

IMPACT REPORT

2023 - Summer 2024

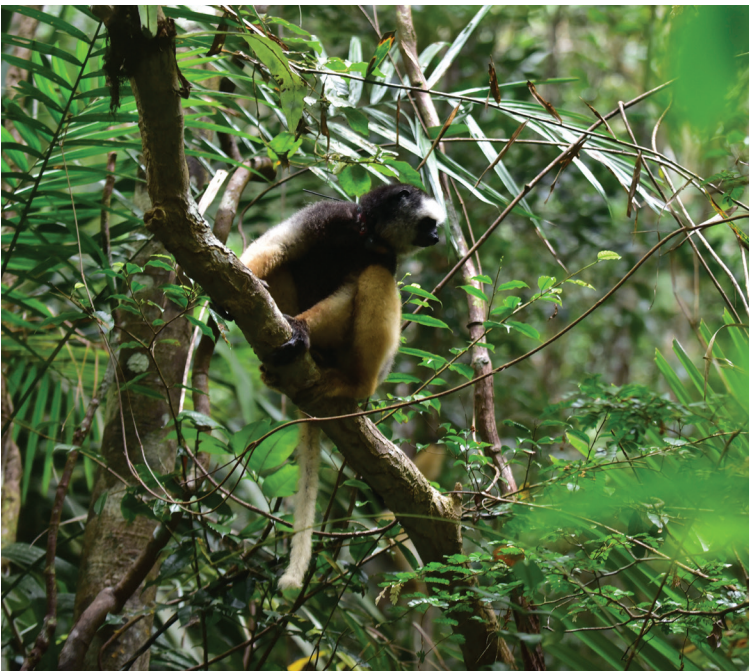


Center for Conservation in Madagascar

Background Summary

The Center for Conservation in Madagascar is one of the original Centers of the Saint Louis Zoo WildCare Institute. The Center's primary goal is to reduce direct pressures on Madagascar's threatened and endangered species. To achieve this goal, the Saint Louis Zoo works through a consortium known as the Madagascar Fauna and Flora Group (MFG). The MFG was founded on the principle that uniting individual institutions under one umbrella significantly increases the contribution any one facility can make on its own. The MFG is an international, non-governmental organization comprised of zoos, aquaria, universities and other conservation organizations. As a collective body, it works with Madagascar government authorities and in-country staff to achieve conservation action, research, capacity building and education efforts in eastern Madagascar.

The Saint Louis Zoo was a founding member of the MFG and has been committed to wildlife conservation efforts in Madagascar since the late 1980s, with the earliest efforts focused on conservation research and wildlife recovery efforts of lemur species. Lisa Kelley, Ph.D., the Executive Director of the WildCare Institute, serves as the Director of this Center. She also serves as Secretary on the MFG Executive Board.



One of the collared diademed sifaka in Betampona Natural Reserve.

In-Country Location

The Center supports efforts at both of the Madagascar Fauna and Flora Group's primary conservation research sites, Parc Ivoloina and Betampona Natural Reserve. Both sites are located in Eastern Madagascar (Fig. 1).

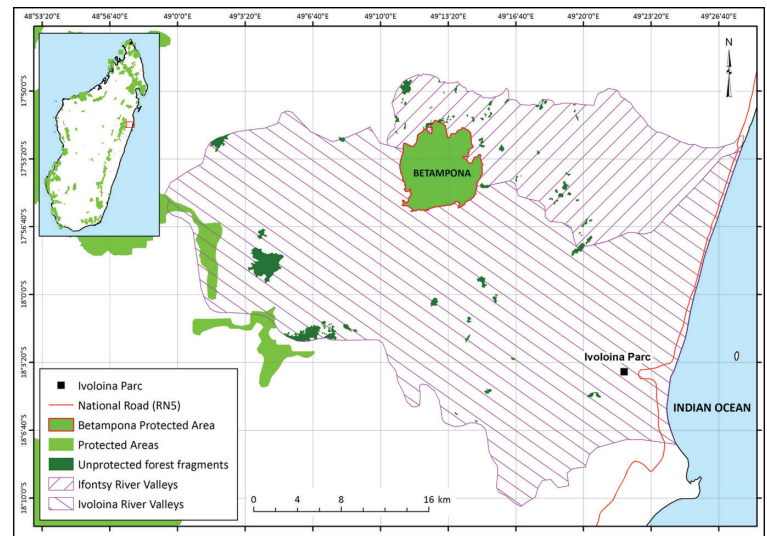


Figure 1: The two primary location sites supported through the Center. Betampona Natural Reserve is a protected lowland rain forest. Parc Ivoloina is one of only two zoos in Madagascar.

- » Parc Ivoloina is a former forestry station that has been transformed into a 282-hectare conservation education, research and training center. Located just 30 minutes north of Tamatave, Parc Ivoloina also is home to a four-hectare zoo for native wildlife. Aside from Parc Ivoloina, Madagascar only has one other zoo.
- » Designated as a reserve in 1927, Betampona Natural Reserve is Madagascar's oldest protected area. It is a 2,228-hectare rainforest fragment that contains high levels of plant and animal diversity. MFG's continual research presence has protected Betampona from large-scale habitat loss and degradation despite the fact that it is surrounded on all sides by village activity. In fact, research completed in 2021 through Saint Louis University's Geospatial Institute confirmed that the decades of Zoo-sponsored conservation work at Betampona Natural Reserve has paid off. Forest coverage at Betampona has

increased by 28% in the mixed forest category and a remarkable 59% in the evergreen forest category (Figure 2). This is only one of only a few reserves in Madagascar where forest coverage has actually increased in recent years.

Land cover types of Betampona Nature Reserve and surrounding areas, Madagascar

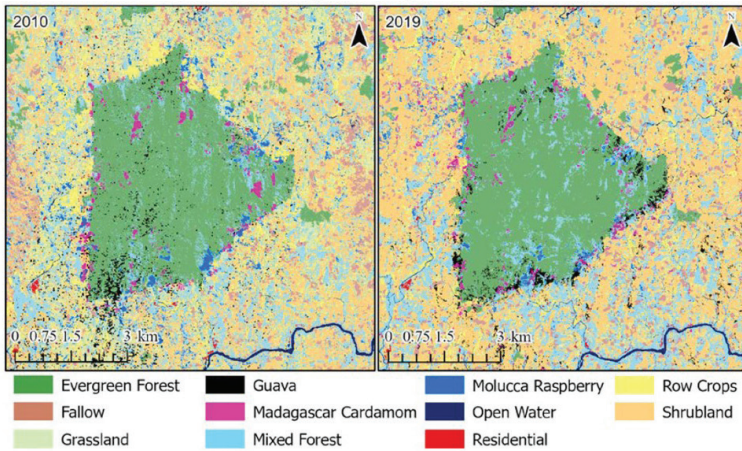


Figure 2: GIS Illustration of 10 year forest growth at Betampona Natural Reserve, both in total area and in forest type.

Center Approach

The Center’s goal to reduce direct pressures on Madagascar’s threatened and endangered species is approached primarily through the four objectives of the Madagascar Fauna and Flora Group. These objectives are:

1. Conservation action to reduce or remove direct threats and maintain or build viable habitat
2. Building in-country research capacity, leadership and/or management
3. Conducting research that informs conservation management needs and/or methods
4. Community development with a focus on local communities and both local and national authorities

2023 Major Accolades and Accomplishments

» On July 20th and July 27th respectively, MFG’s Conservation Training Center manager, Veronique Ravololonarivo, led important training days on MFG’s safeguarding policy at both Parc Ivoloina and at Betampona Reserve for all MFG staff

(permanent and casual manual labor workers). The policy was developed with input from WildCare Institute Executive Director, Lisa Kelley, to help safeguard all MFG employees, stakeholders and target audiences for MFG’s diverse activities. Policies now include statements on employee and participant rights to equal opportunities based on sex, race, sexual orientation, their right to work/learn/train in a non-confrontational and conducive environment, the need to ask for permission before using photos for reports and social media, and grievance mechanisms if individuals feel their rights have not been respected. New committees were created for each main MFG work site to whom staff can defer if they feel their grievances are not being properly dealt with or to raise the grievances on their behalf. This is a very big step forward for MFG to come into line with international expectations and norms, and raised some very productive and lively debate within the team. All MFG contractors and consultants will now be obliged to adhere to the policy in order to be allowed to work for the MFG.



Safeguarding Training at Betampona

» Between the Wildcare Madagascar Center-supported MFG restoration program around Betampona, the Living Earth Collaborative invasive



Alex Mamisoa, often referred to as the best horticulturalist in Madagascar, with air-layered rosewood

plants and restoration program in Betampona Reserve, and project work supported by the Association of Zoological Horticulture, the target of 10 hectares of restored habitat for key endangered lemur species such as the diademed sifaka (*Propithecus diadema*) and the black and white ruffed lemur (*Varecia variegata*) has been achieved and even exceeded. In addition, new techniques have been developed to propagate endangered rosewood species (*Dalbergia* sp.) through air-layering. Although not a new technique to horticulture, this method has not been widely used in Madagascar in the past for rosewood species, which are often difficult to collect seed for due to long intervals between fruiting seasons and the difficulty of collecting ripe seed

before they are wind-dispersed. In total 3,600 trees from seven *Dalbergia* species have been produced at Betampona across the various MFG and community nurseries through both air-layering and seedling collection and nurturing, and 298 trees have been planted ex-situ at Parc Ivoloina in a demonstration conservation plot to provide a safety net genetic population. Work will continue over the coming year to build on these great initial results to further increase genetic diversity in the ex-situ populations and the abundance of these valuable species in and around Betampona. Although the process was time consuming and complicated, it is a great development that Madagascar National Parks and the Ministry of the Environment and Sustainable Development now fully endorse air-layering as a viable method for propagating rare rosewood species.

» Tom Sehnert, Director of the Zoo's Facilities Management Department, Derek Strunk, Manager of Metals and Special Construction, and Emma Ahern, Primate Keeper, spent four weeks at Parc Ivoloina Zoo to help repair and build the zoo's facilities, train the zoo team in specialized carpentry skills and welding, and to share expertise in animal care management. Working with corporate sponsors and the American Association of Zoo Keepers, the Zoo team also brought multiple donated items not easily accessible in Madagascar, from a battery powered welding machine designed to work in



Derek Strunk and Tom Sehnert working with members from the Parc Ivoloina team on the construction of a quarantine space.



Emma Ahern working with a free-ranging Coquerel's sifaka at Parc Ivoloïna



Professor Fidy Rasambainarivo.

Project Spotlights

Project 1: Genetic Management Translocation Project of the Diademed Sifaka *Written by Dr. Fidy Rasambainarivo, Saint Louis Zoo Affiliate Scientist, Mahaliana Labs Scientific Director, Assistant Professor, East Carolina University*

The diademed sifaka or simpona (*Propithecus diadema*) is a critically endangered species of lemur that inhabits the rainforest of eastern Madagascar. The sifaka population that inhabits the Betampona Natural Reserve is geographically and demographically isolated from any other population of *P. diadema* and has been so for several generations. This demographic isolation is bound to negatively impact the population by reducing their survival and reproductive capabilities, which may lead to the local extinction of the species in this protected area. In fact, since 2019, none of the groups that were observed in Betampona had an offspring survive to sexual maturity. The reasons for this poor recruitment and survival are multiple and complex, but inbreeding depression is likely a major contributing factor.

In an effort to reduce the negative genetic and demographic impact of isolation on the critically endangered *Propithecus diadema* of Betampona Natural Reserve, the Saint Louis Zoo WildCare Institute and Madagascar Fauna and Flora Group initiated a

remote areas, to donated work boots and t-shirts. Their visit will have lasting effects, as the training and tools the Parc Ivoloïna team received will save them from having to spend a large amount of money hiring contractors from town. In gratitude, the Parc Ivoloïna team named a newborn sifaka in honor of Emma.

- » In August 2023, Dr. Fidy Rasambainarivo, Affiliate Scientist of the Saint Louis Zoo WildCare Institute, started a new position as an Assistant Professor in the Department of Biology at East Carolina University, North Carolina. While based in North Carolina, he will continue his research on the ecology of infectious diseases and wildlife conservation in his native Madagascar and strengthen his collaboration with the Saint Louis Zoo WildCare Institute and Madagascar Fauna and Flora Group through Mahaliana Labs.

translocation project of the sifaka, initially from the Ambatovy population in central Eastern Madagascar. However, a recent research study cast doubt on the appropriateness of the Ambatovy population as a source population.

Taxonomic resolution of Betampona's Propithecus diadema:

A recent study (Hawkins et al., 2022) identified genetic differences between different populations of *P. diadema* that may warrant distinguishing the populations at a subspecies or species level. While not explicitly studied in the publication, we collaborated with the authors of the study to ascertain the association of Betampona's *P. diadema* to one clade or another, which will influence the potential source population of the translocation project. Advanced genomic analysis of Betampona's *P. diadema* within the context of other *P. diadema* from the entire range of the species confirm that the Betampona population belong to clade V and is different from the Ambatovy population. The Ambatovy population was initially targeted as the source population for the translocated animals. Given these recent results, the team needs to identify a new source population from within the clade V group but now has clearer guidelines for identifying compatible individuals. These analyses were led by Dr Melissa Hawkins from the Smithsonian.

Confirmation of inbreeding in Betampona:

Since 2018, MFG and Saint Louis Zoo WildCare Institute supported team members have closely monitored the populations of the critically endangered diademed sifaka and collected biomedical and genetic samples from most of the individuals in this population. In 2023, the team was able to successfully capture, sample and collar six diademed sifaka including three individuals that were never captured before, which will provide a better picture of the biomedical and genetic health of *P. diadema* in Betampona.

Biological samples from 17 *P. diadema* collected over the years in Betampona were analyzed at Mahaliana Labs in Antananarivo and Dr. Emily Wroblewski's lab at Washington University in Saint Louis to assess the population's genetic diversity. These results confirm that Betampona diademed sifaka suffer from inbreeding

and highlight the need for a translocation. This “hard evidence” of inbreeding of *P. diadema* in Betampona was a request of the Madagascar National Parks and Ministry of Environment. Results of these genetic analyses were presented by Estefania Hernandez at the Midwest Primate Interest Group held in Saint Louis in October 2023.

The team also located three “new groups” that will hopefully be collared and followed in 2024.

Plans for the future:

The Saint Louis Zoo remains committed to the translocation of the diademed sifaka as a priority species despite the indication that the diademed sifaka population is at critically low numbers with a high mortality rate. While the diademed sifaka population at Betampona is critically low, this critically endangered species is at risk throughout the country, and resides in few well protected areas. Moreover, this species does



“Kissing” diademed sifaka in Betampona Natural Reserve.

not do well in human care, which means there is no assurance population in zoos. There is hope that with a translocation, gene flow will occur through the births of offspring that survive and produce viable offspring when they reach maturity.

Project 2: MFG agroforestry promotion and forest fragment conservation *Written by Dr. Karen Freeman, Executive Director of the Madagascar Fauna and Flora Group.*

The MFG has long recognized that the key to conserving habitat and healthy lemur populations in Betampona Strict Nature Reserve is to tackle head on the two biggest threats: slash and burn agriculture and bushmeat hunting. It is not realistic to ask local people to stop using traditional farming methods that have been passed down the generations for centuries without offering practical alternatives. Hence MFG has worked with agroforestry and ecoagriculture expert, Dr Christof den Biggelaar, for over twenty years as well as in-country partners in Madagascar, including the Kew Madagascar Conservation Centre, and the Fruits, Vegetables and Environment Education (FVEE) program of the FJKM (Church of Jesus Christ Madagascar), to promote more sustainable ecoagriculture approaches.



Agroforestry training with Christof, photo credit Alice Heliarisoa, Association Lovasoa, Ampasima

While we have done various ecoagriculture training initiatives over the years, it wasn't until the MFG received a large grant from Darwin Initiative in 2021 that we were able to make a concerted effort across multiple target villages to promote agroforestry, facilitate the setup of agroforestry plots with 100 target households and link it intrinsically with the need to protect remaining forest fragments under the management of local village associations. We have teamed up once again with our long-term conservation partners, Missouri Botanical Garden (MBG), and a new partner, Association Lovasoa, for this project. Association Lovasoa has been working to protect forest fragments by Ampasina, not far from Betampona, with very little outside funding until this project. They had been requesting help from MFG to enable them to carry on their conservation efforts and the promotion of agroforestry seemed the best way to complement their existing forest protection activities.

Training and start up tools and plants have been distributed to 100 households across the three main intervention sites of Betampona, Ampasina and Vohibe (a large forest fragment managed by MBG in the Ankeniheny-Zahamena Forest Corridor). Importantly, as well as distributing start-up trees, we have also invested a lot of effort via our partners in FVEE to set up "mother orchards" at each site and teach nursery staff and interested villagers how to propagate their own agroforestry trees. Through this approach, the project will be far more sustainable long term.

We have worked closely with each household to enable them to develop individual planting plans to address their particular household needs and to be suitable for their land availability/conditions. Participation in the scheme was prioritized for those who are members of the local village associations managing various forest fragments. A Memorandum of Understanding is agreed with every household setting out the specification that in return for the help of getting started with agroforestry, members of the household will contribute to regular monitoring and patrols in the forest fragments under their local association's management. Training was again provided, this time by the MFG's Betampona

Conservation Agents, to help the village associations learn new ecological monitoring techniques and help them to better manage the forest fragments. We have also worked with Catholic Relief Services to help local farmers set up cooperatives to give them greater bargaining power to set fairer prices for the sale of their goods.



Community Forest Patrol, photo courtesy of Fortunat Rakotoarivony (MBG), Vohibe

The objective of the project is that once other nearby villages start to see that agroforestry is profitable, and how homes who are practicing it are more food secure, that we will start to get a “cascade” effect. Even though the newly planted agroforestry trees are still mainly too young to fruit and the benefits of the project are yet to be fully realized, we are already seeing a huge amount of interest locally at each of the three main sites of intervention. In the meantime, we have now successfully secured further funding, this time from the Critical Ecosystems Partnership Fund, to promote agroforestry, forest fragment protection, family planning and the use of fuel-efficient stoves at additional target sites around Betampona. Our hoped-for cascade effect seems to be gaining good momentum.



Community Forest Restoration, photo photo courtesy of Fortunat Rakotoarivony (MBG), Vohibe

Project 3: Key Invasive Species Management Projects
Dr. Freeman will continue to oversee several key invasive species management projects important for the Center.

These include:

- » Completion of the removal of invasive plants and the replanting with endemic trees from a target 10 hectares of critical lemur habitat in Betampona. Over 37,000 native trees were produced in the MFG nursery at Rendrendry representing 56 families and 153 genera of endemic species. By the end of 2023, 22,085 had been planted out in the restoration plots covering an area of 10.4 ha so this first goal has been achieved. Now we are moving on, with funding from the Critical Ecosystem Partnership Fund to tackle an even more ambitious target of restoring a further 25 ha of invasive plant-invaded areas of Betampona over the next three years.
- » A community-based invasive species surveillance and reporting network around Toamasina. This vital network has already provided critical information, particularly on the distribution of the highly invasive Asian toad. In a single year, two new satellite toad populations were identified and emergency outreach

and initial control work completed. Now, through grant funding by a WildCare Institute Field Conservation grant, the network is currently being extended to include communities around Betampona to help delay the establishment of Asian toads in and around the Reserve.

- » Working with the Ministry of the Environment and Sustainable Development in Madagascar to uphold the IUCN's 2020 resolution #116 to increase capacity for invasive species management in Madagascar. Progress has been slower than hoped for at the national level in this regard, due to multiple changes of the Minister and top directors of the Ministry of the Environment and Sustainable Development (MEDD). However, significant progress has been made at the regional level, with strong support being gained by the Governor of the Atsinanana Region, the local Director of MEDD- Atsinanana and other local authorities. There has been initial dialogue with the Tamatave port authorities to start developing basic biosecurity protocols for the port.

Stories from the Field

For the love of lemurs, I went on a mission to Manompana. *Written by Jean Noel.*
Site Manager, Betampona

My name is Jean Noël. Twenty-seven years ago, after stopping my studies for various reasons, I returned to my native village, Ambodirafia, one of the six large villages surrounding the Betampona Strict Nature Reserve (RNI). Having waited for the call for recruitment launched by MFG, I applied and joined the very small team to make my contribution to the activities of the NGO in order to fight against forest clearing for slash and burn agriculture (tavy) and the illicit exploitation of precious wood in the classified forests around Betampona. I was just 25 years old.

However, I almost gave up after meeting one of the illegal loggers who mocked me by saying that he would continue cutting the precious woods in the reserve. At that time, environmental conservation was far from guaranteed in Madagascar; the populations living along

the Reserve did not even know who was responsible for its protection. The offenders were not prosecuted and the offenses went unpunished.

When I informed my grandfather of my idea of resigning and moving elsewhere so as not to see the disappearance of the reserve, he shouted at me that my presence in the village at the time of the call for applications, and my success in being recruited to the MFG team, was fate. I am called to protect Betampona. So he advised me to stay and assume my destiny.



Jean Noel, Site Manager of Betampona Natural Reserve

While listening to his words, I almost fainted and left the house. The next day, I came back to ask for his blessing and returned to work. I have strength, courage and hopes that Betampona Natural Reserve will remain protected.

Since that moment, I have felt in touch with nature. When I enter the forest, I feel connected to the network of biodiversity, and I can find and recognize animals, even if they are very rare and not yet identified. I became passionate about nature. I would like to know everything about the Betampona species. I work closely with major international researchers. I share my experiences with my team and partners. If I find any infractions, I immediately inform all those responsible. I can also say that I have become a specialist, particularly in herpetology and primatology, lemurs. I love them and I am ready to leave everything aside to participate in research missions or to save endangered animals.

This is precisely why I agreed to lead a mission, although I knew the difficulties and challenges there would be along the way, to recover lemurs released in the village of Manompana, Analanjirofo Region. Indeed, on May 6, 2024, the Regional Director of the Ministry of Environment and Sustainable Development Analanjirofo, contacted us and asked us to quickly rescue and bring back to Parc Ivoloina a family of four black and white ruffed lemurs (*Varecia variegata*), because they were exposed to several types of dangers, most significantly threats from local farmers to kill them as they were raiding their crops.

At the head of a team of four technicians (three from MFG and one from the Duke Lemur Center), I took the road to Manompana on May 13, 2024. After two days of grueling travel on a mired secondary road and interspersed with ferry crossings and marshy estuaries, the team arrived at the village. After carrying out the administrative formalities (courtesy visit, presentation of the mission objectives etc.), we began by locating the lemurs and establishing our work plan and our strategy to ensure the capture of the animals. We were confident that the capture would take us only two days, as planned when we left Toamasina.

The next day, we opted to use the dart gun to put them

to sleep. However, after three attempts, we realized that the gunpowder to push the anaesthesia was not exploding, and after checking, all the rest of the darts had the same problem. We then decided to adopt plan B, then C, then D. We used different types of traps and continued to use anaesthesia in darts attached to the end of a long pole. After ten days of incessant efforts, often in pouring rain and tensions with certain villagers who were not happy that we were capturing “their lemurs”, we finally managed to capture the four animals.

After receiving authorization to transport the animals, we set off on our return journey. On May 28, 2024 around 2:00 p.m., we arrived at Parc Ivoloina to secure the four black and white ruffed lemurs of Manompana. Despite all the problems encountered, I worked to maintain the solidarity of my team, which was a little disturbed for a while due to the many difficult challenges of the mission. I succeeded in the mission, thanks to my love of these magnificent animals, but also the support of my colleagues.



Jean Noel and team in typical travel conditions on lemur rescue mission



Rescue lemurs hitching a ride on truck

- » In addition, we provide (\$22,260) to Dr. Rasambainarivo as an Affiliate Scientist to support the following projects 1) Biomedical Evaluation of Fosa and Lemurs, 2) Genetic Evaluation of Lemurs and Carnivores, 3) Behavioral Ecology of Carnivores, and 4) Capacity Building, including funding for student support and a workshop
- » In addition, in spring 2024, Dr. Freeman was awarded a Field Research for Conservation grant (\$9,954) for a project titled “Understanding and mitigating impacts of the invasive Asian toad on five micro-endemic frog species at Parc Ivoloina”.

2024 Center Budget Allocation

Since its inception, a majority of this Center’s budget has been dedicated to the MFG. The Saint Louis Zoo is the only diamond member of this organization. In recent years, we also support Mahaliana Labs. In addition to dues for MFG (\$10,000), funding in 2024 went toward:

- » Research and Restoration efforts, including funding for the salaries of Forest Agents, Research Assistants, equipment and field work expenses, and consumables for plant nurseries (\$26,000)
- » Research Coordinator, Data Base Manager and Executive Director partial salary and support (\$45,000)
- » Capacity Building, which includes in-country university support at the Master’s degree level, University support, Conservation Training Center running costs, local authority and villager training, library support costs, MFG team building and MFG staff training (\$15,700)

Cover photo: Diademed Sifaka, photo courtesy of Dr. Fidy Rasambainarivo