

THE BLADEN REVIEW

2022



Letter from the Executive Director

Greetings to all BFREE friends and family. It gives me great pleasure to share another edition of the Bladen Review filled with some of the highlights of 2022.

As the year began, we weren't sure what to expect as the pandemic was still causing great uncertainty, especially in terms of travel and visitation to BFREE. But before we knew it, student groups, researchers and travelers of all types were eager to come back to experience all the wonder that is BFREE. We were as busy as ever hosting visitors and providing educational and research opportunities throughout the year, and once again we had to adapt to a new normal. Thank you to everyone who brought life back to this incredible place by visiting us and sharing your curiosity, enthusiasm and energy. BFREE serves as a refuge not only for wildlife but also for people of many different backgrounds. We recognize that the role we play in protecting the amazing biodiversity at BFREE benefits the flora and fauna, but it is also an important factor in sustaining the wellbeing of the many people who take the opportunity to come here and experience the pristine Bladen River, the countless species of wildlife, the bountiful forests and our impressive staff and programs.

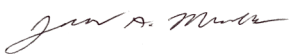


Jacob holding a Tropical Rat snake
Photo by Sean Southey

As we plan our strategic direction for the coming years, BFREE is exploring ways to enlarge our sphere of influence in the broader surrounding landscape. We are in discussions with multiple partners to ensure that the protected areas of the Maya Mountains are part of a larger corridor of managed multi-use zones that provide for the preservation of biodiversity and meaningful sustainable employment for local community members.

As always, we continue to offer exceptional educational programming, to host researchers and to provide unparalleled access to one of the most biologically rich rainforests left on earth. We will endeavor to inspire the next generation, discover the mysteries of the natural world, and ensure that the wilderness in our corner of paradise remains conserved for generations. This is all possible because of your patronage. Thank you for helping us get through the challenging times of the past few years, and for your continued support as we evolve into an even more impactful organization in the years ahead.

In conservation and stewardship,



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Thank you to Rob Klinger

Thank you to Robert Klinger, Ph.D., who has retired from the BFREE Board this year after serving for more than 20 years. Rob served countless roles including Board President during many terms and most recently from 2018-2021. Rob has always been a thoughtful mentor, a committed collaborator, and a dedicated advisor. He has also been instrumental in developing many long-term science programs as well as instituting mandatory "fun, food and game nights" that continue to this day. Thank you Rob for being part of this family, and for your continued involvement.



*BFREE and Crioco Staff photo February 2022
Photo by Jorge Silva Rivera*



Jaguar



Puma

These photos of a puma and jaguar were caught on wildlife cameras deployed in various locations throughout the BFREE property.



*Thomas Pop February 2022.
Photo by Sean Southey.*

Tom Pop BFREE Conservation and Stewardship Award

We are pleased to recognize Thomas Pop as the second recipient of the BFREE Conservation and Stewardship Award. This award was created in 2020 to honor individuals who have committed their lives to conservation work in Belize and have shown a particular passion for BFREE's mission to "conserve the biodiversity and cultural heritage of Belize." Tom has excelled in his work at the Hicatee Conservation and Research Center as a facility manager, a mentor, and as one of the foremost naturalists onsite.

by H. Barrett

Developing a Species Conservation, Management and Action Plan

Co-hosted by BFREE, the Turtle Survival Alliance (TSA), Zoo New England (ZNE), and the Belize Fisheries Department, the Third Hicatee Conservation Forum and Workshop was held online on May 17, 2022. The purpose of the workshop was to bring together stakeholders to begin developing a Conservation, Management, and Action Plan for the Central American River Turtle. Organized by Dr. Ed Boles, BFREE Dermatemyd Program Coordinator, with the support of BFREE staff, the workshop was facilitated by an independent contractor, Ms. Yvette Alonzo, with technical assistance from Mr. David Hedrick of TSA. The workshop was attended by 38 professionals supporting *Dermatemys mawii* research, conservation, and outreach, including key Government officials from the Belize Fisheries Department.



Belize was well-represented at this year's turtle conservation symposium in Tucson, Arizona. Researchers and conservationists alike gathered for this meeting.

Professional Development in the USA

Thanks to the generosity of our partners in conservation, Turtle Survival Alliance and Zoo New England, Thomas Pop and Jonathan Dubon, traveled to the USA this August.

Some highlights:

- Participated in field work on Blanding's Turtles and Alligator Snapping Turtles with Zoo New England's conservation team
- Presented on the HCRC at the Franklin Park Zoo in Boston
- Traveled to Keene, New Hampshire, to visit our field course partner school
- Participated in and presented at the 20th Annual Symposium on the Conservation and Biology of Tortoises and Freshwater Turtles in Tucson, Arizona

After Jonathan returned to the states to begin his studies at University of Belize, Tom, along with Heather Barrett and Jaren Serano, continued on to the Turtle Survival Center in South Carolina. The BFREE team spent several days volunteering and learning at the Center, which is home to thirty of the most important turtle and tortoise species in the world.

Billboards Help Raise the Hicatee's Profile



Thanks to funding from the US Fish and Wildlife Service, BFREE and our partner, Turtle Survival Alliance, celebrated the Sixth Annual Hicatee Awareness Month in October with the launch of two billboards strategically placed along Belize's Western Highway. The billboards, designed by the Hicatee Awareness Month Planning Committee, read "Save the Hicatee from extinction: Follow Belize's Fisheries Regulations" and are on display for one year through October 2023.



Barney Hall releases a juvenile Hicatee turtle into a river in central Belize



A few of the 171 Hicatee turtles hatched at the HCRC during 2022

Re-wilding Hicatee into Belize's Rivers

Over the last three years, BFREE has successfully released 415 captive born and raised Hicatee turtles in five different water bodies in Central Belize. These turtles have been reintroduced into two watersheds where their populations have been severely depleted. Our reintroduction programs include both short and long-term monitoring, which will help us determine the success of this project. Several of the releases included the participation of community members to further expand our outreach efforts.

by J. Marlin

UT Genetics Cacao Research

Over the past few years, BFREE has collaborated with Dr. DeWayne Shoemaker, Professor and Department Head in the Department of Entomology and Plant Pathology at University of Tennessee, Knoxville, on the study of the wild cacao discovered at BFREE. This year, graduate student Holly Brabazon, traveled to BFREE along with Dr. Shoemaker to begin a comprehensive analysis of the wild Criollo cacao trees on the property. Holly's first step will be to understand the population structure of the Criollo cacao trees by partially sequencing the genomes of the roughly 300 wild trees. With the help of BFREE staff, Elmer Tzalam, Lenardo Ash, and Mark Canti, Holly collected leaf samples from almost all of the wild cacao trees. Quite an undertaking!

Analysis of the sequence data will allow us to answer several important questions regarding mating biology, pollen dispersal, breeding patterns within and among the different phenotypic variants, and understanding of the relatedness of the wild Criollo cacao trees at BFREE. These data will provide a foundation for a second planned study analyzing the parentage of seeds to determine patterns of pollen flow throughout this population and for future genomic studies aimed at understanding and/or improving various Criollo phenotypic traits of interest. Thank you, Dr. Shoemaker and Holly, for helping us unravel the mysteries of this special cacao at BFREE!



Dr. DeWayne Shoemaker and Holly Brabazon



One of the hundreds of wild Criollo cacao trees dispersed throughout the BFREE protected area. Clonal material for the grafted trees planted on the farm came from high-yielding wild trees like this one.



Reforestation with Cacao at BFREE

BFREE's for-profit company, Crioco Cacao, LLC, has continued to develop throughout 2022. An additional 3,500 trees were added to the farm bringing the total number of grafted heirloom cacao trees to 12,000. Crioco has planted over 25,000 trees representing 25 native forest and fruit tree species, including the temporary and permanent shade trees planted since the project began in early 2019.

Adopt a Tree Program

BFREE continues to partner with the Heirloom Cacao Preservation Fund (HCP) in a novel program to help mitigate the climate crisis through the capture of carbon by planting heirloom cacao trees at BFREE through the Adopt-a-Cacao Tree initiative.

Over 50 cacao trees have been adopted so far at BFREE. The HCP program supports farmers and heirloom cacao providing environmental, economic, and social benefits.

To adopt your own cacao tree or trees, visit the HCP website and choose the BFREE adopt-a tree location by visiting <https://www.hpcacao.org/adopt-cacao-tree.html> and select HCP #11 under the dropdown menu.



Cacao fellow Mark Canti placing an adopt-a-tree tag with name of adoptee on cacao tree



Crioco Operations manager Elmer Tzalam with criollo cacao tree in fruit



Picture by Shaman Marlin



Crioco staff Elmer Tzalam, Mark Canti, and Kevin Pop, getting ready to open the heirloom cacao pods from part of the 2022 harvest



Criollo chocolate bar
Photo by Shaman Marlin

Chocolate Bars for Sale at Dancing Lion

BFREE's cacao and chocolate company, Crioco Cacao, LLC, has partnered with Dancing Lion Chocolate in Manchester N.H., to manufacture a limited release of chocolate bars from the 2022 harvest of heirloom cacao at BFREE. Shaman Marlin, who grew up at BFREE, works at this award-winning artisanal chocolate shop, and helped handcraft these extraordinary chocolate bars. They will be available for sale just after late Thanksgiving. You can purchase them online at <https://dancinglion.us>. The Cacao trees and chocolate are designated Heirloom Fine Flavor from the Heirloom Cacao Preservation Fund, www.hpcacao.org

Five Years and Five Fellows

by T. Sanville

The Science and Education Fellowship Program was created to provide unique work-training opportunities for young, conservation-minded Belizeans holding an associate's degree. Since the program started in 2017, BFREE has worked with five incredible future conservation leaders. All of the program graduates thus far have pursued completion of their bachelor's degrees, and the first graduate is now working towards his master's degree. BFREE is committed to supporting Fellowship Program alum in their continued studies and has provided partial tuition scholarships to all three graduates during each successful year of undergraduate study.

Meet the Fellows:



Mark Canti

Cacao Fellow: 2021-2023

Mark first visited BFREE in primary school and clearly remembers as a young seven-year-old watching Jacob's snake demonstration with admiration. He's a wildlife enthusiast passionate about all animals and dedicated to his work with the Cacao Team. Over the last year, Mark has given a unique identification number to and documented every cacao tree planted at BFREE. He also oversees the Adopt a Tree Program in collaboration with the Heirloom Cacao Preservation Fund. Mark is very proud to work with BFREE's Cacao Program and hopes to help bring the knowledge he is learning to his village to teach other farmers about sustainable farming practices.

Barney Hall

Wildlife Fellow: 2022-2024

Barney has an associate's in Natural Resources Management from the University of Belize. He has always felt a calling to work towards environmental protection and conserving the biodiversity of Belize. Barney is mentored by Tom Pop at the HCRC and is most looking forward to outreach opportunities where he can help change human behavior toward the Hicatee. Barney is a member of the Sixth Annual Hicatee Awareness Month Planning Committee this year and has already participated in BFREE's largest Hicatee turtle rewilding release to date.



Fellowship Program Alumni



Jaren Serano

Wildlife Fellow, 2017-19

B.A., Jacksonville University, 2021

M.A., University of Florida, 2023

Jaren continues to work with BFREE throughout his studies and traveled to South

Carolina this summer along with Heather Barrett and Tom Pop, where he volunteered at the Turtle Survival Center.



Lenardo Ash

Cacao Fellow 2019-21

B.A., University of Belize, 2023

Lenardo returned to BFREE this year to complete his required college internship assisting with data collection and material for a cacao genetics study.



Jonathan Dubon

Wildlife Fellow 2020-22

B.A., University of Belize, 2024

After graduating from the two-year Fellowship program, Jonathan traveled to the US this summer, where he presented his work at the HCRC at the 20th Annual Symposium on the Conservation and Biology of Turtles and Freshwater Turtles in Tucson, Arizona.

Monkeying around at BFREE

The tropical forests within the BFREE private protected area support critical habitat for both species of endangered primates that occur in Belize, the Yucatan Black Howler Monkey, and Geoffroy's Spider Monkey. Ongoing research led by faculty members Drs. Chris Habeck and Matt Stone of Kutztown University, Pennsylvania, along with students majoring in Environmental Sciences and Biology visited BFREE twice in 2022 to explore the calling behaviors, movement patterns, and functional role that the endangered Yucatan black howler monkey plays in the neotropical forests of Belize.

As Dr. Habeck put it, "We are witnessing dramatic shifts in global climate brought on by human population growth and technological advancement. Deforestation and the use of fossil fuels is causing global temperatures to rise, more extreme weather events, and severe pressures on the natural resources needed for the maintenance of biodiversity. Carbon is at the heart of these problems.



*Yucatan spider monkey in February 2022.
Photo by Jorge Silva Rivera*

Unlike temperate and boreal systems that hold most of their carbon in the soil, most of the carbon in tropical forests is locked up in living biomass, primarily trees. Trees sequester carbon via photosynthesis and store much of it as wood for structural support as they reach to the upper canopy in search of sunlight. In their quest for solar energy, some trees store more carbon than others because of differences in wood density. We think the Yucatàn black howler monkey (*Alouatta pigra*) has an important role in this process of carbon sequestration. Howler monkeys consume many fruits found in the upper canopy of tropical forests. The fruits of trees consumed primarily by howlers tend to have large seeds and large-seeded tree species tend to have relatively higher wood density than smaller-seeded tree species. As such, we think the selective feeding behavior of howler monkeys could enhance the carbon sequestering capacity of tropical forests. Put another way, if we allow this endangered primate to go extinct, we not only lose an iconic species, but also the functional benefits of their presence."



Black howler monkey lounging in a cohune branch

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We are so grateful to each of you for your generous financial contributions, in-kind donations, and words of encouragement. Thank you for believing in BFREE's staff and mission. Your generosity has enabled us to maintain operations at BFREE, allowing us to continue the crucial work of conserving the wildlands and wildlife of Belize.

Our sincere thanks to the BFREE donors from the Summer of 2021 to Summer of 2022.

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Rare
Cacao



*The Hammock, opened to students and other guests in 2022.
Photo by Jorge Silva Rivera."*



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Drone image of the Bruce Cullerton Memorial Observation Tower by Feste Films 2022

We are so honored and excited to be a part of the filming production done in Belize during the spring of 2022 entitled, "Belize Uncovered." This four-part series was sponsored by The European Nature Trust, and filmed by Feste Films, a Belize owned and operated production company. The series highlights the major, ongoing conservation organizations and initiatives in Belize, and will be released for the world to see in early 2023 on a public access channel such as Netflix or Disney. The photo above is a drone image of Feste films taking a break on the Observation Tower at BFREE.