica (Guatemala)

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A donation during November 2021 to help cover the costs of FLAAR research projects specifically to assist and support the current FLAAR project of flora and fauna in the Reserva de la Biosfera Maya (RBM). This donation is also assisting the FLAAR (USA) and FLAAR Mesoamerica (Guatemala) research project in the Municipio de Livingston area of the departamento of Izabal, Guatemala.

This donation is from a family in Chicago in honor and memory of botanist Dr John D. Dwyer, who worked in many areas of Mesoamerica, including in the Yaxha area in the 1970's while the site was being mapped by FLAAR.

This donation is also in recognition of the urgency and need for conservation of both wildlife and rare plants in the bio-diverse ecosystems of the Reserva de la Biosfera Maya (RBM) of Guatemala. Parque Nacional Yaxha, Nakum and Naranjo (PNYNN) is one part of the over 5 million acres of the RBM.

## Ecolodge El Sombrero

I thank Gabriella Moretti, owner of Ecolodge El Sombrero, for providing hotel room and meals while we have been doing field work at Parque Nacional Yaxha, Nakum and Naranjo. We also appreciate the hospitality of her sons Sebastian de la Hoz and Juan Carlo de la Hoz. 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 Yaxha, Nakum and Naranjo.

Equally crucial is having a place to charge the batteries of the computers, plus all the cameras, and recharge all cell phones. Solar power is great, but it lasts only an hour, or less, if you plug in multiple computers and cameras and flash batteries to charge. So a place with enough electricity to charge the entire mass of essential field work equipment is essential and thus very much appreciated.

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 Internet is also provided by the Ecolodge El Sombrero.

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## Why is there a bio-diverse botanical “garden of paradise” creating an island in this savanna?

I first learned about this savanna through Satellites.pro in late 2018. In early 2019, with the assistance of IDAEH and CONAP park rangers, we hiked all the way to this savanna east of Nakum several times (February, March, and May).



The savanna is the “clay colored ground” area at the upper right. The hill forests occupy the upper 50% of this aerial photo. The tinto and bajo vegetation occupies the lower diagonal half of this photo. The tinto and bajo vegetation is south, west, and to the east of the savanna; this bajo reaches near Nakum (which is a kilometer to the west, off the map).

The open space at the far far left is an aguada. In 2006, a really dry year, it lacked most of the vegetation. We carried out photography of this aguada on November 17, 2021 and it was filled with vegetation as it was a wet month.

Nakum is a 20-minute hike from the aguada (to the west).



You can see a bright green edge to the right top edge of the savanna. This is because there is often more moisture around the edge of most savannas. You can notice the entire southern half of the savanna is "charcoal gray" (2006 was a dry year, making it easier for intrusive hunters to set the grass and palms on fire to drive the animals in one direction so the hunters know where to shoot them).

The biodiversity is typical for a savanna within Reserva de la Biosfera Maya, however, what is unexpected, is the "island" in the middle. It looks like a bird eyeball (with the beak being the diagonal area to the right). That is where the geological fault is up on the hill, coming down to the level of the savanna.

This aerial photograph shows that the inner "island" is surrounded by an open area with almost no trees. On our page 52 you can see that the grass in this area is dark green; most of the grass in the "island" is dead color. The *Thalia* area is green.

I consider all the "white trees" in the IGN aerial photograph are trees with leaves have been burned off, so you just see the dead white branches, many of which will sprout back after the next rainy season (about 5 to 10% of the *Crescentia cujete* or jicaro trees will not survive, thus, 90 to 95% do survive).

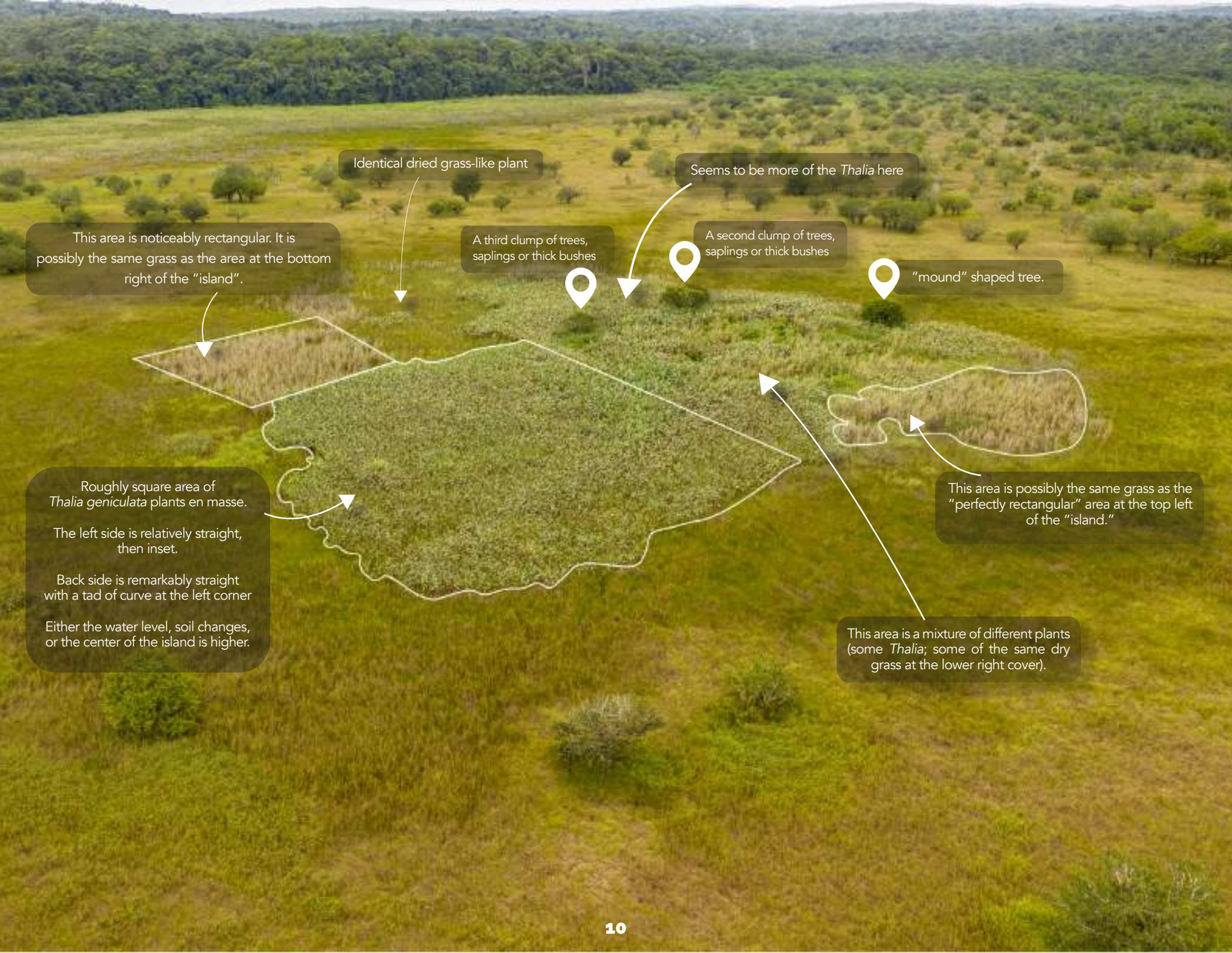
IGN aerial photograph from 2006, 23674\_23\_OR\_T\_RGB, cropped to show the complete savanna.



Satellites.pro image

The savanna and the island are different every several months of every year due to the different rainfall patterns. This image clearly was taken when there was adequate moisture (more than the IGN photo from 2006).

Our drone photos (that we show later in this report) were taken on November 16, 2021, after four days of rain (it also rained a bit the day we arrived and poured rain on us the last hour of our hike back to Nakum base camp). Prior to the four days of rain, it had not rained much this year. Therefore, although it was not a “dry year” it was not a super wet year either.



Identical dried grass-like plant

Seems to be more of the *Thalia* here

This area is noticeably rectangular. It is possibly the same grass as the area at the bottom right of the "island".

A third clump of trees, saplings or thick bushes

A second clump of trees, saplings or thick bushes

"mound" shaped tree.

Roughly square area of *Thalia geniculata* plants en masse.  
The left side is relatively straight, then inset.  
Back side is remarkably straight with a tad of curve at the left corner  
Either the water level, soil changes, or the center of the island is higher.

This area is possibly the same grass as the "perfectly rectangular" area at the top left of the "island."

This area is a mixture of different plants (some *Thalia*; some of the same dry grass at the lower right cover).



This is an enlargement from the Satellites.pro photograph. As you can see the resolution is not high enough to see much detail. But I have been studying this island for so many hours, days, and weeks that I can see all three of the trees that we noticed in our November 2021 visit.

It would be a tremendous help if an individual, a family, a research institute, or a company could donate (tax deductible) funds so we can obtain a 100 megapixel Phase One iXM digital aerial UAV camera with a special DJI M600 drone to fly this high-resolution camera. Two interchangeable auto-focus lenses are needed (they are made specifically for aerial photography with this camera with this model of drone).

We have an experienced drone pilot to fly a drone of this quality.

#### **Caption for previous page (p. 10)**

This aerial photo with the FLAAR drone shows how much it helps to have a drone for botanical and ecological field work research. The same photo but without the captions and outlines is on the “back cover” of this report.

Our DJI Mavic 2 Pro drone is licensed and is registered with the park administrators and it is appropriate when you request permission, in advance, to indicate where and what you will photograph (ecosystems and plants) and where you will not fly the drone (over the top of a pyramid or acropolis).

It also helps to have a full-time experienced drone pilot. This means an individual whose job is to fly drones (not just to occasionally fly them). Haniel Lopez is capable and experienced with several models of DJI Mavic drone.

We hope an individual, a company, or a foundation can facilitate having allowing our project to have a 100 megapixel quality drone camera in the future: Phase One iXM medium format camera with DJI M600 drone and two special iXM lenses. We need to be able to photograph each individual plant so that more plants can be identified by botanists by the details of its leaves and overall appearance.



Google Maps satellite views are not adequate due to the vertical lines that cut through more than 50% of the maps I have reviewed. We had to dedicate time and patience to correct this image in Adobe Photoshop or Adobe Lightroom.

It really helps to have all three views: IGN, satellites.pro and Google Maps satellite view because each one documents the difference in the vegetation depending on whether photographed in a dry month of a dry year or a wet month of a wet year.

My dream is to find a way to photograph this savanna from the air when it has lots of water over its entire surface. That way we can document that these really are seasonally inundated. But at least in November 2021 we had water all over our shoes or boots as we hiked through the middle of the savanna, but rarely over 15 centimeters deep and usually just 2 to 5 cm deep with other areas with no surface water whatsoever.





At this scale “what you get is what you see” as there is not enough resolution.

This is why a 100MP Phase One iXM camera with its special lenses (made just for this drone camera) will be the breakthrough for our documentation on this “mysterious island of biodiversity.”

The “light gray” clump at the left and bottom I believe are two of the three trees at the west side of the island.

Notice the diagonal green area at the left (the “green walkway”). LiDAR technology is needed to ascertain what aspects of this savanna were utilized by the Preclassic and Classic Maya.

Note the gray-brown areas, with no plant remains whatsoever. Either they got flooded out at the height of the rainy season, or incinerated when intruders set fire to the grass that is dry in the dry season.

The “white trees” are probably *Crescentia cujete* calabash trees that were burned during the yearly fires and got so burned they did not resprout as did their neighbors (that are bright green even in the dry month).

## All aerial photos are obviously north at the top, All our photos are from the west

We need to accomplish drone photos straight from above, not only from a diagonal perspective. The series of diagonal photos from November 2021, that we are making available here, are a view of this savanna. However, as we learn from our experience, we will do photos from straight above looking straight down.

Also, it is essential to have these photos from above of the north at the top so we can compare them with the satellite photos.

## Showing where the Island of *Thalia geniculata* is located in the Savanna East of Nakum

Since Nakum is closer than Naranjo, the best route to access this savanna is from Nakum. On all of our visits we have hiked over the hills and then down the geological fault line; however, from local people and from tour guide and organizer (Sebastian de la Hoz), we learned there was a shorter trail: from Nakum through the foothills parallel to the bajo. Curiously, this trail does not go through the bajo itself (so I doubt it would have surface water most years), instead this trail goes through the low hills along the north side of the bajo.

As we entered the savanna about 50 or 80 meters west of the giant *Ceiba pentandra* tree, we only explored this sector of the savanna. It was not realistic to reach the southern or southeastern area of the savanna because it takes six hours to get there-and-back (3 hours each way and 1 hour for lunch which means 7 hours of your day are wasted). In November, with low water in the middle of the savanna, there was no way to get by boat to the other side of the island of *Thalia geniculata*. The location of this savanna can be seen in the following photos.



## How to reach this savanna

There is a trekking trail from Yaxha to Nakum, then to the savanna, then to Naranjo Sa'al ruins. Essential to have experienced guides and light no camp fires anywhere near a savanna. Sebastian de la Hoz (Ecolodge El Sombrero) has experience leading trekking groups. So if you like hiking out in the rain forest and seeing these remarkable open savannas this can be a memorable experience. I am 77 years old and I still hike up to 19 kilometers a day when necessary to reach whatever unstudied ecosystem I am keen on learning about.

Do not try to hike alone. A German tourist tried to wander around by himself at Tikal National Park and was found deceased several days later. I have hiked through areas of Peten, Campeche, Quintana Roo, and Belize for over 50 years, but always with local guides. And nowadays we have portable Garmin GPSMAP equipment so we know where we are (and we can document our route to the park administrators). Be sure you have extra batteries for your Garmin and the necessary local maps pre-loaded. We have a full-time in-house GPS mapping person on every field trip (plus several local guides).



The island is in the middle at the left. You can see that its sides are often straight; the angle at the bottom left is very sharp.

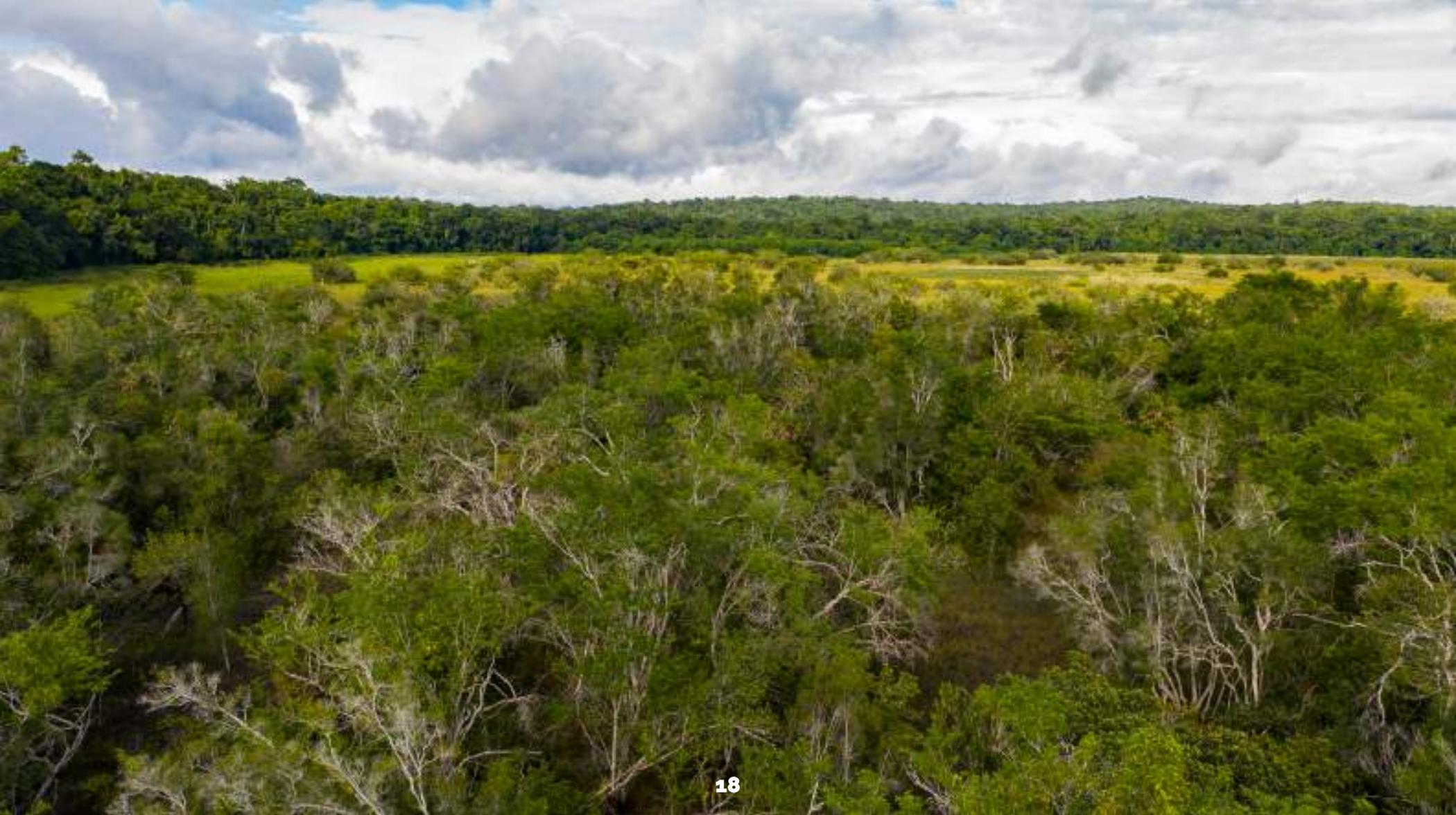
The thick forest at the back varies from bajo to low karst hills, with higher hills in the background.

The scattered trees diagonally up and down the middle are mostly *Crescentia cujete* with some tasiste palms. Not much nance.

The thicker vegetation to the right is the transition from the savanna vegetation to the bajo vegetation (so it includes occasional palo de tinte, logwood trees). At the far right the Bajo la Justa starts and continues to the area between Yaxha and Nakum.

FLAAR DJI Mavic 2 Pro, piloted by Haniel Lopez, FLAAR Mesoamerica.









## From above showing *Thalia geniculata* leaves

The only drone photos from above were of the leaves of the *Thalia geniculata* mass (and tasiste and jicaro trees in the transition to the tinal bajo at the west edge). In the future we need to show everything from “high above” so you can see everything straight down; then lower the drone itself down to photograph each different plant area within the island.









## Front area: Like a wall of Green Vegetation

I first saw the island while observing across the savanna after hiking a hundred meters into it. My eyes noticed a raised row of green plants that stood up like a solid fence. As I got closer I could see that a single plant species was creating this “solid mass” or “wall” of vegetation, the *Thalia*, of course mixed with some grasses.

The question for other scientists such as edaphologists, botanists, and archaeologists is, why is this “wall” so regular? Why are these plants not growing on the other side? What is in the ground that causes a grassland savanna to turn into a *Thalia* upright leaf island?

In order to enrich the documentation we need to accomplish two things with the drone:

- Take overhead photos of the entire island (whole island in some photos and segment by segment in others)
- Get a drone with significantly higher resolution so we can more easily recognize each plant species

We also need to accomplish a third task ourselves:

- Hike to all sides of this “island” to identify each species of plant (and the three trees).























**Front area right corner,  
dried grasses area**







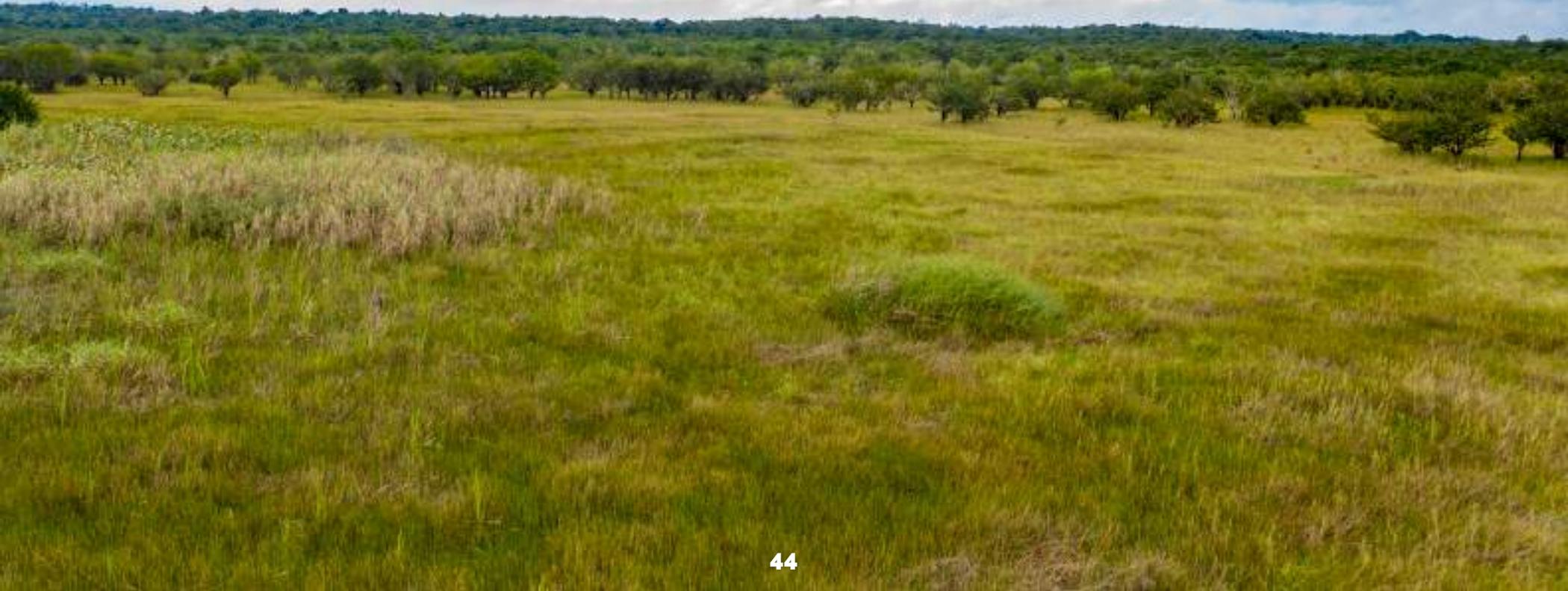








**Green Clump of Vegetation**  
**about 10 meters in front of the Island of *Thalia geniculata***







**Back Area**





At the left there is a rectangular area of dried grasses, reeds, sedges or similar plants and at the top left there is an identical color. On the other side, at the top right, is an irregular area of most likely the same dried plant, however, the color is different from the front right area. If there are different amounts of water and different soil conditions, it could be the same plant but in different phases of drying out. The *Thalia* varies noticeably in color and in the degree that some leaves are dried brown.

When you see the back area from the air, it looks like a modern agricultural field with different plants in each rectangular area. However, there is NO agricultural use of this savanna that is noticeable whatsoever. The straight lines that seem to be agricultural related are actually the result of different materials and/or water concentration. These different materials may be from additions or subtractions from thousands of years ago when there were substantial populations of Classic Maya on all the hills surrounding this area. LiDAR technology is rather obviously needed to explore PNYNN.

## Back Area showing the three green tree areas

There are three dark green treetops clearly visible in all our drone photos of the island. Most likely they are *Crescentia cujete*, jicaro trees, however, most of the documented *Crescentia* trees are all higher. The crown of the three trees in the island are low.

Whatever species the trees are, they could each be an individual tree, or two of the treetops that are next to each other could be one tree (especially for the one in the middle; the one at the far left looks more likely to be a different tree).







Here you can see the three isolated trees or tree groups in the edge of the island. It takes so long reach the savanna, then to hike into the savanna and then to reach the island, that we have not yet had time to hike to this southern edge to photograph the trees to find out what species they are. It takes three hours to hike back to the base camp at Nakum, so unless we camp overnight so we can work the entire next day, or unless the foot trails can be cleaned, there is not much time to explore each remarkable area of this biodiverse seasonally inundated savanna ecosystem. But at least we can provide these photos that we were able to take to the park co-administrators and show the world the importance of PNYNN within the Reserva de la Biosfera Maya.

We hope our panorama photographs can encourage botanists, soil scientists, geologists (especially to study the adjacent fault line on the nearby hill), and ecologists to request permits to explore these savannas in depth. But LiDAR is essential, to show what parts of this immense area were modified by the Maya thousands of years ago.

## Essential Next Steps

So far, this is the most biodiverse and virgin savanna I have yet seen; it has not been bulldozed to make pastures for cattle or turned into a landing strip for illegal flights. However, this savanna is burned by poachers about every two or three years. It is amazing how the savanna plants have learned to regenerate from fire:

- Tasiste palm can withstand incineration; it resprouts
- *Crescentia cujete* trees, jicaro, are decades old (albeit with trunks scared from fire)
- Nance apparently gets “burned to the ground” but resprouts.

Palo de tinte, logwood, *Haematoxylum campechianum*, is the only tree that seems to be totally destroyed by the fire, you see dead branches and dead trunks with charcoal around their edges.

To keep the fires down:

- Improve the livelihoods of local people by training them to become guides for trekking and/or glamping tourism. Glamping or “glamorous camping” is camping in a comfortable way, with great food, chairs to sit on and comfortable sleeping, but surrounded by nature. A glamping area in this region could be implemented in the bajo (so outside the savanna area).

- If local guides from local villages are able to earn money from trekking and glamping tourism (or avi-tourism and eco-tourism), they will promote awareness among their local neighbors and/or relatives regarding the destruction of the ecosystems and killing too many wild animals. The guides and tourism assistants will also establish new goals of conservation.

Trekking is aimed at people of all ages and glamping is aimed at people who like to hike but at the end of the day prefer to have basic comforts and services. For both activities, it is essential that the trail from Nakum camp to the savanna is not obstructed with giant fallen trees. This trail does NOT help poachers (illegal hunters from the eastern areas of the park).

Every time a tree falls down during a rain or wind storm, local people clear a new trail AROUND the fallen tree, which results in 20 to 35 saplings, vines, and bushes being chopped down. It would be better to cut a tiny gap across the fallen tree so that the trekkers and glampers can hike the trail more comfortably and it would allow the guides to use the time more efficiently). But clearing trails needs permission, so we are not cutting through the dead fallen trees at all.

## Appendix A

Savanna East of Nakum seen via Google Earth Engine, Google Earth Timelapse

Surely there are better quality images from other satellite websites, but the one I can reach the easiest is Google Earth Timelapse

1984: too many clouds

1985-2000: not enough resolution to notice much

2001: the island is very visible as is a very dry area to the left (to the west) within the savanna

2002-2005: island visible

2006: very dry year, very different surface appearance

2008: bizarre, black as charcoal

2009-2020, island more or less visible each year

There is no evidence of any invasive agriculture here from 1984 to 2020 and none for year 2021 from our visit.

