

## Conservation Considerations

# Applied Macaw Conservation and Research in Tambopata National Reserve, Peru, and the Work of Sophie Hébert Saulnier, DMV

The Macaw Society project is a lesson in the successes to be had from international conservation partnerships and the valuable role that veterinarians can play as part of a conservation team. Since 1989, the project has been a voice for parrots in Peru, and a beacon for those scientists, enthusiasts, and veterinary professionals who wish to know them and keep the species thriving for future generations. The project arose out of a great need and interest in understanding the community ecology and land usage of large parrot species, especially the charismatic scarlet macaw (*Ara macao*). Charismatic fauna such as the scarlet macaw have been the keystones of successful and sustainable conservation projects the world around. By extension, protecting this species and its habitat also protects much of the biodiversity within the same area.

In this piece, you will read firsthand from a veterinarian who worked closely with the project in late 2019 into early 2020. Dr Sophie Hébert Saulnier is currently working at the Bird and Exotic Animal Clinic in Montreal, Quebec, Canada. She received her doctorate of veterinary medicine from the University of Montreal in 2010, and has worked on several international field projects since. She takes a great interest in parrot enrichment, positive reinforcement training, and best husbandry practices in her work in private practice, and hopes to continue work in conservation medicine in the future.

I hope that Sophie's account of her work with The Macaw Society in Peru will inspire you, as members of the Association of Avian Veterinarians, to contribute to wildlife conservation through field projects in your communities or wherever you may find the opportunity.

—Nicole Becich, DVM

During my teens, when I first became interested in parrots, I read a fantastic article in a magazine talking about the largest clay lick in the world in

the Tambopata National Reserve in Peru. Parrots, including magnificent macaws (Fig 1), would descend by the hundreds to the ground to consume the clay. The article noted that scientists working in the region were carrying out research to understand why the birds were displaying this behavior, known as *geophagy*, the intentional consumption of dirt. I remember being mesmerized by the amazing pictures of all the colorful birds flying around and gathered in large numbers on the clay lick—a living bouquet deep in the middle of the Amazon jungle. I was captivated, and went



**Figure 1.** A pair of scarlet macaws at the Tambopata Research Center in the southwestern Peruvian Amazon.



**Figure 2.** The Tambopata River with a typical pirogue, a long canoe carved from a single tree trunk. This is the only transportation available into the Tambopata Reserve and the river is carefully guarded to prevent intruders from entering this environmentally sensitive area.

online to read further about the region and the research team at The Macaw Society<sup>1</sup> (formerly known as Tambopata Macaw Project) studying scarlet macaws in the wild. I dreamed that one day I might witness such natural wonders with my own eyes.

Eight years into my veterinary career with exotic animals, that dream started to become reality. I got my first exposure to applied conservation with the yellow-headed parrot (*Amazona oratrix belizensis*) project in Belize in spring 2017–2019, and soon after, I had time to volunteer for 1 month with The Macaw Society in Peru in January 2019. I cherished the experience beyond words. When they invited me back as the field vet leader for the 2019–2020 breeding season (November–February), I accepted with great pleasure. This group is dedicated to a long-term research project of the ecology and conservation of macaws and parrots in the lowlands of southeastern Peru.

The Tambopata Research Center is located in a remote part of the southwestern Peruvian Amazon, in the Madre de Dios region, about 7 hours by boat from the Puerto Maldonado, the nearest city. Getting there took me almost 2 days. I took 2 international flights and 1 national flight, an hour-long bus ride to the port, and then the trip on the Tambopata River itself (Fig 2). The boat was a long, narrow canoe carved from a single tree trunk (referred to as a *pirogue*) with a gas engine and a very skilled driver. It was 7 grueling hours upriver, navigating through fallen trees, sandbars, and rocks. The entire time my eyes were wide open,



**Figure 3.** Caiman are frequently seen along the riverbanks in the Tambopata Reserve.

trying to take in all the strange birds flying overhead, the capybaras grazing on the shore, and the caimans tanning in the sun (Fig 3). The dense jungle takes over very quickly after leaving the tiny port, and I felt an overwhelming sense of wildness. After stopping at 2 control points (most of the reserve is entirely wild, and traffic is tightly controlled), we arrived at the lodge and stretched our stiff legs. I was exhausted but also felt the anticipation of my new adventure.

The Tambopata Macaw Project was founded in 1989 by Eduardo Nycander, a Peruvian architect, and initially was mainly focused on artificial nest building. Since 1999 the project has been led by Dr Donald Brightsmith, with the main goal of studying the ecology and conservation of macaws. Dr Brightsmith did his zoology doctoral research in Manu, Peru, and has been involved in parrot research ever since. He is an associate professor at the College of Veterinary Medicine and Biomedical Sciences, Texas A&M University. Countless researchers and volunteers have helped gather a tremendous amount of valuable ecological and population data over the decades, which has led to over 50 publications. The researchers have learned a great deal, including confirming that parrots and mammals in the region eat clay to fulfill their need for sodium, which is naturally low in their diet.<sup>2,3</sup> Growth charts have been developed for scarlet macaw chicks until fledgling.<sup>4</sup> Information has been gathered on natural diets of macaws in the wild and their nutritional content.<sup>5,6</sup> A better understanding of parental care and causes of chick mortality<sup>7</sup> has been achieved as well as determining the factors that influence the selection of artificial nest boxes.<sup>8</sup> In 2020, the name of the project was changed to The Macaw Society.

During my time working at the Tambopata Research Center (breeding season of 2019–2020), the team was mainly composed of a field leader, present all year; a field veterinarian, present during



the breeding season; a lead climber, present during part of the year; and 2 directors (main researchers), based at the Schubot Center for Avian Health at the Texas A&M College of Veterinary Medicine and Biomedical Sciences, who were onsite intermittently based on research needs. Much of the work, however, was accomplished by volunteers of all ages, backgrounds, and origins, coming from around the world, with a common motivation to better understand these fascinating birds. The diversity, motivation, and amount of joint knowledge was incredible, from the 70-year-old retiree to the first-year ecology student; from the biologists working on conservation projects in Mexico, Argentina, or Hong Kong to the intern veterinary student. Gathering scientific data is only one of the goals of the project. It is also a place for training the next generation of conservationists and sharing knowledge with other conservation projects. And, of course, we all come to the research station to help make a positive difference for the amazing diversity of wildlife native to the region.

The team accomplishes a huge amount of work on a daily basis, especially during the breeding season (October–March), the peak period for projects and data collection. The assistants start before sunrise and regularly work until sunset. For the first few weeks, volunteers learn all the necessary skills to stay safe and efficient. This includes learning how to follow the tight schedule, familiarizing themselves with the trails so they don't get lost in the jungle, and learning advanced skills such as how to safely climb the dizzying heights to reach macaw nests in the trees. New volunteers start the process under tight supervision, learning inside on ropes hanging from the ceiling until declared ready to take on their first tree.

Most macaws nest in huge trees, choosing cavities or nesting boxes averaging 30–35 m from the forest floor. Monitoring them regularly during the breeding season requires climbing to visually inspect the nests (see supplemental video available with the electronic version of the journal). Macaws are exclusively secondary cavity nesters, which means they nest in cavities that have already been established. Many of the birds will use natural cavities, but others have found artificially constructed nesting boxes suitable. These are constructed from either plastic piping or wood. Climbing that high, often straight into the air without even the tree trunk under your feet, feels intimidating at first. But after that fear wears off, you discover the exhilarating feeling of accessing a secret location where the parrots live and thrive. At that height, you get the privilege of being over the

canopy as the macaws use the highest and most majestic trees to nest. You get to see dozens of butterfly species and large flocks of birds in flight or foraging right next to you, and if you're really lucky, some of our primate cousins might come over to say hello—sights your eyes would never see from the ground through the dense foliage. You can feel the fresh breeze and see the distant river flowing; you can hear the jungle rumbling, see it moving before your eyes—an unparalleled spectacle that still remains one of the jewels of this planet. I feel very lucky I got to admire it firsthand.

When you get to the top of the tree, the nest is waiting for you, with 1 or 2 macaw chicks, so dinosaur-like, croaking in the nest as they see you. Most of the time, the parents remain perched close by, supervising operations, making sure their chicks are safe. We gently place the chicks in a bucket and lower it to the ground where the medical team will examine them, take their biometrics, and photograph them. We repeat this process every 1–3 days according to the bird's age and our data gathering protocol. We assess the chick's general health and remove external parasites if needed. Large numbers of larva of various botfly species (*Philornis* sp) are removed each season.

Twice during the season, we take blood to do complete blood counts, metabolic biochemical analyses, and genetic analyses. Taking blood in the middle of the jungle without the assistance of a trained technician, or even a table, is a very different experience than in a clinical setting. We use a tarp on the ground as a collection area, the bird is gently restrained in a bucket or on the lap, the blood tubes are resting on the ground, and the willing hands of volunteers are at the ready to assist. Once collected, we quickly transfer the precious sample into a cooler, as the ambient temperature in the jungle is close to 35°C (95°F).

It can take a good hour of walking through the forest to reach some of the nests, with up to 20 kg of equipment on your back at a sweltering 35°C–40°C (95°F–105°F). The first few weeks are physically exhausting. Initially, you can only concentrate on putting one foot in front of the other, following the path and watching for snakes and bugs, and roots sticking out of the ground. The routine includes a nap after breakfast, a nap after lunch, going to bed early, and getting up at 4 AM the next day to start all over again. After a few weeks, you skip the naps, you walk faster, and the bag feels a lot lighter. You realize that you stop noticing the temperature and the biting insects as much, and that you can sustain a conversation and joke around while navigating the labyrinth of

trails, and make it back to the lodge in time for meals. You have adapted to the jungle life.

During the rainy season in the tropics (December–March), it rains violently almost every day. It's like opening the shower full strength on your head for 20 minutes at a time, and then abruptly the water stops and you are bathed in blue sky again. Everything gets muddy and very humid and even flooded. I remember walking to a nest with a vet student through midhigh-deep water and seeing a 1-m (3-foot) caiman swimming in the water next to us—a slightly unsettling experience. Through all these efforts, you find yourself in amazing physical shape after a few weeks!

The jungle can be inhospitable, but this is a condition you must be willing to bear for the experience of living in its beauty. The first person on the trail is on snake watch and breaks through the hundreds of spiderwebs along the way. With the closest hospital being hours away, a venomous snake bite would be a major issue. The biting insects are atrocious, and even with long sleeves at all times and bug spray (reapplied immediately after showering, even when inside the research center), we still got bitten on a daily basis, which is very annoying and anxiety inducing, as these insects can carry tropical diseases. Multiple people on site caught leishmaniasis during 2019 and the disease and its treatment can be quite prolonged and stressful. In addition, despite therapy, the disease can be difficult to get rid of. Nevertheless, the stress associated with these daily threats is greatly overpowered by the wonders of this awe-inspiring environment.

I never ceased to be amazed by the stunning biodiversity. I encountered hundreds of new species every day. My imagination was overwhelmed by the largest variety of species I had ever seen: butterflies and other insects, birds, monkeys and other mammals, reptiles, mushrooms, plants and their flowers. While walking on a trail, we came face to face with a full-grown South American tapir (*Tapirus terrestris*). It stopped and lifted its trunk-like muzzle to smell us. Wide-eyed in amazement, none of us dared breathe. After a few minutes, seeming undisturbed, it went around us and continued walking nonchalantly along the trail. Coming back from the first climbs in the morning, we would often see fresh jaguar (*Panthera onca*) tracks over our own tracks from 2–3 hours earlier; we would almost never see them in the flesh, and when we did, it was always from afar. Big cats are very good at staying unnoticed.



**Figure 4.** Multispecies group of macaws eating the nutrient-rich clay at the Collpa Colorado clay lick. For Dr Sophie Hébert Saulnier, seeing this firsthand was a dream come true from years before. Visible are scarlet macaws, red-and-green macaws and blue-and-yellow macaws. Photo Credit: Roshan Tailor.

Then one day I finally got to see with my own eyes the “Collpa Colorado,” the clay lick that captivated me as a teen (Fig 4). At dawn, parrots arrive at the lick in the hundreds and perform their “dance” over the open section in order to determine if it’s safe to land, an incredible display. Once the first one lands, the show is set in motion, with others quickly following. The clusters of birds grow larger by the minute in a flurry of screaming, flapping, digging, and biting at the clay. Although exposed and visible to us as we hid on an island, we were separated by enough water and distance for the birds to feel safe and undisturbed by our presence. I never got tired of that spectacle, even after hours of counting them every 5 minutes, and classifying them by species and location. Not an easy task with so many moving birds and most of them being mainly green! Up to 17 species might be seen in the region, with the main species being the scarlet macaw, red-and-green macaw (*Ara chloropterus*), blue-and-yellow macaw (*Ara ararauna*), chestnut-fronted macaw (*Ara severus*), blue-headed macaw (*Primolius couloni*), red-bellied macaw (*Orthopsittaca manilata*), mealy parrot (*Amazona farinosa*), yellow-crowned parrot (*Amazona ochrocephala*), white-bellied parrot (*Pionites leucogaster*), orange-cheeked parrot (*Pyrilia barrabandi*), blue-headed parrot (*Pionus menstruus*), dusky-headed parakeet (*Aratinga weddellii*), and white-eyed parakeet (*Aratinga leucophthalma*). We first had to learn to identify the species and then teach the volunteers how to recognize them visually, by sound or flight pattern. It is a long process!





**Figure 5.** The author and field veterinarian researcher, Dr Sophie Hébert Saulnier, with the examination material during chicks' examination. The field sites are rugged, but everything one needs to perform a physical examination, biomaterials sampling, and morphometric measurements is packed in and at the ready.

As a field veterinarian, my main, and favorite, task was to examine the chicks (Fig 5). We would assess their health and record their biometrics. We would also perform necropsies on birds that were found dead. We preserved and processed samples from our health examinations or necropsies including blood, feces and urates, feathers, and tissues. Since we were joined by a fair number of veterinary students and biologists, I also educated and trained the volunteers on subjects ranging from bird anatomy to safe handling, bird diseases, zoonotic disease risk, and safety procedures. Other than a mild load of external parasites, most chicks were very healthy and needed very limited intervention. Collecting all these data and samples was done methodically, with all information carefully recorded for scientific purposes.

One of our principal studies (from 2017 to 2019) ongoing during my first month volunteering there was extremely interesting. Through observation of the parental care, we determined that a significant number of the second chicks (27%) and almost all third and fourth chicks, died of starvation.<sup>7,9</sup> They did not starve from competition between siblings or from lack of food in the environment. Parents favored the first chick during feeding, and the greater the difference in age, the more likely it was that the subsequent chicks would not receive enough food. We studied relocation of these third and fourth chicks, who would otherwise have died, to nests containing only 1 chick, which we selected carefully and monitored intensively so as not to affect the parents and their first chick. Our team provided supplemental feeding up to twice a day



**Figure 6.** “Jabba,” the only scarlet macaw chick from the “Amor” nest during the 2019–2020 season being weighed.

during the transition, and closely monitored the weight and health of the first and foster chicks (Fig 6). The results of our research were that all relocated foster chicks were successfully accepted by their foster parents (N = 28 chicks across 3 seasons) and 89% of them fledged. Fostering increased fledging success per available nest from 17% (1999–2016) to 25% (2017–2019) and decreased chick death by starvation from 19% to 4%. This research has great potential benefits for in situ and ex situ macaw population management and conservation.<sup>7</sup>

The dedication and time needed from the whole team through that project was huge. The promise of saving these young chicks motivated us to get up every 2 hours during the night to feed them in the nursery until they were strong enough to relocate to the designated nest site. These results are very promising for significantly increasing the fledging success of threatened macaw populations in other locations in Central and South America.

Working with The Macaw Society was a fantastic learning experience, both professionally and personally. The project remains active in Tambopata National Reserve, but also continues to expand to work with additional endangered parrot populations in other parts of the world. By applying the knowledge and experience acquired through years of rigorous scientific study and concrete conservation, we can do our best to maintain viable populations of these beautiful birds in the wild.

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