Talamanca Large Mammal Study – Progress Report 2018

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Background Summary

Our research group is conducting a long-term survey of the large mammal fauna of the high elevation Talamanca Cordillera, the major cloud forest region of Costa Rica. The aim is to fill the gap in our understanding of jaguar and other cloud forest predators (6 species of felids plus coyote and tayra), and to determine the status of major prey species that these predators depend upon (e.g., peccary, deer, tapir). Although habitat loss from deforestation has largely ended in Costa Rica, illegal hunting from adjacent agricultural areas is producing an 'empty forest syndrome' in many of the region's premier protected areas. Since 2010, we have investigated keystone predators and prey using camera traps, genetic scat analysis, interview projects, and presentations to support conservation action and promote community-based conservation among local residents. These activities involve the participation of local partners in national parks, private reserves, and biological corridors to maintain our camera trap network. We also collaborate with conservation organizations, universities, and ecotourism operators.

Figure 1. Research team: (L-R) Abner Rodriguez, Steven Blankenship, Dr. Mike Mooring, Amy Eppert, TJ Weigman; Inset: Dr. Ryan Botts

Summary of Research Activitity in 2018

The 2018 research team (Fig. 1) had another outstanding season of fieldwork and data analysis. The first 5 weeks of research (May 21-June 22) involved a concentrated period of writing and data analysis. Under the guidance of Dr. Ryan Botts, TJ Wiegman and Amy Eppert used their computer programming skills to continue the detailed analysis of circadian and lunar activity patterns based on 9 years of camera trap data. While TJ made important improvements to the interactive R-Shiny app, Amy conducted a series of new analyses of activity patterns written in the R programming language. Meanwhile, Dr. Mike Mooring worked with Abner Rodriguez and Steven Blankenship to write up draft methods and introduction sections and conduct extensive online literature research for the publications that we are preparing to submit for publication.

With TJ and Dr. B staying behind to continue data analysis, the field team (Amy, Steven, and Dr. M) departed for the second 5 weeks of special projects in Costa Rica (June 22-July 26). The team set up the short-term camera trap survey on the Lagos and Campamiento trails in the higher elevation Savegre Valley to augment the permanent cameras on the Robles trail. When we monitored the long-term survey at Las Vueltas Reserve, we discovered that the cameras had been running for a record 8 months of continuous operation, taking some outstanding photos during this extended sampling period. We had a large backlog of photos to process in Camera Base from photos that were saved on hard drives at QERC. In preparation for deploying new cameras, the team also constructed a large stock of scent stations and laminated labels.

The most significant accomplishment in Costa Rica was the deployment of new camera traps at La Amistad International Park (PILA) in July (Fig. 2). We returned to Valle de Silencio to deploy 5 new cameras, and conducted a 5-day trek to set up 10 cameras on the remote and seldom-hiked trail to Cerro Kamuk. The photos we have subsequently received have been outstanding, including jaguars and bush dogs. Detailed accounts of these projects are found below.

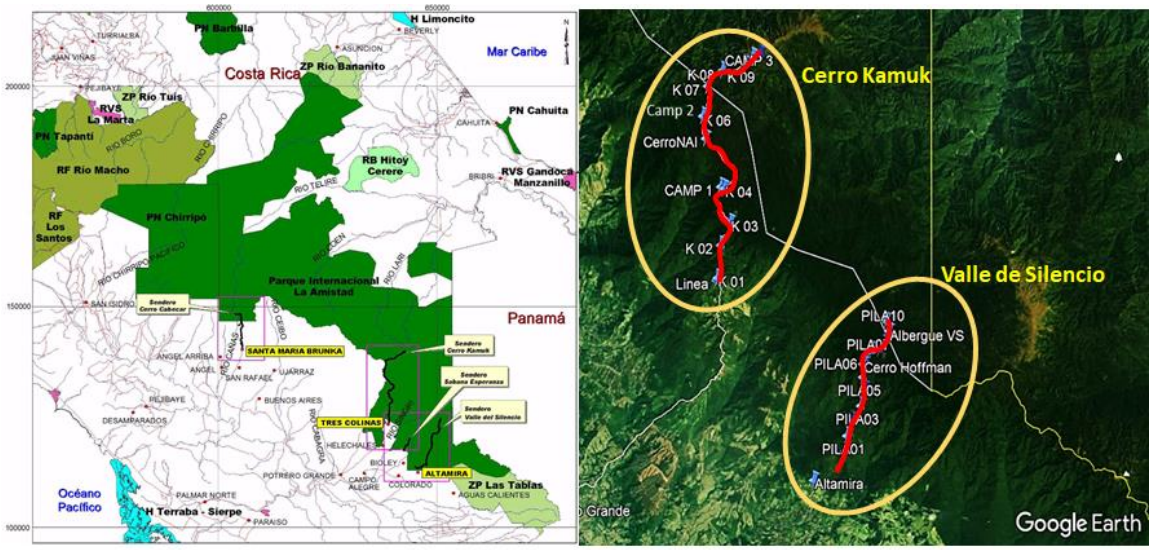

Figure 2. Location of the Valle de Silencio and Cerro Kamuk trails in PILA.

Trek to Valle de Silencio (July 9-10)

In July, the team returned to the Valle de Silencio trail to expand the camera trap survey from 5 cameras to 10 cameras. Last year we hiked the trail to the Cerro Hoffmann boundary between the La Amistad Pacific (ACLA-P) and La Amistad Caribbean (ACLA-C) conservation areas. Because be were accompanied by a scent detection dog, and ACLA-C does not allow dogs on their trails, we had to turn back at 10 km at Cerro Hoffmann. This year, without the scent dog, we were able to continue on the trail to the Valle de Silencio cabin, placing 5 new camera traps along the way. Our expedition was guided by Junior Porras (PILA research officer) and accompanied by 3 volunteers from UNA, the National University (Fig. 3).

Figure 3. The team about to embark on the Valle de Silencio trail. (L-R) Steven, Abner, Junior, Amy, and 3 volunteers.

Our stay at the Valle de Silencio "hotel" was primitive but comfortable, complete with a kitchen equipped with a gas stove and running water, bunk beds with mattresses, and even an indoor flush toilet (Fig. 4). After deploying our final camera past the hostel, we returned to the Altamira station in the rain. The new array of 10 camera traps on Valle de Silencio have since proved their value by returning a wealth of new photos, including jaguar, puma, ocelot, oncilla, tapir, paca and many others. The most exciting of all was the second record of bush dogs (*Speothos venaticus*), an unusual small canid that is naturally rare across it's range. On 6 November 2017 between 10:57- 10:59 AM, the PILA2 camera recorded a group of three bush dogs crossing the trail (Fig. 5), an adult and two smaller juveniles -- possibly a female with two juvenile offspring. On 26 August 2018 between 8:48 and 8:48 AM, the PILA1 camera recorded two bush dogs of unknown sex (Fig. 5). These photos represent a photo rate of 0.08 photos per 100 trap nights. As reported last year, these records are the very first records of bush dogs in La Amistad (PILA), and in conjunction with other recent photos suggests that bush dogs may have recently migrated into Costa Rica from Panama, where they were already established.


Figure 4. A hearty dinner of mac 'n' cheese at Hotel Valle de Silencio.

Figure 5. First sightings of bush dogs (*Speothos venaticus*) at PILA, 2017-2018.

Trek to Cerro Kamuk (July 12-16)

After a day to recover, we left Altamira station early on the morning of July 12 for the small community of Tres Colinas where we would start our 5-day trek to Cerro Kamuk, returning on July 16. Roger Gonzalez (PILA administrator) was an ideal guide, having hiked the trail many times before and possessing an intricate knowledge of the logistics and biology along the way. The trail to Cerro Kamuk is rugged and very muddy during the wet season, with a steep initial ascent to the park boundary and then a never-ending series of ascents and descents from one peak to another and another: Cerro Kutsi, Cerro Bekom, Cerro Kasir, Cerro Nai, Cerro Dudu, Cerro Apri, and finally Cerro Kamuk (Fig. 6). Cerro may be translated as "Mount" and the mountain names are in the indigenous Bribri language – for example, Cerro Nai is "Mount Tapir", Cerro Dudu is "Mount Bird", and Cerro Kamuk is "Place of Rest". Unlike most Costa Rican national parks, there are no services on this trail other than 3 primitive camps that have been set up along the way at one-day intervals. Each camp has a black plastic tarp erected on the trees as protection against the rain, a nearby stream for drinking water and bathing, and a simple toilet consisting of not much more than a hole in the ground. Everything we needed had to be carried in the packs on our backs: tents, sleeping bags, food, stove, and dry clothes in addition to the 10 cameras and associated gear (boxes, cables, scent poles). Each of us had 45-50 lbs of weight to carry up and down steep slippery trails for the 5 days, although they did became a bit lighter as we erected cameras.

Figure 6. Sign at beginning of Cerro Kamuk trail.

Initially, we trekked through oak montane forest, the trees covered with hanging moss and epiphytes (plants that grow on trees). After the first day, the forest shifted to cloud forest dominated by epiphytic bromeliads, rosette-shaped aerial relatives of pineapples that make up to 25% of the cloud forest biomass. As we climbed higher, the cloud forest periodically merged into the humid transition zone called "turbera" (literally "peat bog") dominated by sphagnum moss, and later broke into "paramo" habitat on the peaks above treeline (Fig. 7). Paramo is essentially the tropical version of the alpine zone, a high elevation habitat dominated by Chusquea bamboo and other brushy vegetation. The view from the paramo was always spectacular, although limited by the ever-present mist.

Figure 7. The team hiking through turbera and paramo zones of the Cerro Kamuk trail.

Once past the official park boundary, we positioned a camera trap and scent station about every 2 kilometers (Fig. 8). We aimed to place each camera station along a straight stretch of trail in which animals would be in view of the camera for a longer time, with a tree of the correct width to attach the camera box with a cable (not too large or too small). The positioning of the camera was tested by using a team member to act as the "jaguar", and then the camera was positioned at the correct angle and activated. We attached a placard to each camera and scent station saying "mammal research, please do not disturb" and recorded the GPS coordinates and elevation.

Figure 8. (L) Roger setting up a camera trap, while Steven and Amy (R) deploy the scent station.

For lunch, we ate tortillas with bologna and Costa Rican queso duro (hard cheese) to keep up our energy. We typically arrived at camp in early afternoon and boiled water for coffee on our camp stove and erected our tents under the plastic tarp; sometimes we even bathed in the ice-cold streams! Our standard dinner for the trip consisted of Mac 'n' Cheese with summer sausage, which was nutritious and filling with hot coffee (Fig. 9). We typically were in our sleeping bags by nightfall at 6:30 PM and slept until first light at 5:00 AM, acquiring much needed rest to recover from the day's exertions and renew our energy for the next leg of the journey. Breakfast consisted of granola, oatmeal, and hot chocolate. After packing our gear, we were on the trail by 7:30.

Figure 9. The team makes home-cooked meals and hot coffee at camp before going to bed.

Day 3 was the hardest day of hiking, with the trail ascending and descending 17 peaks as we hiked along the ridgeline from Cerro Dudu to Cerro Apri (Fig. 10). The weather was cold, windy, and interrupted by occasional light rain. The trail was muddy and steep, taxing our physical strength to the max. The three of us wearing botas de hule (rubber boots) were glad that we could keep our feet relatively dry as we trudged through deep mud, while those with regular boots tried their best to sidestep the deepest mud (often without success). We continued to erect camera stations, although it became harder to find relatively flat stretches of trail with an appropriate tree available on which to mount the camera. Finally, we reached Camp 3 in the paramo above 3300 m, 2 km from Cerro Kamuk. At this camp, the clouds and fog were so thick that we could not see Cerro Kamuk 2 km away.

Figure 10. Summiting another peak on the trail to Cerro Kamuk.

By now, the team was exhausted and cold so we decided against continuing on to the summit of Kamuk, which would require another 4 hours of hiking up very steep slopes in the fog and rain. Instead, we focused on resting up, preparing hot food and coffee, and settling down to a long night of strong winds and rain. Nonetheless, the scenery was spectacular and throughout the trek the scenery around us was mind-boggling, so wild and pristine (Fig. 11). We returned to Tres Colinas two days later and completed our trek with a celebration dinner in San Isidro.

Figure 11. Paramo and turbera scenery along the Cerro Kamuk trail.

Roger and the local community plan to erect 5 additional cameras in the Quetzal Biological Corridor (Fig. 12), and every two months for the next year Roger will return to hike the trail, monitor the cameras (change batteries and chips), and retrieve the photos. We are confident that the camera trap survey will provide a wealth of new information about the large mammals of PILA and the Cerro Kamuk region in the coming year. During our 5 days on the trail, we saw continuous signs of tapirs and large felids (jaguar or puma) based on tracks and scat. It is likely that this region holds some of the richest mammalian biodiversity in PILA, and we are happy to have been able to set up the camera survey. Roger has sent us the first series of photos from Cerro Kamuk, and they are nothing short of spectacular, with some of the best jaguar photos we have ever produced. An assortment of photos is presented in Figure 13.

Figure 12. Team with Tres Colinas community members (left) of the Quetzal Biological Corridor.

Figure 13. Camera trap photos from Cerro Kamuk (clockwise from upper left): jaguar, puma, tapir mother with calf, brocket deer, tapir, and tayra.

Conclusion

With the high point of our research completed with the deployment of 15 new camera traps at PILA, our team performed our standard “wrap-up” activities, including the the removal of the seasonal cameras on slope of Cerro de la Muerte and the monitoring of the permanent camera traps at Las Vueltas Reserve. As always, we were assisted at Las Vueltas by the park guards of Los Quetzales National Park, who escorted us into the restricted reserve (Fig. 14).

Figure 14. Park guards Carlos (L) and Gabriel (R) with research team at Los Quetzales National Park and Las Vueltas Reserve.

We finished processing photos, packed away our gear, and completed a thorough inventory of our camera equipment in readiness for the next season. Our final task was to present the new research findings to the Savegre community in our traditional “informe”, attended by a large and enthusiastic audience of local residents, including Don Efrain Chacon and his family. We are once again grateful for the support of the QERC community that makes this research possible (Fig. 15).

Figure 15. Research team with QERC staff and researchers, including housekeeper Nancy Rayo (second from left) and QERC manager Carson Calloway (fourth from left).

APPENDIX 1: Large Mammal Species List for All Surveys

Table 1. Large mammal species documented in the Talamanca high-elevation site, 2010-2018

Common Name	Latin Name	Spanish Name	Mass (kg)
Predator Species			
Jaguar	*Panther onca*	Tigre	80.0
Puma	*Puma concolor*	León	50.0
Ocelot	*Leopardus pardalis*	Manigordo	12.0
Coyote	*Canis latrans*	Coyote	10.0
Bush Dog	*Speothos venaticus*	Perro vinagre	6.5
Tayra	*Eira barbara*	Tolomuco	5.0
Jaguarundi	*Herpailurus yaguarondi*	Yaguarundi	5.0
Margay	*Leopardus wiedii*	Caucel	3.5
Greater Grison	*Grison vittata*	Grisón	3.0
Oncilla	*Leopardus tigrina*	Tigrillo	2.0
Prey Species			
Baird's Tapir	*Tapirus bairdii*	Danta	250.0
White-tailed deer	*Odocoileus virginianus*	Venado	30.0
Red Brocket Deer	*Mazama temama*	Cabro de monte	25.0
Collared Peccary	*Tayassu tajacu*	Saino	19.0
Paca	*Agouti paca*	Tepezcuintle	10.0
White-nosed Coati	*Nasua narica*	Pizote	5.0
Northern Tamandua	*Tamandua mexicana*	Tamandua	4.5
Northern Raccoon	*Procyon lotor*	Mapache	4.0
Nine-banded Armadillo	*Dasypus novemcitus*	Armadillo	4.0
Central American Agouti	*Dasyprocta punctata*	Guatusa	3.0
White-throated Capuchin	*Cebus capucinus*	Mono carablanco	3.0
Striped Hog-nosed Skunk	*Conepatus semistriatus*	Zorro hediondo	2.5
Kinkajou	*Potos favus*	Martilla	2.5
Mexican Hairy Porcupine	*Coendou mexicanus*	Puercoespin	2.0
Common Opossum	*Didelphis marsupalis*	Zorro pelón	1.5
Central American Cacomistle	*Bassariscus sumichrasti*	Cacomistle	1.0
Dice's cottontail	*Sylvilagus dicei*	Conejo de monte	1.0
Common Gray Four-Eyed Opossum	*Philander opossum*	Zorro de cuatro ojos	0.5
Red-tailed squirrel	Sciurus granatensis	Ardilla	0.4

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- *Nancy Rayo, QERC housekeeper and cook extraordinaire*
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