

**Ranomafana (07.01.2011 to 09.30.2011)**

**Year:**

2011

**Quarter:**

July - September

**Communications activities:**

Presentation on Ranomafana TEAM activities was held with a group of students from the program “Stony Brook Study Abroad” on September 28, 2011 at Centre ValBio.

**Unusual Events at the TEAM Site:**

The presence of illegal gold mining within the park destroyed about 60 hectares of the protected area of Ranomafana rainforest and had affected some parts of the TEAM site. Some parts of the area were also stroked by a lightning.

From camera trap pictures, unusual animal behaviors were noted. The large carnivore species, the Fossa (*Cryptoprocta ferox*) was seen playing for a long time, distracted by the camera and tried to bite on the camera lock cable, especially at Array 3 and 1 (site Bevoahazo (CT-03-01 and 04) and site Ranomena (CT-01-01)). The shy endemic bird species, Madagascar Crested-Ibis, *Lophotibis cristata*, was caught by the camera by having a mutual grooming (CT-3-05). The old bush pig, *Potamochoerus larvatus*, was seen with enormous tusks at both Array 1 and 3 (CT-01-10 and CT-03-16). A picture of the “fanaloka”, *Fossa fossana*, yawning was caught at Andemaka (CT-03-12).

**New Species:**

NONE

**Protocol Activities:**

The second phase of monitoring for the Ranomafana TEAM site started in August 2011 using two teams in the field (one for vegetation and another for terrestrial vertebrates) in addition to a team based at Centre ValBio coordinating activities, entering and annotating data and conducting climate maintenance and monthly data collection. Three vegetation plots (Plot 3, Plot 5, and Plot 6) and thirty (30) camera trap points (within ) Site Andemaka, Bevoahazo, and Ranomena) have been completed within this reporting phase in addition to continuous data collection for the TEAM climate station.

Since the teams remained consistent from the first year, the second year involved reinforcement of the protocol training in the TEAM manuals, especially the vegetation and terrestrial vertebrates and particularly any changes or technical issues that were brought up from the TEAM Tanzania Network Meetings or updated protocols distributed to the network. Calibration of field equipment and materials consisted mostly on GPS device, compass, and cameras. For year 2011, prior to monitoring we decided with the advice of the D.C. office and particularly due to time limitations since monitoring were again starting later in the year than anticipated, to separate out one team specifically for terrestrial vertebrates and another specifically for vegetation monitoring. In addition, we added two members to the vegetation team (from the first year of set-up) to expedite this sampling protocol. We have the vegetation and the camera trap teams working separately within two different sites. Climate station has been set up and functioning since the end of May. Climate data collection and maintenance has been scheduled bi-monthly during the 1<sup>st</sup> and 15<sup>th</sup> of every month for the maintenance; and the data collection for monthly during the 15<sup>th</sup> of every month.

Period August – September 2011

Vegetation

Expedition Period	Vegetation Plot Number	Site Name
September 09 – 25, 2011	3	ANDRANOFADY

August 28 - September 10, 2011	5	MAHARIRA
September 14 - 27, 2011	6	MANGEVO

### Terrestrial Vertebrates

Expedition Period	Field Activity	Array/Site number	Site Name (Camera trapping)	Array
August 09 – 17, 2011	Deployment	3 / 1	ANDEMAKA	half of Array 3
September 09 - 16	Pick up	3 / 1	ANDEMAKA	half of Array 3
August 18 – 26	Deployment	3 / 2	BEVOAHAZO	half of Array 3
September 17 - 26	Pick up	3 / 2	BEVOAHAZO	half of Array 3
August 27 – September 04	Deployment	1 / 4	RANOMENA	half of Array 1
September 27 – October 05	Pick up	1 / 4	RANOMENA	half of Array 1

### Climate

Schedule/Month	July	August	September
Maintenance	01/07/2011 and 15/07/2011	01/08/2011 and 15/08/2011	01/09/2011 and 15/09/2011
Data Collection	15/07/2011	15/08/2011	15/09/2011

### Vegetation

Field data from re-census and field observations of the vegetation of Plot 3 (Andranofady, August 09<sup>th</sup> to 25<sup>th</sup>), Plot 5 (Maharira, August 28<sup>th</sup> to September 10<sup>th</sup>) and Plot 6 (Mangevo, September 14<sup>th</sup> to 27<sup>th</sup>) have already been obtained during this reporting period. Before the vegetation tree monitoring, the vegetation crew had conducted some plot prospecting and state verification, checking of the pre-set delimitating marks, such as plot corner sticks, strings and ropes delimitating the plots and subplots, flagging marks, etc. Any missing markings detected from Year 1 of monitoring had to be replaced. Then, specific roles were assigned for the vegetation crew members to be responsible for stem measuring, individual tree field observation, and collection of field data and voucher specimens. In addition, pre-census measurement error estimations were taken prior to starting data collection at plot 3 (Andranofady), the first monitored vegetation plot of this year. One hundred trees were measured and re-measured (DBH) until the technician's error of measurement corresponds to the TEAM standard scales. This is critical to ensure minimal measurement error between team members following TEAM technical guidelines. In addition to the DBH, data collection always takes into account the tree condition codes and the emplacement of POM on the measured

trees. The location of the POM, designated at 1.3m from the ground level, was also verified and corrected, especially in the case of problem trees (for example, uprooted, damaged, inclined, dead, etc.). A team from the Missouri Botanical Garden (MBG), led by MBG Technical Director Dr. Chris Birkinshaw and Patrice Antilahimena, came to Ranomafana National Park from September 26<sup>th</sup> to 29<sup>th</sup>, to give training on collection and preservation technique for field voucher specimens. Collected plant voucher specimens targeted fertile plant parts when possible and were processed and preserved, using 50% alcohol before they could be dried (using a drier) for future reference. An ad-hoc plant drier was made at Centre ValBio and has been used to facilitate the drying process. Plant collecting and preparing materials, such as plant press and accessories were brought to Ranomafana/Madagascar with the help from ICTE Stony Brook. Photographs of the voucher specimens were also taken whenever possible. Some ecological parameters, such as tree phenology, morphology, geographical position of each tree from which collected specimens were taken were also recorded (referred to as Supplemental Field Notes as per MBG's suggestion). In addition, one student from the Botany Department of the University of Antananarivo had worked with the vegetation data coalition and comparison between plots and years as a pilot study for potential extension into work in this area for a Ph.D. thesis.

Preliminary analysis of the density and taxonomic data has already started. Plot 3 (Andranofady) represents the highest density per hectare (1404 ind/ha), followed by Plot 5 (Maharira) (1292 ind/ha) than Plot 6 (Mangevo) (1087 ind/ha). Due to changes in nomenclature and ongoing revisions at certain taxonomic levels (e.g., the family level), the following results remain preliminary and further confirmation of taxonomic classification for those unable to be identified, as well as those in which nomenclature has been revised will be confirmed through the assistance of online resources (Tropicos), herbarium resources (Tsimbazaza) and others with expertise on Malagasy botany (e.g., MBG). Similar to our results from last year, Mangevo (Plot 6) contains the highest diversity among the three plots samples thus far. From the identified stems, Plot 6 (Mangevo) has 96 species within 74 genera and 40 families, Plot 3 (Andranofady) has 84 species within 63 genera and 39 families; and Plot 5 (Maharira) includes 64 species, 53 genera and 36 families. There are still several unknown tree individuals, at the family level, there are 11 unknown individuals at Plot 3 (Andranofady); 18 individuals at Plot 5 (Maharira); and 5 individuals at Plot 6 (Mangevo). Diversity of stems in Plot 3 (Andranofady) are represented predominantly by the families of Rubiaceae and Lauraceae (5 species each), followed by the families of Clusiaceae and Sapotaceae (4 species); Plot 5 (Maharira) has a high diversity in Families of Lauraceae (5 species and 4 genera), Clusiaceae (6 species and 4 genera), and Rubiaceae (4 genera and 4 species). Stems in Plot 6 (Mangevo) are also mostly predominated by the families of Rubiaceae (9 genera and 9 species); Lauraceae (5 genera, 9 species), Sapindaceae (5 genera, 6 species), and Clusiaceae, Apocynaceae, and Sapotaceae (4 genera and 4 to 6 species). The unknown individual trees will be subject to further identification. Preliminary results show that there are some similarities among the three plots. Some families are found in all of the three plots (Plots 3, 5, and 6), while others are restricted to only one plot. All 3 plots share the following 17 families: Lauraceae, Rubiaceae, Clusiaceae, Sapindaceae, Euphorbiaceae, Moraceae, Sapotaceae, Araliaceae, Stilbaceae, Anacardiaceae, Areaceae, Elaeocarpaceae, Malvaceae, Monimiaceae, Myrtaceae, Pandanaceae, and the family Annonaceae. The less common families across plots (detected in only one of the three plots) include: for Plot 6 (Mangevo) representatives of the families of Bignoniaceae (1 individual), Rhamnaceae (1 individual), and Sarcolaenaceae (1 individual); for Plot 3 (Andranofady) exclusively included the family of Proteaceae (1 individual); and Plot 5 (Maharira) exclusively included the family of Lamiaceae (with 1 individual). These families are restricted to only few areas within the park. Data from last year still hold that the Madagascar endemic family of 'Sarcolaenaceae' occurs only within plot 6 (Mangevo).

Voucher specimens from Plots 3, 5 and 6 represented about 71.43% (N=76), 77.77% (N=63), and 69.44% (N=65) respectively of the total number of genera within each plot. During the field expedition, not all individual tagged TEAM stems were sampled but only about 5% of the total number of plot stems was collected. Another field expedition will be needed (at least) to further collect voucher specimens from all genera present within each plot. Also, collection at other times of the year will assist in getting fertile parts of each plant sample since it was not possible to get all of the necessary parts even for some of the voucher specimens already collected.

### Terrestrial Vertebrates

During the monitoring phase, the TEAM terrestrial vertebrate crew was re-trained and tested in camera trap point deployment and pick up, and on calibration of the cameras. Cameras were calibrated to follow the TEAM standard protocols, with reinforcement of setting different camera trap parameters, such as the correct time and date, camera resolution and function mode, and each of the camera trap point locations. This training was reinforced after complications with this portion of deployment in Year 1 of monitoring and TV team members were tested several times to ensure that camera parameters were correctly set up. Field expeditions were planned to go to the different camera trap points within the three arrays of Ranomafana National Park. The suitability of the camera trap points (locations) was first checked before making any other decision on their placement. Any type of disturbance found within the point area and changes in camera emplacement had to be reported, for example in case of missing of the original tree support. Two expeditions of thirty (30) camera trap deployment and pick up have been planned within this phase of the second year of monitoring (2011). The first 30 camera deployment started with the northern part of the rainforest (Array 3 and half of Array 1) to cover 1.5 Arrays. The team went back to the same camera trap

points from the 2010 monitoring phase to install cameras at the same support at a rate of 1-2 per day. Then, pick up began after 30 full days of deployment after exposing an informational white board with the point identification number, end date and time, and a complete name of the responsible field crew. Before turning off the cameras, memory cards and batteries were taken out. From August to October 2011, deployment and pick up of 30 cameras had been accomplished within the 1.5 Array of Ranomafana TEAM site (Array 3 (Andemaka and Bevoahazo), and half of Array 1 (Ranomema)).

Once back from the field, camera trap pictures have been in process to be downloaded into the deskTEAM and annotated.

A total number of photos of 6,758 photos were obtained from the three different camera trap deployment expeditions of Array 3 (Andemaka and Bevoahazo) and half of Array 1 (Ranomema) thus far. All photos have been in the process of being transferred and annotated within deskTEAM. Among the 1.5 Arrays (30 points) deployed thus far, a mean of 1,919 pictures were triggered across the camera traps. Half of Array 1 (Bevoahazo) represents the highest total number of taken pictures (2,926) followed by half of Array 3 (Ranomema). Preliminary analysis of the data shows that out of all the three CT point clusters thus far, half of Array 1 (Ranomema) showed the most signs of disturbance by human intrusion. Note that this portion of Array 1 (Ranomema area) is the most disturbed by both natural induced disturbance (lightening) as well as anthropogenic intrusion due to the presence of the gold miners within that part of Ranomafana National Park. Post-field expedition annotation of the photographs will be continued, and CT taken pictures will be exported from deskTEAM and sent back to the D.C. office as soon as possible. All the collected photos thus far haven't been fully annotated. However, from reports from the field expeditions we expect that analysis of photos collected this year will differ from last year and those differences are likely to exist among the different camera trap point locations, sites and arrays. Preliminary surveys of the photos from Andemaka showed the presence of lemur species that were not captured last year (e.g., *Propithecus edwardsi* going down on the ground) and the rare species of Fanalouc, *Eupleres goudoti* (carnivorous mammals). Array 3 (Site 2 – Bevoahazo) and Array 1 (Site 4 –Ranomema) captured some rare endemic bird species, such as the squally ground roller (*Brachypteracias squamiger*) and the Crested Ibis (*Lophotibis cristata*). Similar to last year, there appears to be more domestic species (e.g., dogs) in areas with the most human presence; although we expect this to be significantly more frequent overall this year due to increased human presence in particular areas of the park. The presence of zebu in the forest was detected in all Arrays sampled thus far, especially for the lower portion of Array 3 (Site 2- Bevoahazo). Within the 1.5 Arrays sampled thus far, there were signs of human disturbance, but Array 1 (Ranomema) displayed the most significant difference from last year. From the 1.5 Arrays sampled thus far, Array 1, situated in the middle part of the park has been subject to an intense influx of gold mining. One camera trap point (CT-01-16) couldn't be deployed because the area was totally destroyed and the presence of miners posed security issues for our team members. We have sent the information on that point to the TEAM headquarters in Washington, and they will determine the change of location for the additional CT point during the next monitoring phase.

## Climate

The climate station was installed between the TEAM Arrays 2 and 3 on the CVB campus following approval from the D.C. office and running in full since the end of May 2011 with the first full month of data collection started on June 1, 2011. Upon returning from the Tanzania TEAM network meetings, an additional solar panel was purchased following Jorge's recommendation for the our site's climate station. All data and photographs were submitted and approved prior to the commencement of Year 2 of monitoring. Logistic personnel continue to reinforce skills in terms of establishment parameters, maintenance, data collection and upload. Regular maintenance has been scheduled bi-weekly (1<sup>st</sup> and 15<sup>th</sup> of every month) and data retrieval in monthly intervals (15<sup>th</sup> of every month). The maintenance of different components includes clearing the core area, checking the fence as well as the base tower, radiation shield, temperature and RH sensors, data logger, automated precipitation gauge and power sources. Power maintenance includes checking the voltage output from the solar panels and the battery to the main data logger. Climate data has to be retrieved once a month. In addition, the manual precipitation gauge is monitored daily at approximately 6am to have a continual log of precipitation to reference the readings from the automated precipitation gauge.

Climate data have been continuously collected automatically at five-second intervals through the data logger. Replacing the compact flash card and data uploading are scheduled on the 15<sup>th</sup> of every month (once a month). To date, all climate equipment, including the base tower, data logger/memory, sensors, powers (battery and solar panels) are in good condition and working perfectly. Occasionally, there have been slight fluctuations in voltage output of both the solar panels and battery to the main interface, however this has only been a difference of 1 volt (e.g., 13 instead of 12 volts) and always stabilizes to 12 volts by the next inspection. There are 23 climatic parameters that are being continuously recorded. There has been some concern with solar radiation measures during night; however these have been reported to the D.C. office and are likely due to moon phases and cloud cover with very low levels registering occasionally at different times of the night. We are continuing to monitor these closely for any abnormal readings. In addition, we have contacted the national METEO weather service personnel to register the TEAM climate station. We expect the registration to be complete after a site visit.

From June 1<sup>st</sup> to September 30<sup>th</sup>, the average monthly temperature was 16.07 °C (minimum of 8.41 °C to a maximum of 25.44 °C on

average), the average relative humidity was 85.60% (minimum 31.33% to maximum 96.91% on average), and average precipitation was 0.015 mm (minimum 0 mm to maximum 1.65 mm on average). There were no large rainfall events or substantial variation during the four months of data collection thus far (June – September). The month of July showed the lowest rainfall while August data indicated the highest. Data on the air temperature showed a slight fluctuation over the four-months of collection. The relative humidity demonstrated a small trend towards decreasing humidity.

#### **Protocol Problems:**

Since the first year, illegal gold mining activity surrounding and within the park became a big issue for Ranomafana National Park. A vast area was destroyed with holes and tree cuts. The camera trap point area for CT-01-16 was totally destroyed and couldn't be used for the camera trap deployment. About 600 meters around the point was destroyed and some trees were cut down. Report has already been sent to CI Washington, waiting for a new coordinate point, and will be moved to another area for the next monitoring phase. Prospecting activity was also conducted with Madagascar national parks and gendarmes to locate and measure the damages caused by the mining activity.

Security inside the forest also became a problem for the TEAM crew to work without worries since more than 50 people could be found especially in the mid-part of the TEAM site, launching for gold mining. So, collaboration with the local security guards had to be established to assist the team in the TEAM sites and to ensure that the protocols could be executed safely and completely. More effort plans had also been implemented with the participation of all the local stakeholders involved in park management.

#### **Schedule Problems:**

Following the problem of human encroachment, especially near the gold mining activity, some of the TEAM plot-delimitating strings were missing and sticks/tree tag were also stolen from the plot/sub-plots. The vegetation team had to spend more time in fixing the problem by replacing those missing strings and sticks/tags.

Because of the period of expedition, which was outside of the reproductive season of the trees in the plot, the fertile plant parts of collected specimens could not be obtained during the field expedition.

#### **Logistical Problems:**

Having enough porters to carry expedition materials and equipments to the forest was sometimes a problem. Because of the high traffic in the gold mining activities, porters were not always available. Even though some arrangements were already set up with porters few days in advance, not all of them were present at the picking up point most of the times. They also discussed and refused by asking for a raise in the porting price. The same request was also asked by the local guides. Sometimes we ended up postponing the transporting of some of the field materials or the expedition departure day.

#### **Suggestions:**

MBG contribution in the project should be reinforced. It helps building the capacity of the Ranomafana TEAM crew in updating the theoretical, field, and laboratory techniques and methods. Taxonomic identification of some unknown species could also be done in-site or initiated before bringing them to the laboratory. To complete the field plant taxonomy, additional field planning for fertile voucher specimen collection would be very helpful in getting the reproductive plant parts for identification.

Salary and price rates of local guides and porters need to be discussed and revised because there was a lot of discussion and retreat from the people about the rate of their services. Also, to assure the safety of the team in the forest during the expedition, hiring of security agents should always be considered or adding more people at the camp site (as cook assistant), especially within the illegal mining zone in the northern part of Ranomafana National Park.