Tasistal Ecosystem, Savanna #24

Seasonally Inundated Wetlands of Southeastern portion of Parque Nacional Laguna del Tigre (PNLT)
Reserva de la Biosfera Maya (RBM)
Peten, Guatemala

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Nicholas Hellmuth
FLAAR (USA) and FLAAR Mesoamerica (Guatemala)April 2022

APPRECIATION FOR ENCOURAGING THE RESEARCH PROJECT

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GUIDES FOR FAR EAST-SOUTHEAST AREA, March 29-April 2, 2022

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Julio Trabanino

GUIDES AND EQUIPMENT PORTERS FROM PASO CABALLOS DURING RESEARCH IN PNLT, March 29-April 2, 2022

Leonardo Cucul
Juan Carlos Col
Gonzalo Caal
Jeronimo Cuc

We appreciate a donation during November 2021 and a follow-up donation in June 2022 to help cover the costs of FLAAR research projects specifically to assist and support the current FLAAR project of exploring remote areas to find and document flora and fauna in the Reserva de la Biosfera Maya (RBM), Peten, Guatemala.

This donation is from a family in Chicago in honor of the decades of botanical field work of botanist Dr John D. Dwyer, who worked in many areas of Mesoamerica, including Peten.

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) and Parque Nacional Laguna del Tigre are the first two parts of the over 5 million acres of the RBM where we have initiated field work in 2021 and 2022. In July 2022 we initiated field work in cooperation and coordination with the biologists of PANAT at Tikal to study epiphytic plants (orchids, bromeliads, cacti, ferns that grow high up in tres) plus other biology topocs of mutual interest and importance to document. Photographs are donated to the park admistrators. Contact sheets are being prepared to also donate to CONAP and to the park administrators.

Credits

The helpful individuals listed below are part of the FLAAR Mesoamerica research and field work team. The office research team is additional individuals in the main office in Guatemala City.

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Contents

Introduction to Savanna #24 of Parque Nacional Laguna del Tigre

Using Satellites.Pro it has been possible to locate 35 grassland savannas, high sawgrass savannas (cibales), savannas of solid tasiste palm (tasistales), and marshes in the far southeast part of Parque Nacional Laguna del Tigre (PNLT).

Next step is to register all these with the park administrator and CONAP's office in Peten. Then we will work with the park rangers to figure out how to reach each savanna. In past field trips, (2021 and 2022) we reached Savannas #3, 4, 5, 6, 9, and 10. Also with our drone we have seen Savannas #1 and #11 from the air but so far only our trail clearing team has reached these two (they have also prepared trails to Savanna #12 and a few others).

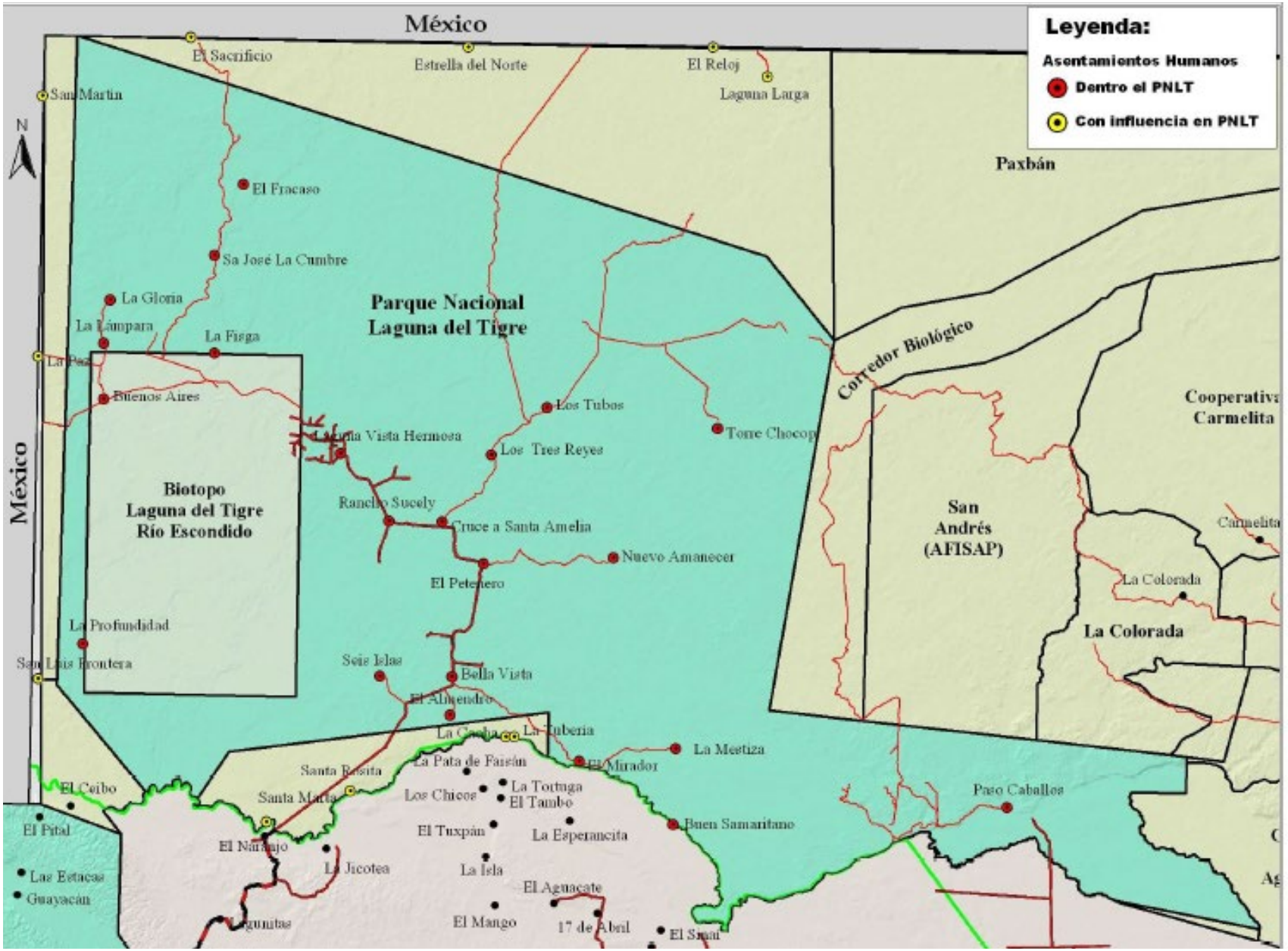
None of these savannas, that we are aware of, have been visited, studied, or published before FLAAR found them on satellite photos. All the local people and park rangers say that no research team has done field work in this area. The main reason for this is that 90% of the field work on flora, fauna, and ecosystems is done by teams based in the comfortable Las Guacamayas station. My first four or five visits to PNLT were all based by staying at this comfortable facility constructed by Nini Berger to help protect nearby guacamayas. I would enjoy staying here for many days, , however, as our interest is finding savannas that have not previously been studied. Thus, any savannas near Las Guacamayas, or reachable by lancha along the Rio San Pedro, will already have been studied. Therefore we stay about 11 kilometers southeast, at the far away entrance of the park and our field work is in areas even further way.

How to get to Savanna #24

In theory you could drive to Rio Sacluc (north of a private hacienda), then hike to Savanna 26 and then hike left and finally north. Nonetheless we did not yet have a trail from Savanna #23-25 up north to Savanna #24.

The other option is to hike east from the camp, using the trails we had improved from those already existing. Then turn southeast to reach Savanna #13, continue to Tasistal Savanna #14, then used the trail cleared by our trail preparation team (Byron Pacay of FLAAR Mesoamerica plus local Q'eqchi' Mayan people from Paso Caballos who have been helping us each field trip).

All trails are shown on our GPS MAPS.



To reach the biological research station Las Guamayas first you have to drive lots of kilometers to reach Paso Caballos. There, you park your vehicle (there is a safe place to do so) and go by motorboat to Las Guacamayas. Traveling by river is very expensive (renting the boat and buying fuel). The bungalows are a very comfortable place.

Map source: Consejo Nacional de Áreas Protegidas (CONAP). PLAN MAESTRO 2007-2011. Parque Nacional Laguna del Tigre y Biotopo Laguna del Tigre-Río Escondido.

GPS map from our Garmin model GPSMAP 66i by Byron Pacay.

We will have a 2nd edition of this report that will show the timeline. By knowing where we were each hour we can tell where each photograph was taken.

The campamento is at CONAP's camp on the southeast entrance where the dirt-gravel road reaches the park. Paso Caballos is further north then west. The water in this satellite photo is Rio Sacluc. Every stream in this entire area is named Rio Sacluc. But I am not yet convinced they are all the same river.

Reaching Savanna #24 was a totally unexpected opportunity

For our field trip during March 30-April 2 we planned to reach Savannas #1, 2, 7, 8, 9, 11 and 12. Savannas #11 and #12 are the largest and most biodiverse habitats of this area, so I was really keen to reach these. However when we arrived at the base camp the evening of March 29, we learned that park rangers had their own trails to reach Savannas #25 and #26. The days before a fire had been set by proachers in Savanna #30, thus the park rangers had gone to inspect the size and spread of the fire. After discussing these tasistal areas with Julio Peña, and Mario Mazariegos, CONAP's technicians, I realized that this was a unique opportunity to explore them. So I cancelled the area of Savannas #1 through 12 and switched immediately to Savannas #25, 26, 30 and thereabouts.

Nonetheless, the only way to get even near these savannas was to have a modified pickup that has been lifted by a pickup truck outfitting shop. There are thousands of these lifted pickup trucks all over Guatemala, specially used in fincas or haciendas you will have one or more of these specially outfitted vehicles. Byron Pacay knows lots of the people in Paso Caballos so was capably and helpfully quickly able to find and rent a lifted 4wd pickup to help us the following days. Byron speaks Q'eqchi' Mayan and works with the local people every field trip to reopen and clean up trails that have grown vines, branches, and other obstacles that make them impassible.

On March 30 and 31st and April 2nd we went to the really distant tasistal savannas. On April 1st we hiked the many kilometers to Savanna #24. As not even a lifted 4-wheel drive pickup can get anywhere near it is exhausting to hike these distances in 40 degrees Celsius (about 104 degrees F) and since the route goes through Savannas #13 and #14, it was possible to do more aerial photos with the licensed drone of FLAAR and more panorama and macro photography at ground level.

PNLT, Savanna # 13. April, 2022. Photo by Edwin Solares.

It was especially entertaining to see all the baby crocodiles floating in a water lily pond in the middle of Savanna #13. We have lots of close-up photos (fortunately mommy and pappi crocodile were nowhere to be seen).

Photo by Edwin Solares, April 1, 2022.
Camera: Sony A1 mirrorless with in-camera stabilization.

This is the area of Savanna #13 with the most *Crescentia cujete*, calabash trees, morro. Every 60 meters the habitat changes (as we will show in a forthcoming FLAAR Report on this savanna).

Aerial photo of Savanna #13. April 1, 2022.
Photo by our pilot and photographer Haniel Lopez.

Panorama showing widely spaced *Crescentia cujete* calabash trees, morro. Some of the morro trees are bright green all over; others have white branches with almost no leaves. This means they were burnt in recent fires and are barely surviving. In this part of the savanna there is no tasiste palm nor guano palm. 99.9% of all other savannas in Peten that I have hiked through do not have *Sabal* species of palm. I was quite surprised to see several guano palms in this savanna. How the trees survive the burning is a good question for ecologists. Are the guano palms in a wet area of the savanna (that does not get hit by the nearby fire) in the rest of the savanna? I am not yet sure of this assumption because there is grass everywhere and the guano palms are not next to pools of water. Thus this may also be an issue of the type of soil is in each part of the savanna (and what alterations the Classic Maya may have made in certain areas thousands of years ago).

Lots of diverse sedges and grasses. In the background is the surrounding bajo forest vegetation.

All this area is seasonally inundated and within Savanna #14 there are several ponds that have water “permanent enough” that *Nymphaea ampla* grows in at least one of the ponds (the pond with the baby crocodiles). There are no alligators in Peten; only crocodiles, *Crocodylus moreletii.*

Savanna #14 from the ground level. When hiking long distances to reach a distant savanna there is no time to set up a tripod and use one of our Nikon, Canon, or Sony cameras. So on exploratory field trips I use only the iPhone 13 Pro Max. April 1, 2022.

This is part of the tasiste palm area of Tasistal Savanna #14.
Other parts are open grassland. A few *Crescentia cujete* trees are present in the more open grassland areas.

Photo by drone pilot and photographer Haniel López. April 1, 2022.
Camera: DJI Mavic Pro II.

Tasiste palm of a Tasistal Savanna is an interesting and very adaptable plant

Many of the savannas in the southeast area of PNLT are tasistal habitats. A tasistal is an area where between 80% and 90% of the vegetation are tasiste palms, *Acoelorrhaphe wrightii*. In PNLT and PNYNN *Acoelorrhaphe wrightii* grows only in savannas, either grassland savanna or solid tasistal savanna. In the eastern half of Municipio de Livingston, we found *Acoelorrhaphe wrightii* palms only along the edges of rivers or lakes (usually that had brackish water). There are no savannas of any kind in the areas where we spent 17 weeks exploring in this part of the Departamento de Izabal during 2020-2021. It is notable that a palm is so adaptable (to seasonal floods in Peten and to brackish water near the coast in Izabal). The *Acoelorrhaphe wrightii* palms in savannas survive annual burning pretty well. We have not studied river banks possibly burnt in Izabal for milpas, so we do not yet have data on whether these palms sprout back up when cut and burned in a milpa in Municipio de Livingston.

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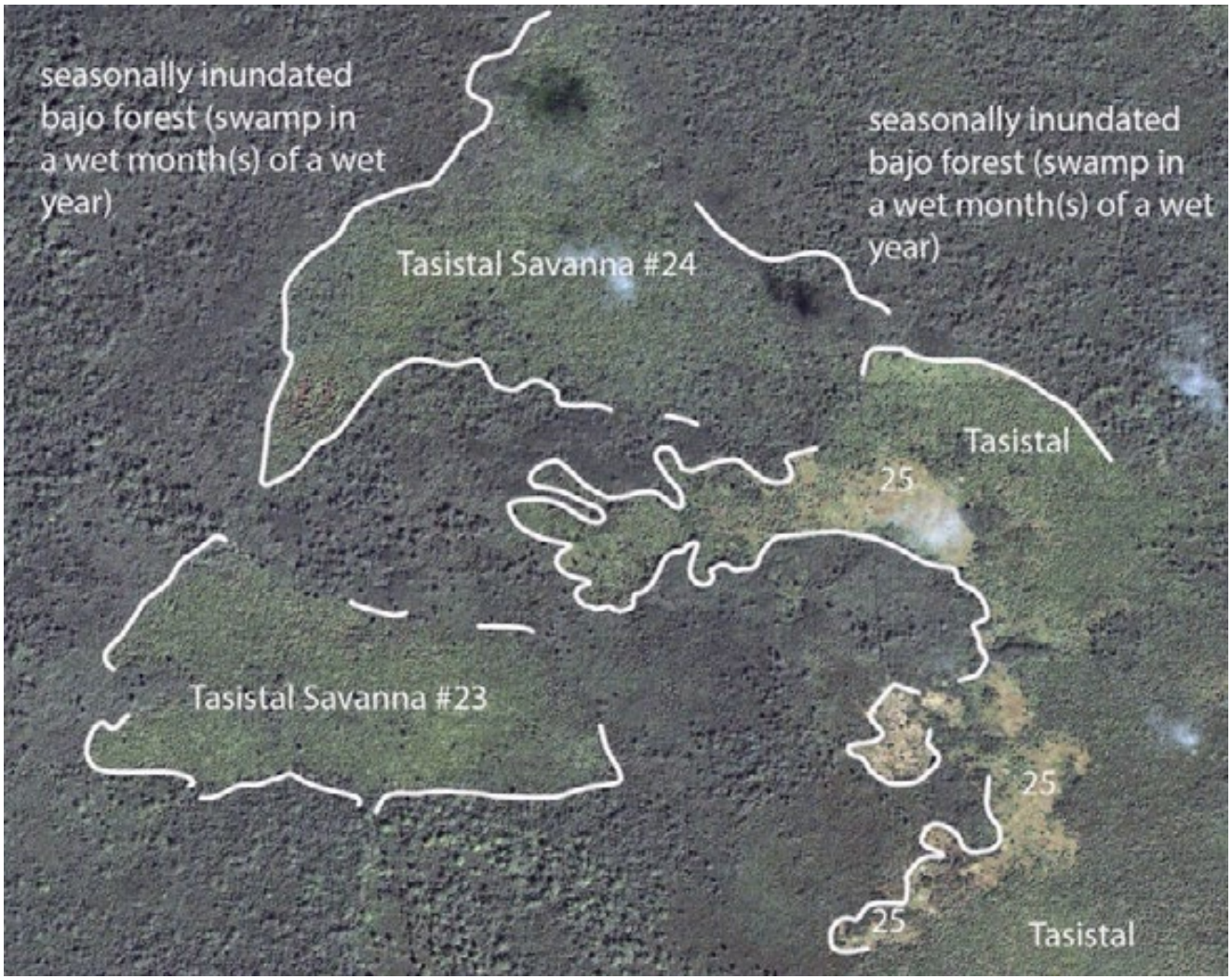
Savanna #24 and its proximity to Savanna #25

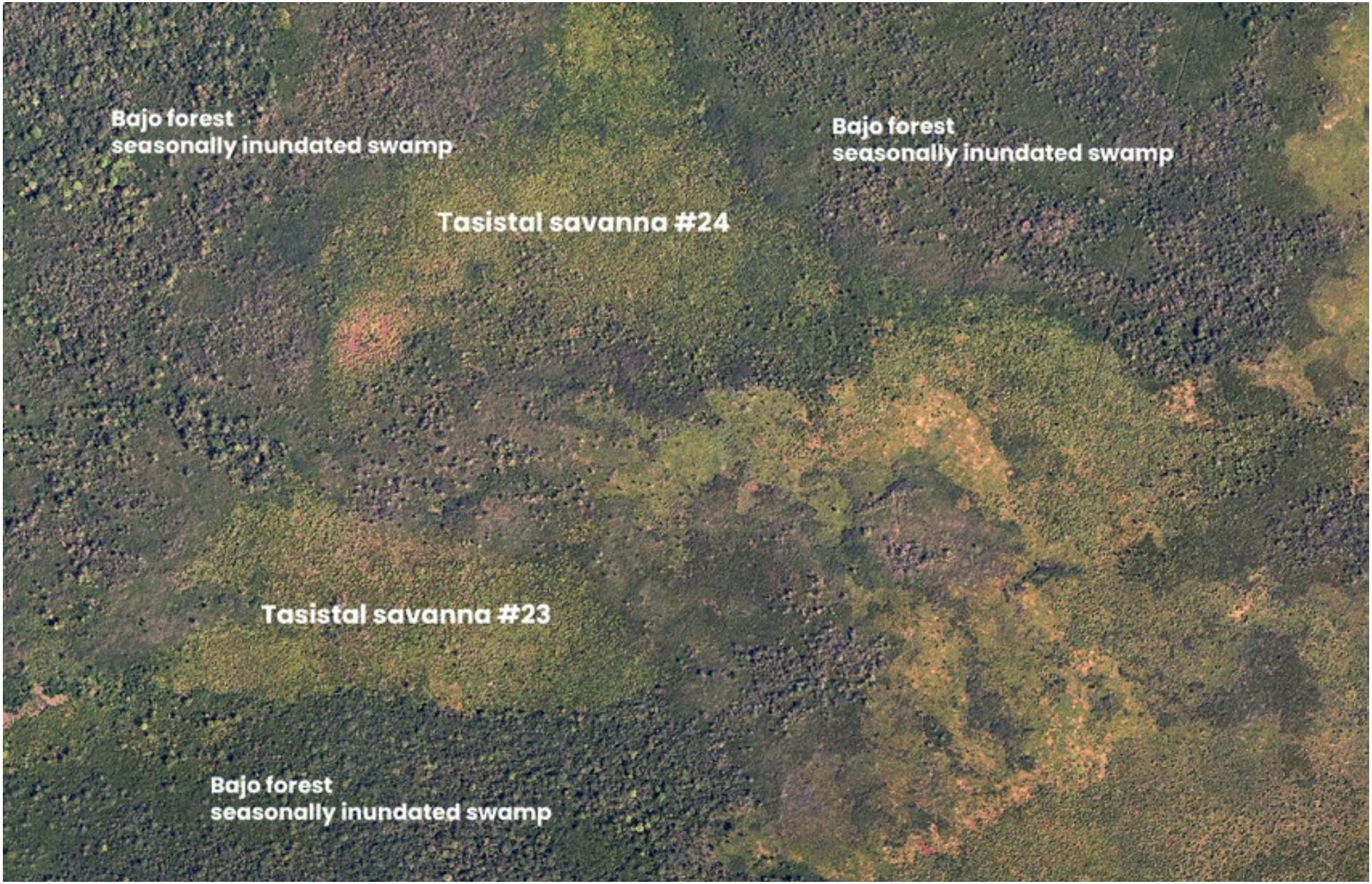
Because of the extreme heat it was not recommended to stay all day and literally roast in the sun. Thus, after arriving at the savanna we did aerial drone photos and then prepared for the long hike back to the base camp.

Tasistal Savanna #24 is not fully visible due to the shadow of the cloud (the cloud itself is over western part of Savanna #25). Tasistal Savanna #24 is triangular in shape (at least at top left). Satellites.pro



In Google Maps, satellite view, you can see Tasistal Savanna #24 a bit better.

Tasistal Savanna #24 could be considered as an extension of the tasistal area of Savanna #25; however, I prefer to keep the two separate. Defining the limits of Tasistal areas of Savanna #25 will be a challenge that we will face when a higher resolution drone is available ,such as the 100-megapixel Phase One (brand), iXM-100 (model) camera with two interchangeable auto-focus lenses and pertinent software (Multi-spectral software, mapping software, Capture One software to process high resolution digital photographs).



Tasistal Savanna #23, #24, Savanna and Tasistal Savanna #25 as seen from this aerial photograph by IGN (Instituto Geográfico Nacional de Guatemala).

Savanna #24 as seen from the air (with FLAAR drone aerial photography)

The photos showed here are the first aerial images of these remarkable ecosystems within this previously unexplored area of Reserva de la Biosfera Maya. We donate all these drone photos to the park administrator and to CONAP, thus, have permission to use them in their own reports, their next Plan Maestro, in lectures, etc.

The photos were taken with the FLAAR drone, a DJI Mavic 2 Pro, which is better than any GoPro and better than most other DJI cameras. We have been trying to get the DJI Mavic 3 cine but it is unavailable in Guatemala and not really available in the USA. Besides, the Phase One iXM would be 500% higher resolution.

Wide angle view of the tasistal part (in the middle) and the bajo vegetation all around it. This tasistal has quite a number of different tree species, taller than the tasiste palms. This raises the question of whether this tasistal has been burned intensely, since it is unlikely these tall trees would have survived. In the far far left background you can see an open low grassland savanna.

A helpful view to show the transition zone between the tasistal (bottom and right) and the adjacent seasonally inundated bajo forest at the left and above. All of these areas have standing water above the surface during a wet month of a wet year. In a dry month of the dry season the soil is so dry it is cracked open. El Peñón de Buena Vista is in the background. We will study that area this coming year.

The bajo forest is in the center and at the top right of the picture. The trail through the tasistal is at the bottom right.

El Peñón de Buena Vista can be seen in the background.

Burned part area in the Southern part of the Tasistal Savanna #24

In this area there are about 60 black palm stems, burned black. These stems no longer have leaves (however, the root mass sprouted up again). Yet there are other trees on both left and right that are not burned.

We need to learn why those trees don't get roasted and toasted and what species they are).

In the background (especially the right half of the top) you can see a high bajo forest.

Other photos have been at a diagonal angle; this photo is slightly more taken down. This area of the tasistal has hundreds and hundreds of black burned tasiste palms (especially in the middle and left sides). The slightly open area you see is one of the trails that leads through this tasistal.

Closer view of the area that was burned most likely the previous year.

I took this panorama photograph from the top of a 3-meter high ladder. You can see a lot more at this height than from the ground. The iPhone 13 Pro Max is perfect for doing panorama views of habitats. Here you can see the burned black stems of the tasiste palms; lots have resprouted from above but most have sprouted up from the root mass below ground.

[redacted]

A closer view of the transition zone: tasistal in the lower center and the bajo forest at left and across the top.

Transition Zone: The Bajo Forest encroaches or Tasistal Palms expand their area?

The tasiste palms are bursting with fresh green color (even though it has not rained recently). On the other hand, the tree species of the surrounding bajo forest are not bright green on top, therefore, you can easily see where the bajo forest is.

The tasistal area meanders to the far right. The taller trees of the surrounding bajo are easy to spot. While the tasiste palms interweave into the bajo forest. Or is the bajo forest encroaching the palm savanna? It would be helpful to have several PhD dissertations and ecological projects addressing this topic (there are around 35 savannas here and over 61 located less than a hundred kilometers to the east: thus, enough to study and explore).

What is needed for this project is: the 100-megapixel medium format Phase One iXM UAV camera for an industrial-strength DJI M600 drone. Then what if our team had 8K displays on their wall, so they could enlarge the 100-megapixel aerial images and study every square meter and see the details of every different species of tree?

An Open Grassland surrounded by thick clusters of Tasiste Palm

Many “solid tasistal savannas” actually have open grassland areas. Tasistal Savanna #14 has solid tasiste in some parts and wide open low grassland in other parts. Here is the small area of the south/southwest of Tasistal Savanna #24 that has open space with low grass.

This is the northern end of the open grassland. We show all the other areas on the following pages.

The entire lower half was burned more than the upper half; you notice the hundreds of blackened tasiste stems in the bright green clusters of tasiste palm in the lower half. This may be due to the open grassland, since dead grass spreads a fire quickly.

This open grassland aspect, to me, indicates that a "Tasistal" can acceptably be considered a "palm savanna." I would not be surprised if international experts in ecology around the world opt for different classification jargon. However, the open grassland here is a savanna, and savannas of the RBM of Peten have tasiste palm.

Note the palms clustered there are almost no individual palms. This is because a tasiste palm rises from a root mass that can grow between 8 and 12 (or even more) stems.

Low grass savanna area at the lower left. The bajo forest of many different kinds is on both sides of the tasiste areas.

During April, the height of the dry season, a noticeable percentage of the tall trees in the bajo forest have no leaves.

This photo shows another 60 to 80 meters lower than the previous photo. The trail is also visible.

This diagonal lower area is different than the tight bright green clumps of tasiste palms in the upper part.

The oval area encircled in white is the open area of the previous photographs.

Once you spend day after day, week after week, analyzing savanna after savanna, you can recognize different features (specially if you have been hiking through these same savannas for several months).

It is good to look a 32-inch 4K HDMI monitor and a close up on the adjacent 32-inch monitor.

Unfortunaly, the resolution from Google Maps satellite view is not very good.

Same area as seen in the aerial photograph 21671_17_ORT_RGB. from 2016, Instituto Geográfico Nacional. It would be helpful to have satellite and aerial photos from different years to create a timeline of the area (I estimage Google and Satellites.pro images are a decade older than the IGN)

I quickly noticed that most of the tasiste palms are in round shapes. These are not individual palms; these are clusters or clumps that rise from one single root mass. Often, there are several root masses near each other.

Surely there are satellite photographs of higher resolution than those of Satellites.pro or Google Maps satellite view.

However so far, the best resolution that we have seen are from IGN. Nonetheless, the digital technology of 2022 is definitely higher resolution than that of 2006. This is why the Phase One, 100-megapixel iXM camera, with interchangeable lenses, and special software, will enable us to show the savannas (and surrounding bajos) at a quality never before seen.

The FLAAR (USA) and FLAAR Mesoamerica (Guatemala) team are in the middle of this photograph. This is all the more proof that the open area is indeed the lower (southern) western part of Savanna #24, since the entrance trail comes from Savanna #14 to the west. We reached only the bottom left 5% of the savanna.

Thus, we have a lot more of this savanna we need to hike to, especially the even more open area at the far lower right which is part of Savanna #25.

It is helpful to have photos from above and photos from lower (and at a diagonal angle) to show the meandering aspect of this open grassland area within the savannaln the lower half of this photo a hundred or more tasiste palms have been burned a previoius year.

At this angle you can see how much taller the trees of the bajo forest are (trees of hillsides are even taller).

Final view of a old growth forest in the Maya lowlands of the RBM

All Mayanists are familiar with seasonally inundated bajo vegetation, however, a better tabulation of the different kinds of these bajo areas is needed. For example, here in this part of Parque Nacional Laguna del Tigre there is no palo de tinto (palo de Campeche, *Haematoxylum campechianum*.

The transition zones between a bajo and a savanna depend on soil, elevation, and whether the savanna is sawgrass, low grass, tasistal or other mixture of diverse plants. Many savannas have permanent lagoons or at least pools of water the entire year. Other savannas have pools of water that dry up during a really dry month of a dry year (the *Nymphaea ampla* pool with the dozen baby crocodiles, Savanna #13). A noticeable percent of the 65 savannas of Municipio San Jose have pools of water (each savanna has such pools of different depth, size and shape). With the ongoing field work cooperation project, in collaboration with CONAP, we hope to collect a huge amount of information regarding flora, fauna, and ecosystems.

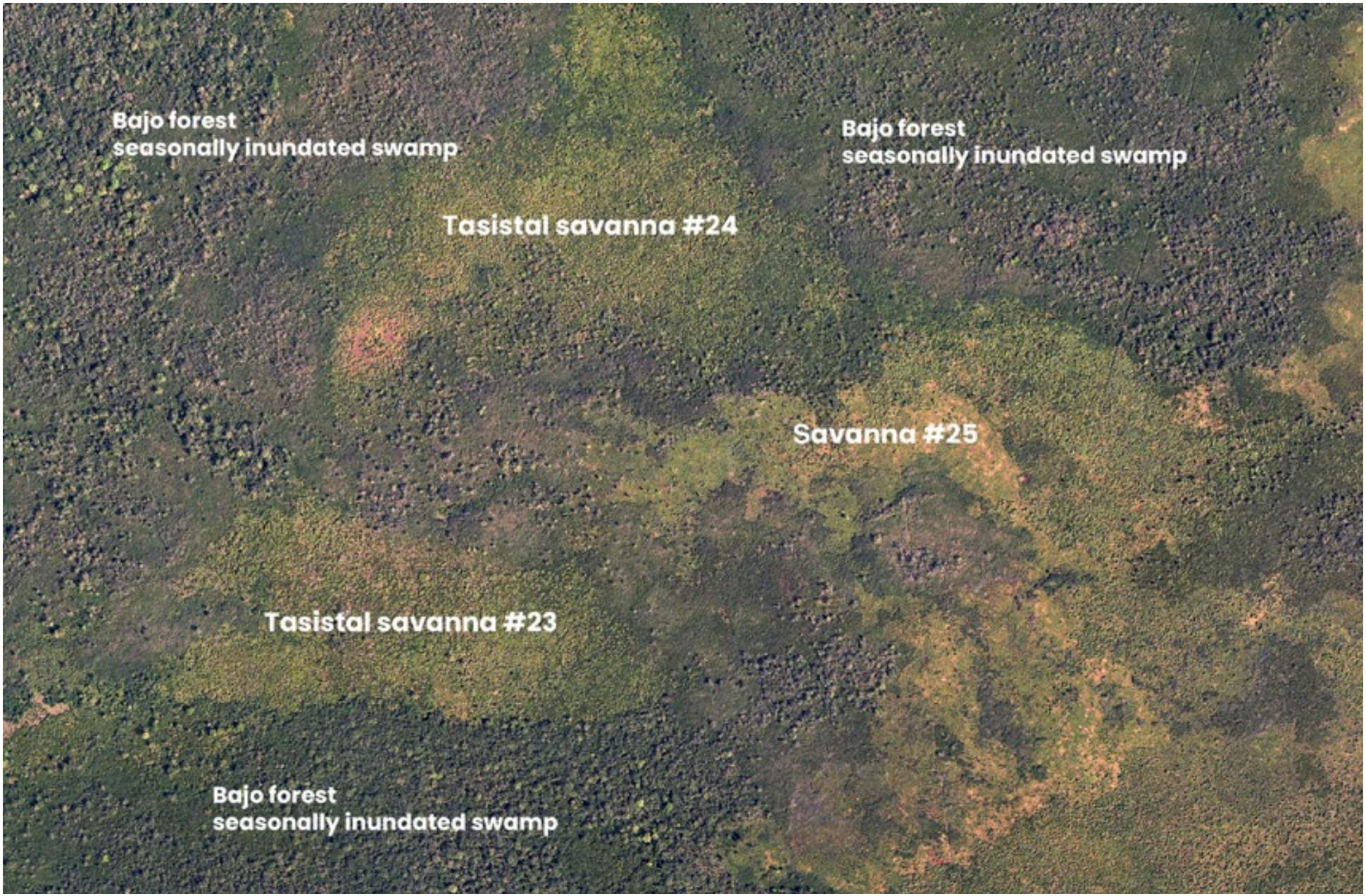
Presence of *Crescentia cujete*, calabash trees and morro support the idea of calling this tasistal a tasistal savanna. *Crescentia cujete* trees, out in the wild and in these parts of Peten (PNLT and PNYNN) "grow only in savannas." If you find a morro tree in a Mayan kitchen garden it has been planted there.

Savanna #24, May 15, 2022. Photo taken by Byron Pacay, while he and the trail-clearning team were studying (on the ground) how best to prepare a path for the entire team of photographers to arrive on the upcoming field trip.

More *Crescentia cujete*, calabash trees. The other common "logo tree of a savanna of PNYNN and PNLT" is the tasiste palm. This "area #24" has both logo trees of a savanna. I guess that nance trees are also present.

Photos by Nicholas Hellmuth, April 1, 2022.
Camera: iPhone 13 Pro Max.

There is no pine in this part of Peten. On the other hand, oak trees are present elsewhere in the PNLT, and along the edge of Savanna #10. So far no sandpaper leaf trees have been found in any savanna of PNYNN or PNLT. These *Curatella americana* trees are in savannas in drier areas of Peten, throughout Belize, and in a hillside savanna a few kilometers north of Rabinal, Baja Verapaz (a savanna we have visited three times). In Baja Verapaz and southern Peten pine trees are in or around savannas.



We bring back the original scene to show the biodiversity of these savannas: some are mostly solid tasiste palm (#23); others are palms en masse but have an open grassland area (#24 and #25). Savanna #25 has such changing plant cover that it will be a challenge to define this. There is lots more to accomplish on field trips each month.

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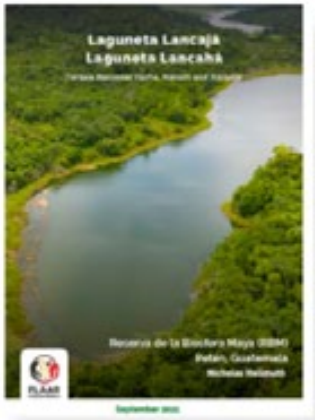

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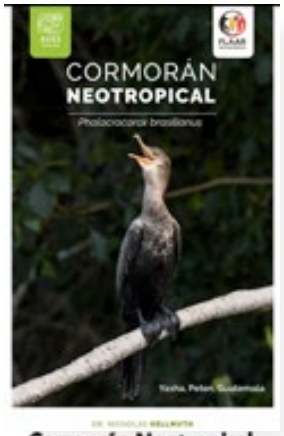

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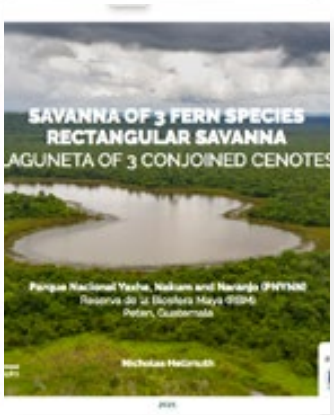

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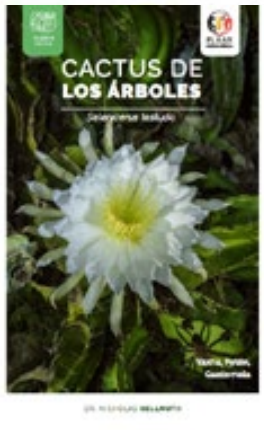

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Sabanas de palmas de Tasiste y Bosques Inundados Estacionalmente en Parque Nacional Laguna del Tigre

Savanna #10 far Southeast part of Parque Nacional Laguna del Tigre, Reserva de la Biosfera Maya

Savannas, Unexpected Unexplained Circular Areas, Laguna del Tigre, Reserva de la Biosfera Maya

Spider Lily Savanna at Parque Nacional Laguna del Tigre, San Andrés, Petén, RBM

Exploration of Tasistal Savannas, Parque Nacional Laguna del Tigre, Petén, RBM

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