



# Annual Report 2015

*Advancing conservation  
in Madagascar:  
The little NGO that can...*



We would like to dedicate this report to our friend and colleague,  
Mr. RAKOTOMAMONJY Jean Jacques,  
Madagascar National Parks Director of Betampona Reserve, who left us to join the ancestors this past year.  
He is greatly missed by those who had the opportunity to work with him,  
and we will continue to carry on his commitment to community conservation and development.



*Chief Editor*





Maya Moore

*Graphic Designer*

Alain Rasolo

*Photographers*

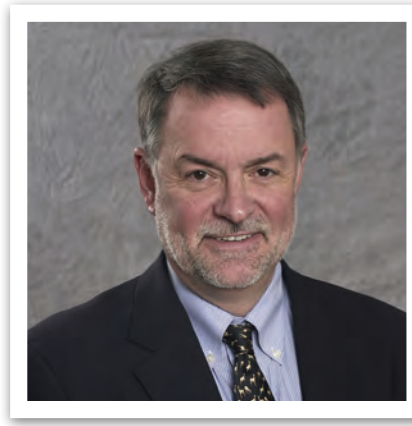
Maya Moore  
 Fidisoa Rasambainarivo  
 James Reardon  
 Tracy Dove  
 Irene Eggmann

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Conservation is a spectrum, a rainbow of actions and activities that extends from the protection of individuals to species, to the conservation of habitats, to the support for communities so they do not have to misuse/abuse their environments simply to survive. Madagascar Fauna and Flora Group (MFG) is a model of how successful conservation attempts fill needs across the spectrum, not just one focused area.

At the most focused end of the spectrum, black-and-white ruffed lemurs are an example. They are not only protected at the Betampona Natural Reserve, but have been genetically supplemented with reintroductions by the MFG. Protection is not limited to just animals, for tropical hardwoods, rosewood and ebony are also protected when Betampona guards are equipped and salaries paid by the MFG. In the same vein, endangered species are protected and bred at Parc Ivoloina which I believe is one of the premier native fauna zoos in the developing world.

As the scope of conservation expands, protection of the Betampona Natural Reserve, among the most biodiverse areas of Madagascar, not only lemurs, but a vast number of amphibians, small mammals, insects and plant species are still being identified and their habitat protected. Research on invasive species, both plant and animals is developing standards, e.g., effective and biosensitive ways to control invasive guava, for controlling this serious threat not only to Betampona, but also for parks across Madagascar and around the world.

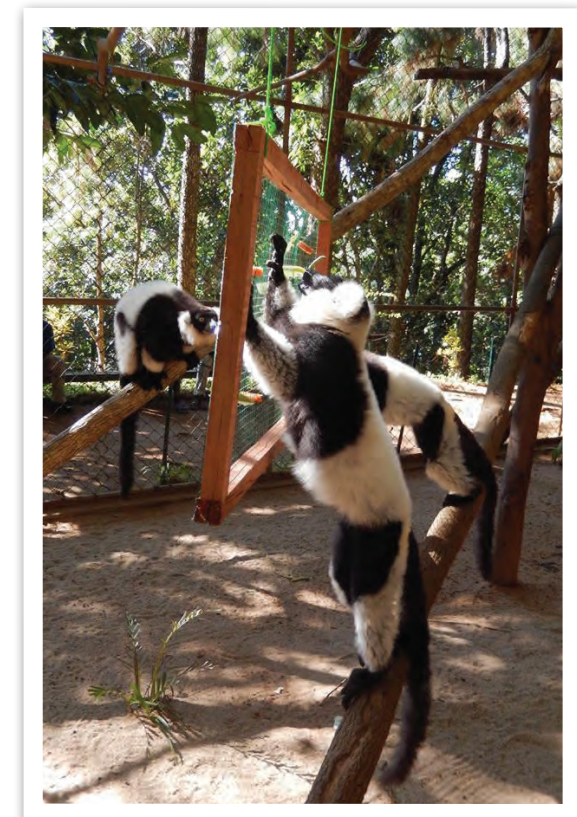


A handwritten signature in black ink, appearing to read 'Eric Miller', written in a cursive style.

R. Eric Miller, DVM  
MFG Chair

Finally, conservation in its broadest, and I believe most important sense, is the focus on people. MFG strives to work with community members to create a mutually beneficial program that supports both forest and community development. It should not only reflect our personal desire to preserve species and biodiversity, but also our desire to assist those living locally to share our passion while at the same time having a chance to live a life free of hunger. MFG's assistance with sustainable ecoagriculture, including getting their crops to more viable markets reduces hunger and enhances lives. MFG's "Saturday School" program assists children living around conservation areas to have a chance at better lives through education.

Indeed, conservation is a multi-faceted endeavor and MFG will continue to work to fulfill the spectrum of needs that fulfills conservation in its most holistic sense.



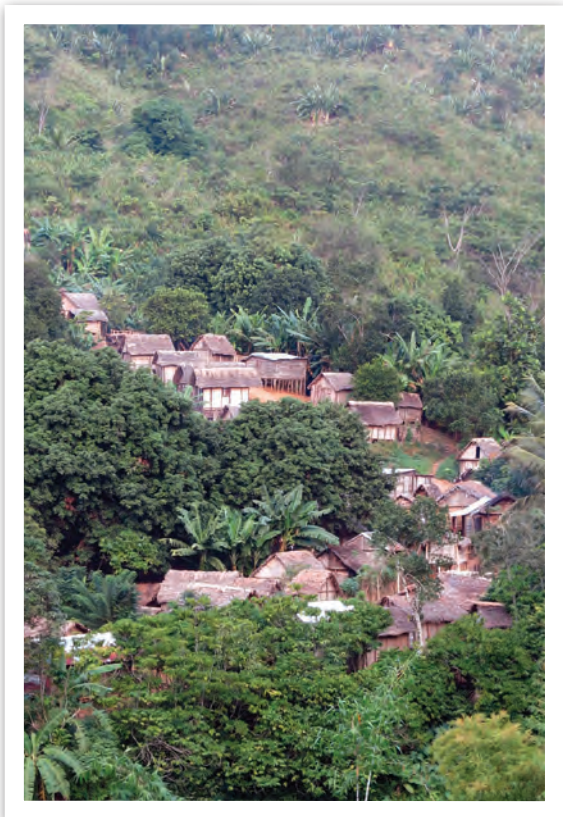
Each January, when the MFG managers gather together to present all that has been accomplished over the course of the past year, I am always astonished at all that has been done. As you read this report, I am sure that you will be amazed as well. For such a small organization operating on a shoestring budget, MFG truly is the little NGO that can...

This report is not only overflowing with programs, projects and activities undertaken by our energetic and committed MFG staff, but also highlights support received from staff coming from our member institutions across the globe. In 2015, we were pleased to welcome and have the opportunity to learn from veterinarians from Saint Louis (USA), education officers from Isle of Wight (UK), keepers from Duke Lemur Center (USA), and business managers from Wellington, New Zealand.

MFG is an organization that truly embodies the spirit of collaboration. Most of us are familiar with the expression, “It takes a village to raise a child.” In the case of MFG, it takes member institutions working together to advance conservation in Madagascar.  
*Misaotra betsaka atsika jiaby! eee!*



Maya Moore  
MFG Program Director



## Year in numbers

- New Managing Members: 1 (Perth Zoo)
- MFG staff visiting Duke Lemur Center and Lemur Conservation Foundation: 2
- Duke Lemur Center and Lemur Conservation Foundation staff visiting Ivoloina: 2
- MFG staff visiting Paris Zoo: 2
- Presentation on MFG's programs to San Diego Zoo primate keepers: 1
- Pairs of boots donated by Timberland Boot Company: 50
- Inflatable solar-powered lanterns donated by Luminaid: 500
- Trovan microchips donated by Lotus Technology: 50
- Microchip reader donated by Lotus Technology: 1
- Lemur notebooks printed: 50
- Likes on MFG Facebook Page: 2,573
- Likes on Parc Ivoloina Facebook Page: 762
- Followers on Twitter: 471
- Articles about MFG appearing in Tana Planete in 2015: 3
- Anti-chytrid boot washing stations constructed at Betampona: 2
- Chytrid surveys conducted at Parc Ivoloina: 2
- Gift shops renovated: 1

**New at the zoo:** a water pump and renovated quarantine enclosure thanks to Trio Foundation, a new office for the zoo keepers thanks to Holcim Cement Company.



New zoo signs are up! After a year of hard work investigating materials that will hold up in the harsh condition of Madagascar's east coast, drafting text and creating graphics, we are pleased to announce that the new signs have finally been installed at Ivoloina. Many thanks to our fabulous graphic design team, Jana Grabner and Alain Rasolo!



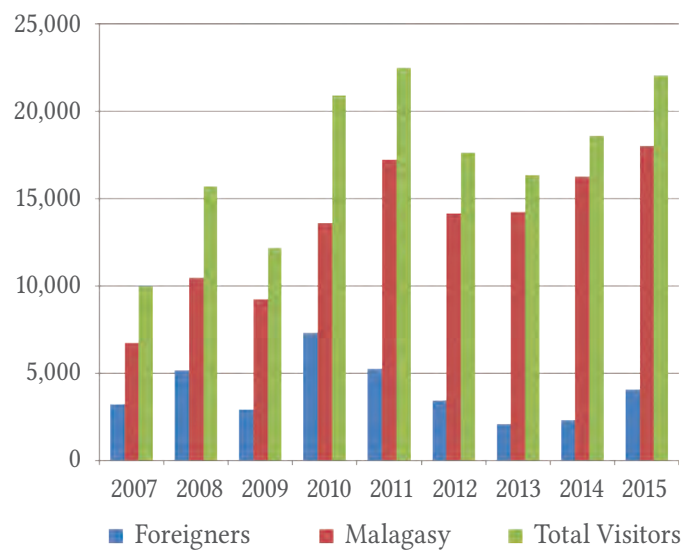


## Visitation

Each year, thousands of visitors from across Madagascar and around the world visit Parc Ivoloina, the 282 hectare site comprised of an endemic animal zoo, environmental education center, model agricultural station, and training center with laboratory facilities.

In 2015, 22,079 people visited the park, of which 7,808 were Malagasy school children as part of school field trips. This year, as in 2014, visitation continued to grow with the help of the Africa Mercy Ships hospital boat parked in Toamasina harbor. Nearly 200 Mercy Ships volunteers and staff visited the park in 2015.

### Parc Ivoloina visitation



7,721 people visited our Environmental Education Center.

There were 98 activities and 2,294 visitors at the Ivoloina Conservation Training Center, including 28 activities at the laboratory and 798 students participating in our lab trainings.

547 people visited the Model Agricultural Farm to learn about improved farming techniques.

MFG also hosts visiting researchers at our research station, Rendrirendry, at the gate of Betampona Natural Reserve. In 2015, 23 visitors and researchers stayed at Rendrirendry.



*"[Ivoloina] is a must see experience. Lots of lemurs, chameleons. Beautiful nature. The local guide is the best."*

Tripadvisor

*"Dedicated and engaged with the local community. Ivoloina is a great place to visit."*

Tripadvisor

## MFG MEMBERS MAP

A consortium of international zoos, aquariums, botanical gardens and universities, the MFG works to conserve Madagascar's rich biodiversity by pooling together resources. In this way, the MFG maximizes the contribution its individual members can make towards sustainable conservation strategies for the fauna and flora of eastern Madagascar.

### Managing Members

Duke Lemur Center  
Koln Zoo  
Lemur Conservation Foundation  
Missouri Botanical Garden  
Naples Zoo  
Perth Zoo  
Saint Louis Zoo  
San Antonio Zoo  
San Diego Zoo  
Taipei Zoo  
Zoo Zürich

### Sponsoring Members

Cleveland Metroparks Zoo  
Greenville Zoo  
Isle of Wight Zoo  
Zoo Leipzig  
San Francisco Zoo

### Contributing Members

Allwetterzoo Münster  
Akron Zoo  
Cango Wildlife Ranch  
Dickerson Park Zoo  
Indianapolis Zoo  
Jacksonville Zoo  
The Living Rainforest  
Seneca Park Zoo  
South Carolina Aquarium  
Ueno Zoo

### Friends of the MFG

Maryland Zoo  
Milwaukee Zoo  
Sacramento Zoo  
St Augustine Alligator Farm  
Wellington Zoo

If you would like to learn more in becoming a member, please contact MFG Chair Dr. Eric Miller at [REMiller@stlzoo.org](mailto:REMiller@stlzoo.org).



Missouri, United States

*In 2015 I was fortunate to visit Madagascar and work with the wonderful MFG team at Parc Ivoloina. With Bernard Iambana, head of Parc Ivoloina, and his keeper staff, we were able to place transponders in a few lemurs, re-stock and organize the veterinary clinic and perform health checks on animals that had recently arrived at the zoo. MFG strives to provide high quality care of the animals housed at Parc Ivoloina and I am honored that I have been able to provide veterinary support to these iconic island species.*

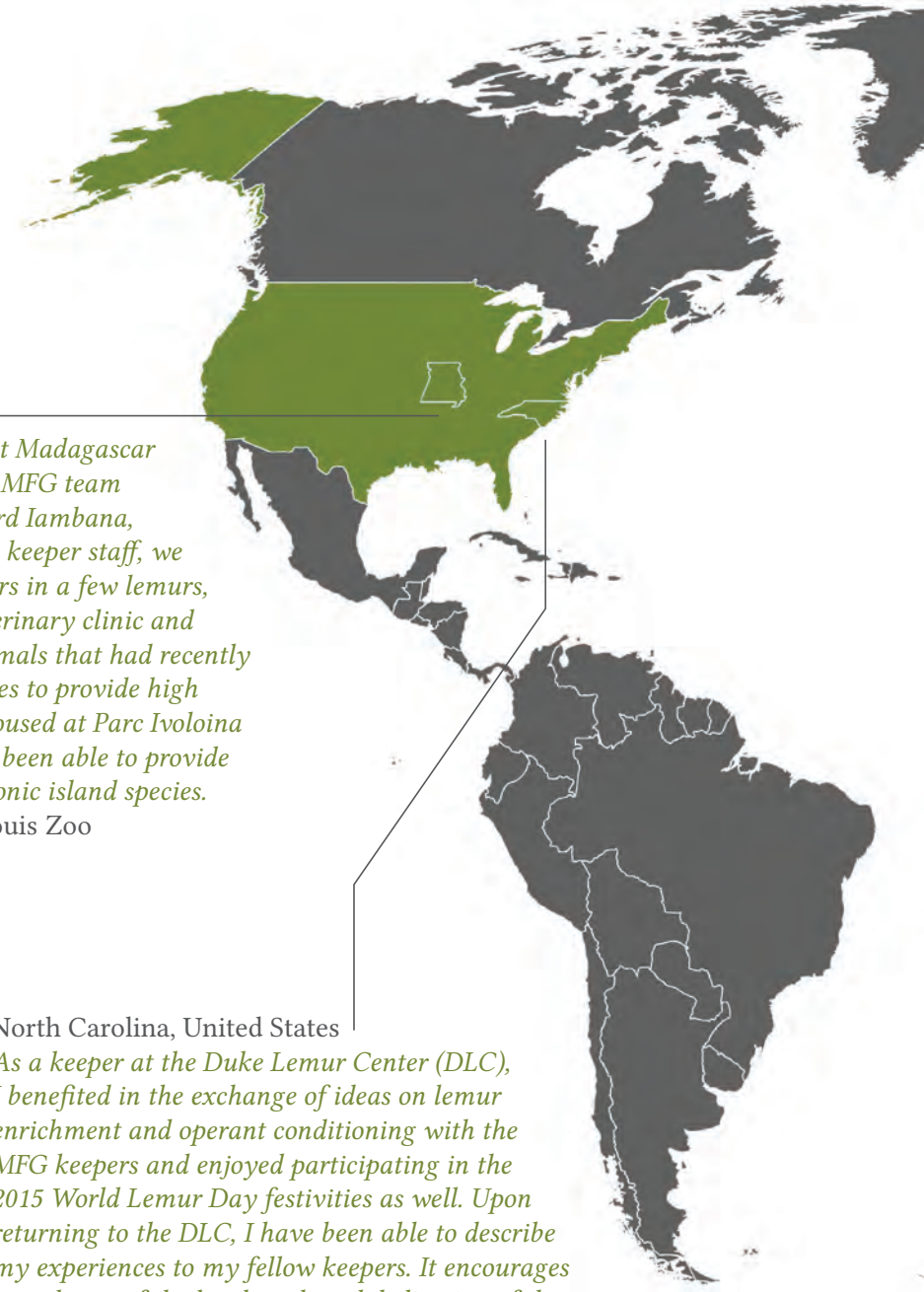
Dr. Sharon L. Deem, Saint Louis Zoo



North Carolina, United States

*As a keeper at the Duke Lemur Center (DLC), I benefited in the exchange of ideas on lemur enrichment and operant conditioning with the MFG keepers and enjoyed participating in the 2015 World Lemur Day festivities as well. Upon returning to the DLC, I have been able to describe my experiences to my fellow keepers. It encourages us to know of the hard work and dedication of the MFG staff and we hope that there can be future collaborations between the keeper staffs.*

Steve Coombs, Duke Lemur Center







England, United Kingdom

*During the three weeks that I spent developing evaluation techniques with the MFG environmental education team, I learned a great deal about the MFG's education programme and was really impressed by their skills and dedication.*

*The Isle of Wight Zoo is proud to be a sponsoring member of the MFG and to be a part of the vital conservation work that is carried out at Parc Ivoloina, Betampona Reserve and the surrounding regions. We are particularly pleased that in 2015, we were not only able to host the MFG annual meeting at the Isle of Wight Zoo, but could also provide practical support in the field.*

Tracy Dove, Isle of Wight Zoo



Wellington, New Zealand

*The Wellington Zoo Conservation Fund allows staff members to work in field conservation projects to lend their skills where they are most needed. I was the first Wellington Zoo staff member to travel to Madagascar and spent three weeks working with the MFG team facilitating the creation of a new strategic framework. A highlight of my trip was seeing (and hearing!) Black and White Ruffed lemurs in the wild, thanks to the impressive work that the MFG team accomplishes in the field. Wellington Zoo is proud to be a member of MFG.*

Daniel Warsaw, Wellington Zoo

■ Countries of origin of MFG members

## CONSERVATION ACTION: *to protect Malagasy biodiversity*



### *Main Programs*

- > Captive breeding of critically endangered lemur species
- > Native forest restoration
- > Population-Health-Environment
- > Invasive toads in Toamasina

### *Numbers*

**138** Lemur individuals

**12** Births from 4 lemur species

**8,357** Trees planted during Phase VI of Betampona Forest Restoration Program

**3,423** native trees planted at the Ivoloina Forestry Station

**378** women in the Betampona area received access to family planning methods



## Captive Breeding Lemur Conservation Program

An international collaboration to improve the genetics and age structure of captive populations of the critically endangered blue-eyed black lemur (*Eulemur flavifrons*) was developed in 2015 between the Government of Madagascar, AZA/SSP and EAZA/EEP. As the first step, MFG oversaw the transfers of a female from Lemuria Land (Nosy Be) and a male from Madagascar's national zoo, Parc Tsimbazaza (Antananarivo). These two unrelated individuals will become part of Parc Ivoloina's conservation breeding program.



## Endemic animal refuge center

The Ivoloina Zoo also serves as a refuge center for confiscated, injured or donated endemic animals.

In 2015, we received 19 donations including 14 lemurs (2 *Microcebus rufus*, 1 *Varecia variegata*, 3 *Cheirogaleus* sp., 3 *Eulemur fulvus*, and 5 *Haplemur griseus*) and 5 radiated tortoises. We also participated in the seizure of three *Varecia variegata* that were confiscated by local officials.

## Focus on Enrichment

This year, we focused on improving enrichment at the zoo. First we trialled various enrichment types and let the lemurs vote! Then we developed an easy-to-follow enrichment calendar for the keepers.



## Betampona Forest Restoration Project

Since 2007, nearly 70,000 native rainforest trees have been planted around Betampona Reserve as part of MFG's Betampona Forest Restoration Project.

This year, in addition to receiving a total of 624 kilos of corn and bean seeds, participants received conservation credits instead of cash prizes to reward their efforts in planting and caring for native trees. Through a series of focus groups, we learned that participants supported the change and helped us to identify items that would be of most interest and use to them. This new system allows MFG to better monitor its impact of the reforestation project on local communities.



In October, “conservation credit” distribution ceremonies for Phase VI of the project were held at each of the four tree nurseries around the reserve. Participants each received a rain poncho (with Betampona logo on the back) and a certificate with the amount of conservation credits that they earned. Participants then redeemed their credits for items listed in a catalogue.

The following items were ordered and delivered to participants as part of the conservation credit program:

• Kilos of nails	103
• Backpack with notebook, pens, pencil	156
• Hammers	11
• Bags of Cement	39
• Solar lanterns, lamps & torches	45
• Energy efficient cookstove from ADES	46
• Wheelbarrows	2
• Gallons of paint	3
• Water filters	5
• Solar ovens	2
• Solar powered radios	88
• Large solar lamps	14
• Large cooking pots	10
• Sewing machines	8
• Shovels	79
• Bicycles	5
• Chickens	121

## MFG's Population-Health- Environment (PHE) Program

PHE is an approach to development that recognizes the interconnectedness between people and their environment. A long proponent of a holistic approach to conservation, MFG joined the ranks of other conservation organizations operating in Madagascar looking at innovative ways to integrate environmental programs with health and family planning initiatives.

In 2015, MFG forged a partnership with the NGO Marie Stopes International (MSI) and three rounds of family planning clinics were held in three villages around Betampona Reserve. During the clinics, women have the choice of either implants which last up to three years, IUDs that last twelve years, or the more permanent option of ligature, all for free. This year, MSI conducted 96 IUDs, 230 implants and 52 ligature procedures.

MFG was able to participate in the East Africa Regional PHE Conference in Kenya and meet with many passionate colleagues already working on PHE projects in East Africa and Madagascar. We learned that many of MFG's programs already fit into the PHE model.

At the end of October, the first-ever “Health and Well-being Festival” was held in Fontsimavo, in conjunction with the third round of family planning clinics. Partner organizations including Madagascar National



Parks, St. Gabriel, and Population Services International set up informational booths and made speeches. Children gave dance performances and recited poetry about healthy habits and hand washing. Over 600 people came out to celebrate.



## *Invasive toads*

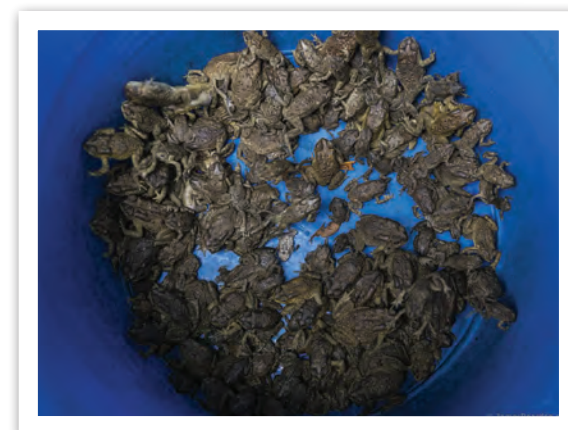
In August 2015, following the recommendations of the authors of the invasive toad (*Duttaphrynus melanostictus*) eradication feasibility study, MFG was nominated by the Malagasy government to take the lead in the project. Having been heavily involved since the toad was first confirmed present in Toamasina, first as coordinator of the distribution study and feasibility study, as well as ensuring regional, national and international communications, and serving as a major driver in fundraising, the decision to accept the nomination was a difficult one.

While incredibly honored, the MFG board acknowledged the additional workload that this new project would place on in-country staff.

Ultimately, as an organization which is highly concerned with the impact of invasive species on native fauna and flora, MFG decided to accept the project as we are best placed to take on this challenge with the necessary logistical skills and deep understanding of local community relations.

In addition to organizing National Committee meetings and a press conference for the official release of the feasibility study in early 2016, MFG took on the task of fundraising and organizing for an international eradication expert from New Zealand to travel to

Madagascar to launch a series of eradication method trials. The results of this study will add to our body of knowledge and hopefully can be used to stop the spread of other anuran invasions in the future. We will also be spearheading the public education campaign.



## CONSERVATION RESEARCH: *to improve knowledge*



### *Main Programs*

- > Species composition, diversity and distribution
- > In- depth ecological, behavioral and/or health studies of threatened species
- > Assessing the threat of invasive species in Betampona
- > Evaluating methods that address specific conservation problems

### *Numbers*

**7** Malagasy University students mentored

**23** Visitors to the Rendriendry Research Station

**3** New MFG publications



All of the research that MFG carries out or facilitates has potential practical conservation management applications. Indeed conservation practices may be best served when research and conservation action are inextricably intertwined such as when research data alerts managers to enact conservation actions, which are, in turn, evaluated. Research also lends itself to capacity building, especially in the instance of graduate students undertaking research questions identified by the MFG.

MFG's work in Betampona represents one of the few sites in Madagascar where long-term meteorological, phenological and amphibian/reptile transect datasets have been collected concurrently. The detection of significant population trends and changes reveal the enormous value of such longitudinal datasets

### *Species composition, diversity and distribution*

MFG's Betampona Conservation Agents are responsible for conducting long-term fauna transects and monitoring botanical plots including

- 1) the eighth year of surveying vertebrates on 3 transects in primary forest and 2 in secondary forest,
- 2) the seventh year of surveying reptile and amphibian species at two herpetologically rich sites in Betampona,
- 3) bimonthly "missions" to map the

distributions of all vertebrate fauna, rare flora and invasive plant species across the whole reserve and have been expanded to include small, isolated pockets of forest outside the Reserve limits.

- 4) daily collection of rainfall, temperature and humidity data from two meteorological stations,
- 5) monitoring 45 botanical plots of which 9 are located in areas of near-pristine forest (monitored annually for regeneration and tri-annually for individual tree growth), 15 in areas heavily affected by invasive guava (*Psidium cattleianum*), 12 in areas of high density invasive Molucca raspberry (*Rubus moluccanus*), 9 in areas with high densities Madagascar cardamom (*Aframomum angustifolium*) (all invasive plant plots are monitored and managed every 6 months),
- 6) monthly phenology monitoring of Betampona endemic plant species and key Varecia-feeding tree species.

Benja Lovanasolo of the Department of Vegetal Biology and Ecology, University of Antananarivo, study involved taking further voucher herbarium specimens in the Betampona permanent plant plots (permanent plant plots should ideally have a voucher specimen for each and every tree over 10 cm diameter at breast height for species identification and future reference).

Hajatiana Rabarison, Njaratiana Raharinoro and Dina Ramamonjisoa, of the Department of Animal Biology, University of Antananarivo,

came to Betampona to carry out inventories of the bats, micro-mammals and herpetofauna respectively, under the supervision of Dr. Steve Goodman. The team found 5 species of bat, 8 micromammal species, 41 amphibian taxa and 39 reptile species. An expert in the taxonomy of Madagascar's small mammals, Dr. Goodman was able to confirm the identity of several additional species.

Zach Farris, PhD, developed a survey method to obtain reliable population density estimates for all eleven of the reserve's lemur species. After training MFG agents on line-transect sampling techniques for primates, Zach and the team established five 2 km transects on existing trails in the southern and four 2 km transects in the northern portion of the reserve. For some lemur species, methodological adjustments will be needed to attain accurate population estimates. Once established, we will be able to systematically monitor Betampona's lemurs over time and inform and evaluate conservation strategies.



Mino Rasoaharinirina, DBEV, University of Antananarivo, focused on mapping two native yet seemingly problematic plant species: Madagascar traveler's palm (*Ravenala madagascariensis*) and umbrella fern (*Sticherus flagellaris*). Mino has studied the vegetation structure and composition in areas dominated by these two species in varying proportions and has mapped and calculated their extent within the Reserve.

Nicolas Dubos of the Paris Natural History Museum is analyzing the seven year dataset of amphibians and reptiles along with the relevant meteorological records. His preliminary analyses have revealed significant declines in multiple amphibian species at both sites. These results may be due to climatic changes in recent years, however, invasive plant and animal species may also play a role in the declines.

#### Carnivores

Camera traps have provided more than occupancy and species interaction data for Fidy. They have documented the presence of three additional carnivore species in Betampona. The presence of the wild cat *Felis sylvestris*, an introduced species, was discovered in 2014 and this year a second non-native carnivore, the Indian civet, *Viverricula indica*, was identified. The best surprise was seeing a falanouc, *Eupleres goudoti*, a rarely seen endemic species that is classified as endangered.

### *In-depth ecological, behavioral and/or health studies of threatened species*

Sarah Federman, PhD student, Yale University, received phenology data on important *Varecia variegata* food tree species collected by MFG agents through November 2015. Sarah had noted interesting fruiting patterns in two key tree species plants and wanted comparable data from a different year.

### *Assessing the threat of invasive species in Betampona*

Fidy Rasambainarivo continued his PhD research on disease transmission and patterns of interactions between endemic and exotic carnivores in Betampona. He established a reserve-wide grid of 30 camera trap stations, which resulted in a survey effort totaling 2,782 trap-days and 650 capture events. The top three species were dogs (240; 36.9%), fosa (130; 20%) and ring tailed mongoose (75; 11.5%). To identify the pathogens domestic carnivores may transmit to endemic species, Fidy collected biological samples from 43 village dogs and 7 village cats. Live traps in the reserve were used to capture and collect samples from the following endemic carnivores: 11 broad-striped mongoose, 8 ring-tailed mongoose, 5 fosa and 1 brown tailed mongoose; 3 dogs were also captured and sampled.



Emilie Ribault of Manchester Metropolitan University, UK, carried out her Master's research on the invasive black rat (*Rattus rattus*) in and around Betampona from September to November. Working in collaboration with Fidy Rasambainarivo, Emilie focused her research on parasite diversity and load and habitat occupancy of the black rat. Over a period of 43 days, six Sherman traps were placed in villages, degraded, secondary and primary forest habitats. Camera traps were used to assess the presence of endemic and invasive carnivores. A total of 63 black rats were captured in all but primary habitat types; occupancy was estimated at 72% among the sites and was not affected by the presence of carnivores. Fecal and blood analysis revealed 84.5% of the rats were infested with Strongilidae-like parasites.



## Investigating and evaluating methods to address specific conservation threats

Njara Razakaniana, DEA student based at DBEV, University of Antananarivo, completed his thesis write up on the best methods of control of the invasive *Molucca* raspberry (*Rubus moluccanus*) at Betampona. He concluded that uprooting and subsequent planting with native species is the most effective means of control.

Liantsoa Raharomanambina of the Department of Vegetal Biology and Ecology (DBEV), University of Antananarivo, carried out a field study from January to April comparing two methods of controlling the native but problematic Madagascar cardamom (*Aframomum angustifolium*), which acts like an invasive plant in some instances.

Robert Rasolofomanana, a Master's II student from ISSEDD, Toamasina University, carried out experiments at Parc Ivoloina to optimize conditions for effective propagation of two rosewood species (*Dalbergia maritima* and *D.chapellieri*) using the technique of air layering. The project has important ramifications for rosewood conservation as ripe seed is often hard to source and vegetative propagation may prove to be a far more reliable method of preserving critically endangered species that are currently only known from small numbers of remaining individuals.

Giovanni Rakotonarina, a DEA student from ISSEDD, Toamasina University, completed his project to assess the feasibility of establishing an orchid walk at Parc Ivoloina. Giovanni studied an example of an orchid walk established at Andasibe by Association Mitsinjo and compared conditions between Andasibe and Parc Ivoloina.

Alisha Farris, PhD, Human Nutrition, Virginia Tech, arrived in Betampona to initiate research on food insecurity, food beliefs, and nutritional status of women and young children living near the reserve. Mothers with children were asked to participate in a survey about the foods they eat and beliefs around nutrition. The team visited 10 villages and collected 138 questionnaires including anthropometric measurements. Additional data on seasonal diet diversity and food availability is being collected by volunteers and local students to enable MFG to better tailor our programs to community needs.

## 2015 MFG Publications

Birkinshaw, C.; Freeman, K.; Schatz, G. (2015) Ex-situ conservation of endangered Malagasy trees at Parc Ivoloina. *Journal of Botanic Gardens Conservation International* 12 (2)

Ghulam, A.; Ghulam, O.; Maimaitijiang, M.; Freeman, K.; Porton, I.; Maimaitiyiming, M. (2015). Remote sensing based spatial statistics to document tropical rainforest transition pathways. *Remote Sensing* 7(5), 6257-6279; doi:10.3390/rs70506257

Moore, M.; Fidy, J.F.S.N.; Edmonds, D. (2015). The new toad in town: Distribution of the Asian toad, *Duttaphrynus melanostictus*, in the Toamasina area of eastern Madagascar. *Tropical Conservation Science* Vol.8 (2): 440-45



## ENVIRONMENTAL EDUCATION: *to raise awareness*



### *Main Programs*

- > Saturday School
- > Environmental education workshops
- > Youth leadership camps
- > Teacher trainings
- > Outreach and public education

### *Numbers*

**350** Saturday School students

**54** local girls attended Science and Leadership Camps

**39** Participants in teacher trainings

**35** Participants from 18 organizations attended Environmental Education Workshop

**77** runners in 2nd Rainforest Run (up from 19 runners in first year)



## *Saturday School*

MFG has been engaged in providing environmental education programs for school children since 1990. In collaboration with local teachers, MFG produced “A Practical Guide for the Teacher: the Application of Environmental Education in Primary School Instruction” in 2001 which was widely distributed to schools in the area. The first program at Ivoloïna focused on providing visitors and school groups with educational tours of the zoo, and over the past 26 years the programs have continued to expand in number, target audiences, objectives and form. Environmental education programs for youth include the Saturday School program for primary school children, week-long environmental camps for secondary school age children, a “Girls Science and Leadership Camp”, teacher training workshops, events, newsletters and a radio program.

The Saturday School supplemental classes (in French, mathematics and the environment) are organized for children in their last year of primary school in the Ivoloïna and Betampona areas. These classes help to prepare students for the national CEPE exams which must be passed in order to advance into secondary school as well as infuse environmental education into the traditional school curriculum.

During the 2014-2015 school year, MFG ran 30 sessions reaching 350 pupils from 25 different primary schools from five school districts. The CEPE success rate increased to 90% from 88% in 2014. Further confirmation that the program continues to improve. The drop-out rate decreased from last year’s rate of 12% to 9%. This is likely due to the reintroduction of the school lunch program.

Five nature field trips were also held at Parc Ivoloïna as part of the Saturday School Program. During these visits 326 students, nine teachers and three school district supervisors were able to explore the park and open their minds to new ideas and experiences.

At the start of the 2015-2016 school year, we introduced a number of changes to the Saturday School Program. We discontinued the site in Toamasina, as we felt that it was outside of our zone of intervention and not reaching our target beneficiaries. We also divided the Ivoloïna Saturday School class into three groups, rather than having 110 children in one classroom. These groups rotate through their lessons taught by three different teachers.



## Environmental Education Workshops

Without a doubt, it was an exciting year for environmental education in Madagascar!

As part of a series of workshops examining environmental education programs in Madagascar, the MFG held a two-day workshop with various stakeholders, including a Saturday School teacher, a member of a parents' association, the mayor of Ambodiriana, a local superintendent of schools, the regional UNICEF representative, and relevant MFG staff, to take a closer look at our own education program.

The most fruitful aspect of the workshop was conducting a SWOT (Strengths-Weaknesses-Opportunities-Threats) analysis of each of the components of the MFG environmental



education program: Saturday School, Saturday School teacher trainings, Green Ambassador camp program, Green Ambassador teacher/mentor trainings, organized park visits by local school groups, outreach events such as World Environment Day and World Lemur Day, and outreach tools such as the Bitsik'Ivoloina Malagasy-language newsletter and the MFG weekly radio program.

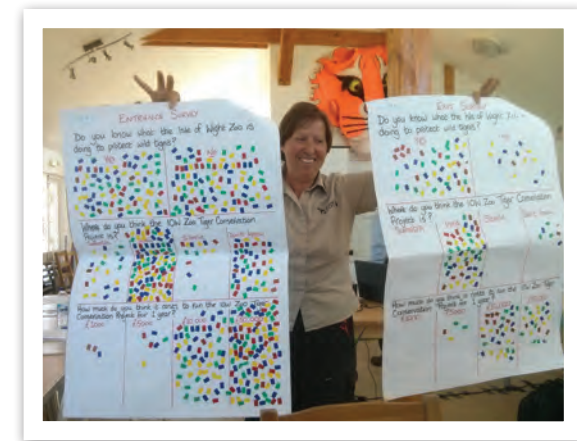
Our findings were then shared during the two-day environmental education workshop held immediately following MFG's Annual Meeting at the Isle of Wight Zoo, UK. We were extremely fortunate to have Tracy Dove, Lesley Dickie and Dave Naish, Head of Education from Bristol Zoo (and chair of the BIAZA Education committee), who not only facilitated the workshop and kept discussions flowing, but offered an incredible amount of experience and insight.

Finally, in October, MFG organized a workshop in conjunction with Professor Jonah Ratsimbazafy and sponsored by the McCrae Fund, to bring together other organizations throughout Madagascar who are working on environmental education with the goal of exchanging resources, experiences, and "best practices". 35 participants from 18 different organizations spent three days at Ivoloina's Conservation Training Center.

## Monitoring and Evaluation Toolkit

Evaluations of MFG's education programs have, for the most part, been limited the number of children attending programs, Saturday School children national exam pass rates, environmental knowledge pre- and post- exams and number of teachers trained per year.

Driven by a desire to develop a better monitoring and evaluation system for these programs, the education team spent one week with Tracy Dove, education officer from the Isle of Wight Zoo. Each environmental education program was reviewed and different forms of monitoring and evaluation were discussed. A toolbox of techniques was created so that the team will have many ways to gather information and measure success.





## Youth Camps

### Green Ambassadors

MFG holds two week-long environmental education camps targeting middle and high schools around Betampona and Ivoloïna. The objective of this activity is to instil a sense of responsibility for the environment and foster the development of “Green Ambassadors” in their schools, homes and communities.

For each session, 15 girls and 15 boys were invited to spend a week learning about environmentally sustainable practices and developing projects to later complete at their respective schools. Students also gain experience working in the science lab and building fuel efficient stoves.

### Girls Science and Leadership Camps

MFG continues to work with young women in order to foster an appreciation for science and encourage them to continue their education. During this past year, two camps were held with a total of 52 girls attending. The camps aim to introduce students to new scientific experiences and encourage girls to become leaders in their communities.

A career panel of local women was added so that participants can hear success stories and ask questions about challenges the women faced in reaching their goals.



## Outreach and public education

### World Environment Day

During this year’s event, MFG held its second annual Rainforest Run to help bridge the gap between Toamasina and Parc Ivoloïna. This year the race attracted 77 runners! The rest of the activities at Parc Ivoloïna included a soccer tournament, question competitions for kids, and free guided visits to the zoo. Since Zumba is all the rage in Madagascar and across the world, MFG decided to add a new World Environment Day activity this year. “Zoo-mba” was a huge hit with visitors from surrounding villages.

### World Lemur Festival 2015

In honor of the second annual World Lemur Festival, MFG held two festivals. The event in Toamasina helped to raise awareness about MFG and the work it does with lemurs. This was the first festival of it’s kind to be held in the city and included a lemur photo exposition, a parade of local school groups, and a showing of the film “Island of Lemurs”. Over 1,000 people attended World Lemur Day at Parc Ivoloïna. Activities included lemur-related arts and crafts, quizzes, and lemur calling contests. There were also free guided visits to the zoo for local officials and other visitors. A drawing contest with the theme “The Future of Lemurs is in our Hands” was held. The festival concluded with a free concert featuring three Malagasy musicians.

## CAPACITY BUILDING: *to strengthen local ability for sustainable development*



### *Main Programs*

- > Support and training of partners
- > Laboratory activities
- > Model Agricultural Station and Eco-agriculture training Program
- > Staff capacity building

### *Numbers*

2 ISSEDD students mentored

28.18 m<sup>3</sup> amount of raw compost produced this year

2060.5 kg of fruit produced

7444 vegetable plants planted

3.61 Tons/ Hectare of rice yielded at the Model Farm



## Support and training of partners

MFG's capacity building program encompasses many activities focusing on promoting adult knowledge and skills, as well as providing support to local university students. This year, we oversaw and organized numerous trainings at our own training center, as well as facilitated exchange visits to surrounding areas of Madagascar and abroad.

### Support to Ministry of Environment, Ecology, Ocean and Forests (MEEMF)

Last year, MFG held the first ever workshop to improve captive animal care across all institutions in Madagascar. This initiative continued in 2015 when Mr. Eric Robsomanitransarana of the MEEMF, the official responsible for all fauna in captivity in Madagascar, travelled to the United States with Bernard, Head of Ivoloina Zoo, and Maya Moore, MFG Program Director. First stop was Duke Lemur Center in Durham, NC where

they learned about their successful lemur breeding and exchange programs. They then traveled to Sarasota, Florida to attend the Prosimian Taxon Advisory Group's (PTAG) annual meeting hosted by MFG member institution Lemur Conservation Foundation. This was a great way for Eric to get to know the many AZA lemur-holding institutions and forge important relationships. His first visit was so successful that he was invited back to attend the 2016 PTAG meeting in Omaha.

### Conservation Medicine Training for Malagasy Veterinary Students

For the second year in a row, Dr. Fidisoa Rasambainarivo held a training for Malagasy veterinary students interested in learning more about wildlife health and conservation medicine. Six themes were discussed during the training including health and conservation medicine, especially reptiles and mammals.

During the training, the presentations were made in the mornings and hands on practicums were held at the zoo every afternoon (e.g. physical examinations of lemurs and tortoises, and various techniques in medicine and field research).

### Chicken-raising training for Betampona Restoration Project Participants

39 participants in the forest restoration project around Betampona attended a two-day chicken raising workshop held at the Ivoloina Conservation Training Center (ICTC). Topics included improved techniques in food, hygiene, housing, health and vaccinations. The training also aimed to allow participants to choose the type of chicken that they would prefer to raise. Following the training, participants chose to use improved methods to rear the local variety because they recognized the inputs necessary to raise laying hens.



### Support to Malagasy University Students

The Institute for the Environment and Sustainable Development (ISSEDD) at the University of Toamasina, works to train future Malagasy environmentalists and researchers and MFG continues our ongoing support to ISSEDD as part of our Capacity Building Program.

In 2015, many students and teachers took advantage of our lab facilities at the ICTC and conservation library located at the MFG office in Toamasina. In addition, the 2nd Annual ISSEDD “Green Day” at the Ivoloina Forestry Station was a huge success, with students planting and caring for over 1,000 native trees that had been grown in our tree nurseries.



### Sustainable agriculture trainings for local population

To promote the nutritional and economic development needs of the local population, our Capacity Building Program Manager held informational meetings on MFG’s sustainable agricultural activities in the five fokontany surrounding Ivoloina. Participants were then invited to sign up for a vegetable growing training if they were interested. Of the 17 farmers that attended the July 2015 training, 11 of the 17 were still practicing the techniques after two follow-up visits. In general, their focus was directed on the local market, and that is why they chose to grow leafy greens and African eggplant.



### Improving Rice Production: Collaboration with Association Analambo and the Ivoloina Rice-growers Association

In Madagascar, it is impossible to talk about conservation and development without considering rice production. Thus, as part of MFG’s ongoing efforts to promote the System of Rice Intensification (SRI), two field trips were organized for members of Association Analambo and the Ivoloina Rice-growers’ Association, respectively. First, they travelled north to the vast rice-producing plain of Iazafo in Vavatenina. Then they stopped in to talk with the Rice Seed Producers’ Group located in Ampasina Maningory, Fenerive East. Finally, participants were able to observe the progress made at the SRI demonstration site in Foulepointe.







## Staff Learning and Exchanges

After visiting the U.S., Bernard also had the opportunity to spend two weeks at Durrell Wildlife Conservation Trust's Jersey Zoo learning more about amphibian and lemur husbandry. The first week, he worked with the lemur keepers to observe their feeding system, hygiene, capture system, different enrichment techniques, mixed exhibits, and daily record keeping. He remarked at how many volunteers are relied upon on a daily basis to keep things running smoothly.



The second week, Bernard learned more about important biosecurity measures needed when keeping amphibians in captivity. He also increased his knowledge on breeding live insects for food, different procedures for quarantine, managing water quality, and providing nutritional support for amphibians.



Thanks to ongoing support from Durrell, MFG continued to work closely with Association Mitsinjo to further develop the amphibian center at Ivoloïna in 2015. Mitsinjo staff made numerous visits to the center and made very helpful recommendations on ways to improve biosecurity, install terrariums and drainage systems, as well as to establish a new terrarium in the Environmental Education Center as part of our effort to raise public awareness on amphibian conservation.

### Kianjavato exchange visit

Four members of the MFG staff had the opportunity to travel to Kianjavato near Ranomafana in the southeast of Madagascar, to learn more about the work of two local NGOs, Madagascar Biodiversity Partnership (MBP) and Conservation Fusion. MBP has been successfully working with local communities to reforest the area using a conservation credit scheme. Conservation Fusion works with schools to make learning about the environment fun and creative. The creation of a teachers association has been an integral part of Conservation Fusion's success. In addition to learning about these excellent programs, MFG was able to share our own projects and knowledge on planting and nursery techniques. This helped reinforce the idea to the team that collaboration is an important part of conservation.





## Team Building and Strategic Planning

MFG cares about the health and wellbeing of our staff, and this year we continued to show our appreciation by providing travel and learning exchange opportunities (Kianjavato, USA, France & UK) and organizing the annual Teambuilding.

For the second year in a row, the Team-building was held off-site to give the staff a chance to experience new projects and better reflect on our own work. This time, we travelled by boat along the Pangalanes Canal to the village of Andranokoditra to visit a community-run ecotourism project, the tree

nurseries at Vohibola forest and free-ranging lemurs at the Palmarium Private Reserve.

At the end of 2015, thanks to the support of Daniel Warsaw from Wellington Zoo, we also hosted staff workshops to identify key values that represent MFG and defining moments in MFG's 27 year history. This allowed us to then draft a strategic plan and vision document that will help guide MFG moving forward. We hope this draft will be a point of discussion at the 2016 MFG Annual Meeting at Taipei Zoo in Taiwan.

## Looking ahead to 2016

If 2015 was the year of environmental education, 2016 is the year of the toad. Of course, we will continue focusing on improving environmental education at the national level with another workshop to be held in the capital, likely in June of 2016.

In terms of the invasive toad, funds were raised to bring Dr. James Reardon from the Dept. of Conservation, New Zealand, to Madagascar to design and launch a series of eradication trials to be carried out by Malagasy university students in conjunction with MFG, Association Mitsinjo, and the local population. MFG will also launch a public education campaign in collaboration with Association Vahatra and Island Conservation.

A new project entitled "Ex-situ conservation of threatened plants from the Ivoloina valley" in collaboration with Missouri Botanical Garden and Kew Royal Botanical Gardens will be launched, which aims to train young Malagasy botanists to prevent extinctions through ex-situ conservation of at least 500 species of flowering plants.

A number of international and Malagasy researchers are expected to conduct research in Betampona in 2016. Roderic Mahasoia will focus on studying the *Mantella laevis* population. Zach Farris will return to continue a multi-year lemur survey, and Fidy Rasambainarivo will continue his research on carnivores.



MFG generated \$24,597 in Parc Ivoloïna entrance fees in 2015 (up from \$16,470 in 2014).

This more than \$8,000 increase in revenue can in large part be attributed to an augmentation in visitation by both nationals and foreigners, as well as the slight increase in ticket prices which went into effect at the beginning of the year.

Sales in our renovated gift shop also more than doubled in 2015.

### Acknowledgments

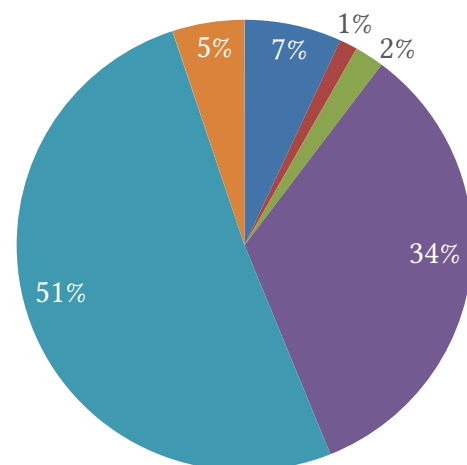
In addition to the on-going support that we receive from our members, MFG receives funding and in-kind support from our many friends across the globe.

We would like extend our sincere gratitude to the following organizations, companies and individuals for their:

- Financial support: Durrell Wildlife Conservation Trust, Guhl Foundation, McCrae Conservation Fund, Planet Foundation, Trio Foundation, the WildCare Institute at Saint Louis Zoo, Jacksonville Zoo for funding the E. flavifrons transfers, Duke Lemur Center and Disney for supporting Bernard and Eric's travel to the U.S., and darlene Benzon.
- In-kind support: Holcim Cement Company, Timberland Boots, Locus Technologies, LuminAid, Busch Gardens, Duke Lemur Center and Disney.

We would also like to thank everyone that financially supported our 2015 World Lemur Day: Bamboo Basics, Centre Lambahoany, Omaha AAZK Chapter, Lemur Conservation Foundation and Penelope Bodry-Sanders, Lemur Conservation Network and Lynne Venart, and Blair Drummond Safari Park for donating funds that they raised during their World Lemur Day celebration.

### Incoming Resources



- Parc Ivoloïna Admissions
- Boutique Sales
- Other Revenue
- Membership Dues
- Grants
- Donations

## FINANCIAL SUMMARY

### Revenue

Parc Ivoloïna admissions	24,597
Boutiques Sales	4,557
Other Revenue	7,387
<b>Madagascar Operating Revenue</b>	<b>\$ 36,541</b>
Membership dues	119,795
Grants	182,001
Donations	18,270
<b>Membership Dues, Grants and Donations</b>	<b>\$ 320,066</b>
<b>Total revenue</b>	<b>\$ 356,606</b>

### Expenditure

Program Services	149,982
Cost of Goods Sold	2,194
Personnel Costs	176,090
<b>Operating expenditure</b>	<b>\$ 328,266</b>
<b>Total expenditure</b>	<b>\$ 328,266</b>
<b>Net surplus/deficit for the year</b>	<b>\$ 28,340</b>

### Summary balance at 31 December 2015

Total comprehensive revenue	\$ 28,340
<b>Current assets</b>	
Cash and cash equivalents	418,101
Inventories	1,771
<b>Total current assets</b>	<b>\$ 448,212</b>



**Madagascar Fauna and  
Flora Group**

BP: 442 Morafeno,  
Toamasina (501)  
Madagascar

Tel: (+261) 20 53 308 42  
MFG c/o Saint Louis Zoo  
1 Government Drive  
St. Louis MO 63110 USA  
[www.madagascarfaunaflora.org](http://www.madagascarfaunaflora.org)

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