

# Savanna West of Maya Ruins of Naranjo-Sa'al

This Savanna is the final Kilometer of the North transition Zone from Bajo La Pita



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Drone Pilot and Aerial Photographer: Carlos Elgueta

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# Introduction to the Savanna Alongside the West Side of Naranjo-Sa'al

The savanna alongside the west side of Naranjo-Sa'al is easy to see in Google Earth and in Satellites.pro. Once I had learned of this fascinating ecosystem, Horacio Palacios led us up one of the pyramids where we could see and photograph the entire savanna in the far distance. Then he led us on a trail through the spiny jimba bamboo plants and then sawgrass (navajuela) where we then entered the savanna to explore it.

All maps of this area that I have seen so far so not label this as a savanna—it is merely shown as the northern part of Bajo La Pita. But I prefer to document the grasslands part as a Peten savanna since it has tasiste palm, *Acoelorrhaphe wrightii*. In Izabal tasiste palm grows primarily in clusters along rivers and lagoons. We have not yet found savannas in the Caribbean area that we explored. But in the PNYNN, tasiste palm grows only in grassland savannas.

Upstream from Sayaxche, along the Arroyo Petexbatun and tributary Arroyo Faisan, there are, literally, MILLIONS of tasiste palms, especially in the Tasistal Arroyo Petexbatun (Google that and you will find the 2020 FLAAR Reports by Hellmuth, 2020a, b, c, and d). In the grassland Savanna East of Nakum, tasiste palm, *Crescentia cujete*, and nance are the logo-trees of that savanna. Pine savannas around La Libertad, Peten and in Belize are different. The presence of clumps of tasiste palm in the grasslands area west of Naranjo-Sa'al is what emboldens me to name it a Savanna. I estimate there may also be *Crescentia cujete* calabash trees. Nance fruit trees do not survive annual fires as well as the other two savanna species. But even if morro/jicaro calabash trees and/or nance are not present, tasiste palm is enough for me to propose calling this area a savanna.

In the future it would help to have an updated FLAAR Reports to include all photos from previous field trips to this Savanna West of Naranjo-Sa'al, but in the meantime we wanted to show all the nice aerial photos by Carlos Elgueta from April 29, 2025. On previous trips the drone photographer was Haniel Lopez. I show an example of his good aerial photos later in this report.

What is needed in the future is a drone that can map the entire savanna—so have multiple flights at the same altitude and join them all together in software so you have one continuous view at high-resolution of every part of the savanna. Then multi-spectral photos are needed to map each individual species in this savanna (and compare them with species in the Savanna East of Nakum and the Savanna of 3 Fern Species (northwest of the west end of Lake Yaxha). All three of these savannas are in PNYNN. The greatest number of savannas and biodiversity of savannas is in PNLT (Parque Nacional Laguna del Tigre, RBM). There are multiple FLAAR Reports by Nicholas Hellmuth and colleagues on these savannas of Parque Nacional Laguna del Tigre (part of the RBM so part of our research area for CONAP). It would also help to have a multi-spectral drone and multi-spectral software so we can map where and how many of each species of plant is in and around this savanna.





Looking southwest (towards the Bajo La Pita). In this aerial photo you can see about 80% of the Savanna West of Naranjo-Sa'al. Lots of cattle ranches are on the edge of the park (upper left corner).



Savanna  
West of  
Naranjo-  
Sa'al.

Not as  
much  
vegeta-  
tion as  
now that  
CONAP  
and the  
military  
(since  
circa  
2024) are  
protecting  
it.

Aerial  
photo  
from IGN,  
circa  
2006.





There is lots more vegetation inside the savanna in our visit in April 2025 than whatever year this satellite view was taken.

I have cropped off the diagonal water canal so you can see more of the savanna—but the pond that feeds water to the canal is visible at the top right.

I estimate the lack of vegetation is from having been incinerated that year by people that burn savannas.







Same satellite photo as before. You can now see the entire diagonal water canal that ends in a pond of water at a “cave entrance”. The white spots are the temples and palaces of Naranjo-Sa’al that stick up from the forest surrounding them.



Lower left area at southern end of the Savanna and northern end of Bajo La Pita. Cropped from previous satellite view.

Maps of Naranjo-Sa'al and studies of bajos in the PNYNN and PANAT show the Bajo La Pita going all the way to the north (so no savanna is mentioned in any article on these areas that I have yet found).

I estimate that the open area at lower left has been used as milpa or cattle but this needs to be visited in-person to learn whether this area has been used by local people.

The time lapse option of Google Earth shows you in what year these open areas became chopped down. But the time lapse photos are such low resolution that you can't show close-up details in a presentation.





One of the recent years when we hiked into the Savanna West of Naranjo-Sa'al there was charcoal from burnt trees in many locations. The people in the base camp told me the savanna was frequently burned.

Now that the military are there, I estimate there has been no burning for at least two years (but would need to ask people at the base camp).

When I saw fallen trunks burned significantly in past years, I estimated some were palo de tinta. But...if there is palo de tinta anywhere in this savanna it suggests that perhaps in a previous century it really was part of Bajo La Pita.

The Savanna East of Nakum transitions from a bajo and there are (if my brain remembers), palo de tinta in the transition zone and obviously in the surrounding bajo. But it is not expected to have palo de tinta throughout an actual savanna of the RBM.

Based on all the vegetation that I saw in the Savanna West of Naranjo-Sa'al on April 29, 2025, I estimate that if not burned at all it will gradually become either forested or at least a variant of bajo vegetation. If you Google burning a savanna in Belize to keep it a savanna? you get the AI answer: "Yes, controlled burning in Belizean savannas can help maintain them as savannas, rather than allowing them to transition into other vegetation types like forests. This is because fires are a natural part of savanna ecosystems, and they play a crucial role in regeneration of savanna plants and preventing woody species from taking over." I am not myself advocating burning any savanna in PNYNN because CONAP is in charge, plus it would be notable to see a savanna literally reforested and this documented by good-resolution aerial photos year-by-year.

The resolution of Google Earth timelapse is not usable to show details but surely there are other sources of historical photos at higher resolution.

<https://earthengine.google.com/timelapse/>

Years 1991-1992: oval dark area, either water or burned or dark vegetation

1996: surface color in middle is dark

2002-2003: very different surface colors

2004: either LOTS of water on the surface or lots of burnt dark charcoal

2007: very different surface colors

2008: appears to be LOTS of water at north and along western side (but the dark color could be fire remains).

2013 or 2014: slash-and-burn milpa or comparable deforestation at south end.



So far, each of the several dozen savannas that we have found in PNLT and the three in PNYNN have different colors (and/or different vegetation) in parts of the savanna. I am not a soil scientist but I estimate that each part of each savanna was used for a different purpose by the Classic Maya so the soil today differs in many parts of a savanna.

Cropped by Hellmuth from 23673\_05\_ORT\_RGB with 23673\_10\_ORT\_RGB, IGN





Archaeologists working at Naranjo-Sa'al are well aware of the water canal that you see here. We have photographed the bottom end (it's a geological area that is sort of a cave entrance, but often filled with water).

So if the Classic Maya were building water canals surely they were also utilizing every square meter of the savanna (and all surrounding areas, such as the corozeras).

Cropped from satellite photograph.





More  
complete  
satellite  
view  
showing  
the  
higher  
hills  
across  
the top  
(north).

23673\_05\_ORT  
\_RGB with  
23673\_10\_ORT  
\_RGB , IGN







68 Megabytes, so you can enlarge on a 32" 4K Philips screen and see lots of detail (obviously resolution in the PPTx or PDF has to be compressed so the complete report can be sent as an attachment). Helpful high-resolution aerial photo by Haniel Lopez, Dec. 17, 2021, probably with Mavic 2 Pro. Diagonal photos are as essential as photos looking straight down.



Tasiste palms have evolved to survive fires. The roots sprout up as soon as it rains after the fire. And actually some stems don't even get incinerated. Tasiste palms have evolved quite specifically to survive in grassland savannas of the PNYNN, PNLT and surely elsewhere in the RBM and in adjacent Belize. Hopefully there are savannas in the Calakmul area of southern Campeche but I have not yet noticed botany or ecology reports on this topic. When you Google sabana, Calakmul, Campeche you get the AI answer "no sabanas extensas como en otras regions."



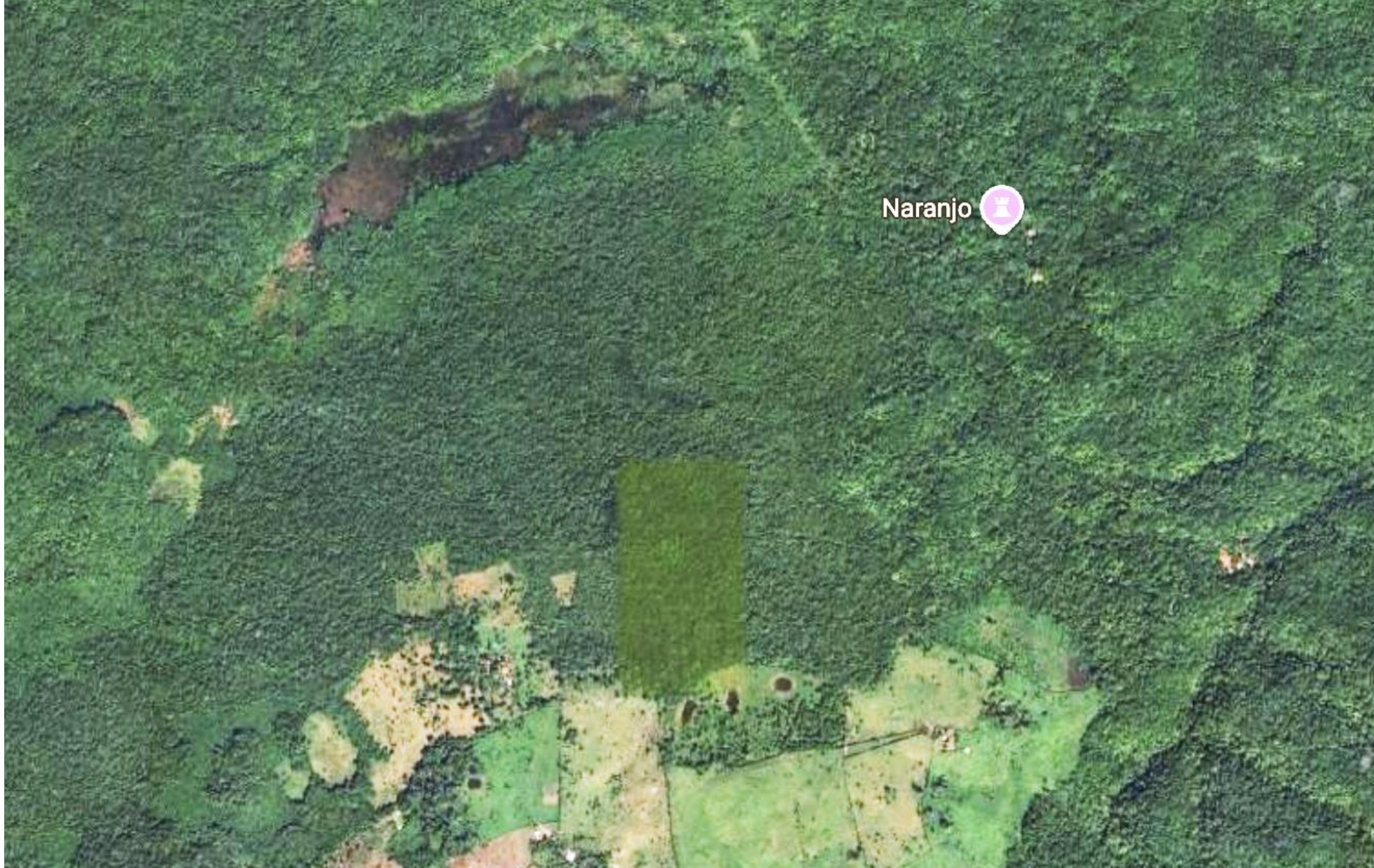
I estimate that the black color is charcoal and burned plants because at least once and possibly also another year that we hiked through this savanna, there were charred tree trunks all over the place. That said, all the remaining vegetation in this satellite view is bright green so this photo is after it has rained after the burning.

Google Earth, year and month not yet known. A larger view is on the next page. Since we are not at a university we do not have access to high-resolution aerial photos or high-res satellite views that need to be enlarged to full-page-size for this PowerPoint. We would greatly appreciate colleagues who could share such photos with us for an updated edition.



Savanna is the black area. The ruins are under the Naranjo name.

Below are the encroaching cattle ranches and farms.







A hill rises along most of the northwest and northern side of the savanna. There are large areas of native jimba bamboo in the moist “ring around the savanna” and then sawgrass. Then lots of shrubs forming an island. In the aerial views from above you can see more different types of vegetation throughout many parts of this (and most other) savannas of the RBM.





Wider view of same area as the previous photo. All these aerial photos by Carlos Elgueta with FLAAR drone are at a helpful angle.





Jimba is the most common bamboo that is completely native to Guatemala. *Guadua longifolia* grows in seasonally wet areas of RBM.





Several meters of jimba bamboo grow in the wet area at the edge of much of this savanna. Behind the hill slope begins and lots of trees begin. In front of the jimba bamboo the grassland aspect of the savanna begins. Most savannas of RBM have a ring of water around them (that I estimate was Maya-made) but not all these rings have jimba bamboo. We have a FLAAR video on jimba bamboo of this Naranjo savanna on YouTube plus FLAAR Reports in PDF format on jimba bamboo in Caribbean area of Izabal, Guatemala. *Guadua longifolia* is native—not from Asia.





Solid bamboo from the base of the hill across the wet area. This bamboo was for scaffolding and other uses for the Maya.









There is a FLAAR video on YouTube on *Jimba: una especie de bamboo creciendo en Guatemala*.









Now you can see why I often call this a grassland savanna. What is needed is a botanist or a student wanting to accomplish a MA thesis or PhD dissertation to literally map the entire savanna, indicating which species of trees, vines, bushes and other plants are found here. And especially, whether *Crescentia cujete* calabash trees and nance trees are present, or not.

















Lots of plants are spotted around the area--they will grow larger and higher every year until fire burns them down. Notice that the left area vegetation is encroaching on the grassland. Also notice the grasses are different color in each part. Classic Maya obviously used this entire area.





Islands of plants grow out every year. The vegetation along the edge grows more into the savanna every year. And trees already inside the savanna grow taller—until there is an invasive fire. Would be helpful to learn if deer graze in this savanna at night.









You can see here that dozens of different kinds of plants are rising up and spreading out. If this keeps up each year (no fires) this area will become a thick scrub forest and/or bajo vegetation (and no longer a grassland savanna). But that is part of Mother Nature.













Cattle ranches and farming fields right up to the edge of PNYNN.





Cattle fields and farms getting close to the Naranjo-Sa'al area of PNYNN.



If you compare this year 2025 view with lots of different satellite views you can notice that this is almost the most vegetation yet documented, most likely because CONAP, IDAEH, and the military are protecting this area.

The field work of FLAAR and FLAAR Mesoamerica are to provide CONAP, IDAEH, scholars, students, and the interested public nice good-resolution documentation of aspects of PNYNN and RBM that deserve to be studied and published.







Protected virgin forests around the savanna and to the upper right. Cattle ranches at the upper left.





Closer aerial view at helpful diagonal angle. You can see how large areas of the savanna are being “reforested” by Mother Nature.





Vegetation out in the savanna is not yet very high since the grassland was incinerated at least every two years.









North end of the savanna. The diagonal canal of water is a dozen meters past the end. The ruins of Naranjo are to the right. In the near distance are cattle ranches and slash-and-burn milpa areas.









The entire savanna needs to have all the vegetation identified and “mapped”.





I estimate this is the transition of the east side into the corozera and transition of the south end into the Bajo La Pita.





Since Naranjo-Sa'al was a militarily and politically important city in the Late Classic, it would be great if archaeologists, soil scientists, biologists, and ecologists could study this savanna in detail.





View of over 90% of the *Savanna Alongside the West Side of the Maya Ruins of Naranjo-Sa'al*. During 2025 Lake Yaxha and adjacent Laguna Sacnab continued to rise due to heavy rains on December, and it can also rain in January—each year is slightly different. But obviously in the year of this photo, 2021, it was also raining a lot.

Aerial photo by drone pilot Haniel Lopez, Dec. 18, 2021. FLAAR Digital Photo Archive of Flora, Fauna and Ecosystems of Guatemala.





Standing water on the savanna, Dec. 18, 2021, aerial photo by drone pilot Haniel Lopez. I estimate that at the height of the rainy season there is standing water covering over 90% of the savanna. Snag is that the road is in such bad condition during the height of the rainy season that it's not easy to reach here to accomplish drone photography in the rainy season.





This was my first view of the savanna to the west of the Maya ruins of Naranjo-Sa'al. We thank Vilma Fialko and Horacio Palacios for guiding us around Naranjo in these years. Photo on a FLAAR Mesoamerica field trip several years ago by Maria Alejandra Gutierrez.



# Corozera between the Savanna and the Ruins



The following photos show the corozera between the savanna and the ruins even better.









Corozera in the lower area but also corozo palms growing on the initial part of the slope leading uphill.



CAMPAMENTO NARANJO SA'AL HACIA LA SABANA

3:43pm Llegada a Sabana Naranjo Sa'al  
Vuelo de Dron

2:42pm Vuelo de Dron, Camino a  
Sabana Naranjo Sa'al

1:49pm Vuelo de Dron  
Vista de Sabana, Corozera

1:44Pm, Fotos de Corozo, Vuelo de Dron

1:31pm Vuelo de Dron,  
Area de Corozera

Naranjo

12:45pm Salida del Campamento  
Naranjo Sa'al hacia Sabana





# References Cited and Suggested additional Reading on Tasiste and Jimba Bamboo

## **CHACON, Belen and Nicholas HELLMUTH**

2022 Jimba Bamboo, *Guadua longifolia*, Municipio de Livingston, Izabal, Guatemala. FLAAR (USA) and FLAAR Mesoamerica (Guatemala). 36 pages. Easy download on-line.

## **HELLMUTH, Nicholas**

2020a Tasistal Arroyo Petexbatun Part I: Tasiste Palms and Tasiste Biome from Ground Level, *Acoelorrhaphe wrightii*. FLAAR Mesoamerica. 50 pages

All four of these FLAAR reports are an easy download on-line.

## **HELLMUTH, Nicholas**

2020b Tasistal Arroyo Petexbatun Part II: Drone Photographs of this Tasistal and Tasistal-Tintal Transition Habitat by Haniel López. FLAAR Mesoamerica. 24 pages.

## **HELLMUTH, Nicholas**

2020c Tasistal Arroyo Faisan, Part I, Tasiste Palms from Ground Level. FLAAR Mesoamerica. 61 pages.

## **HELLMUTH, Nicholas**

2020d Tasistal Arroyo Faisan, Part II: Drone Photographs of this Tasistal and Tasistal-Tintal Transition Habitat. FLAAR Mesoamerica. 20 pages.

## **HURTADO, Vivian** (narrator), **Haniel LOPEZ** (drone photographer and editor), **Nicholas HELLMUTH** (theme and concepts)

2023 Jimba: una especie de bamboo creciendo en Guatemala. FLAAR and FLAAR Mesoamerica. Video 2:51 (two minutes, 51 seconds).

For other plants of the Naranjo-Sa'al area there is a nice publication by Vilma Fialko on the orchids, bromeliads and other flowering plants. For archaeology there are dozens of reports by Vilma Fialko, Raul Noriega and other archaeologists.



# Credits and Acknowledgements

We visited with Mario Vásquez (CONAP for PNYNN area) while passing through San Benito/Santa Elena en route to the corozera and savanna areas.

The field trip concept and initial itinerary was initiated by Nicholas Hellmuth. He also does pano photography and other photography from the ground with an iPhone 15 Pro Max.

Norma Estefany Cho and Byron Pacay, FLAAR Mesoamerica, prepare all the photography, drone, and camping equipment, plus assist every day the entire week of the field trip. Byron prepares the hour-by-hour maps, and also drives the VW Amarok—he knows all the roads from years of experience.

Edwin Solares did video and ground photography. He is also very experienced in video editing.

Carlos Elgueta is a professional drone pilot, aerial photographer, and photographer with his Sony camera. He was recommended by Haniel when Haniel himself had other projects so was not available the first week of May.

Vivian Hurtado prepares the daily menu and oversees the organization of all field work and research projects. Since there is not space in the pickup trucks she works from her home office.

Teco, the nickname for Moises Daniel Perez Diaz, park ranger at PNYNN for 23 years so has impressive experience on flora, fauna and ecosystems of this part and also of surrounding areas. He uses software on his cell phone to map where we have been each day.

Franklin Baudilio Perez Mendez helped as general assistant setting up camp at each base camp and helped as porter carrying needed things during each day's hike. He is the son of Teco.

Rubelsin Ariel Recinos Orellan, driver of the decades old Toyota 22r that survived all the ruts and gullies washed out across the roads because this Toyota was “raised” so the underside of the motor did not get scraped.

Perfecto Matus driver who transported our equipment to the camp of Naranjo Sa'al, in his Toyota 22r.

Daniel Ramirez Mendez, driver of the Ford Ranger.

Daniel Alexander Recinos Corrales, driver of the Izusu DMA.

Neria Virginia Herrera Pinelo, hospitable owner of place to overnight, Campamento Chiclero Uaxactun. She is also the founder of the Museo de Piezas Arqueológicas de Uaxactún.

Maria Isabel Jacome Franco has assisted as a cook on several FLAAR field trips. There are obviously no hotels or restaurants at Nakum or Naranjo, but there are cooking areas that the local park personnel make available to research teams who have permission from the park administrators to camp in those areas.

Jaime España assisted as corozera guide on our day heading north to the corozers on the road towards Dos Lagunas.

Ruben Edmundo Carreto Almaraz, park ranger in Naranjo-Sa'al, provided helpful assistance in our camping at that site.



## **You can learn about about flora, fauna and ecosystems by hiking deep into the savannas, bajos and forests of Mesoamerica**

I have zero training in biology, or ecology. I never studied botany or zoology at any university. But at 16 years of age, in 1961, I took a 3<sup>rd</sup> class bus from Saltillo, Mexico all the way south to Palenque, Chiapas, to learn about monumental Maya architecture and with the help of a local Maya man in Tabasco I hiked with him into the surrounding rain forest to learn about things I had never experienced in my childhood in the Missouri Ozark Mountains. My high school thesis included my photos of the rain forest surrounding Palenque's temples and palaces. Then in 1962 or 1963 I was kindly accepted as a student intern by the INAH archaeology team going to the Maya ruins of Bonampak—I had offered to help them carrying supplies on the many-kilometer hike from the airfield at the Lacandon village all the way up and down hills and across streams to Bonampak. In 1963 and again in 1964 I spent a week each year at Tikal so learned more about the forests surrounding Maya cities. Then the Penn project team asked me to help them with photography and architectural recording of Tikal for an entire year (1965), since I was majoring in Architectural Sciences at Harvard and had a Leica camera plus photography experience. Then during 1970-1974 I spent several months each year mapping Yaxha and two visits to Nakum. One day at Yaxha, Hal Ball of the Institute of Maya Studies came to visit. His wife was an orchid enthusiast and they both encouraged me not just to be an archaeologist searching ground level for low mounds that none of the Tozzer, Morley, Lincoln Carnegie archaeologists had included in their helpful maps (which were focused on showing the location of carved stelae and the giant pyramids and palace acropolises of Yaxha—they did not even show the northern area in their maps of Nakum—so the FLAAR team added that). Then my 1980's PhD dissertation focused on sacred animals in Maya mythology. Yet no classroom training whatsoever in biology or ecology.

During the 1990's-2020 I drove through as many different biodiverse ecosystems as possible literally across Guatemala, to teach myself about flora, fauna, and ecosystem biodiversity. Then circa 2018 the PNYNN asked if our team of photographers and student biologists could dedicate a year to field trips, library research, and prepare publications on flora, fauna and ecosystems of especially the Yaxha area. Then the government of Municipio de Livingston, Izabal, Guatemala noticed all our field work and PDFs and they came, literally to our office, to ask us to spend 18 months hiking through and boating into remote biodiverse ecosystems that had not previously been studied by university professors. Since CONAP is part of the administration of PNYNN, we were then very pleased to receive a 5-year project of cooperation and coordination with CONAP for the entire Reserva de la Biosfera Maya (RBM) of Peten, Guatemala. Obviously neither FLAAR nor CONAP had up-front funds for that large an area so we focused on PNYNN, PNLT and several field trips to explore remote areas of Tikal, together with the PANAT park biologists.

I feel that to be an archaeologist it is essential to know the plants, animals and biodiverse ecosystems around the Classic Maya sites. Having in-person up-front experience with flowers, fruits, birds, insects, etc. also helps hugely to identical aspects in Maya iconography and epigraphy.